Project acronym **Project Number:** **Project full title**	**AAL 2011-4-094** **SafeMove** **Safe mobility of elderly in the vicinity of their home and on journeys**
Dissemination level	PU
Contractual date of delivery	31/12/2013
Actual Date of Delivery	17/01/2014
Deliverable Number	D4.4
Deliverable Name	Draft Business plan, Report on Market Survey and Expectations
Type	R
Work package(s)	WP4
Status & version	SafeMove D4.4, V2.6
Number of pages	125
WP contributing to the deliverable	All partners
WP / Task responsible	T4.2
Other Contributors	Megatel, Neusta, Volkshilfe, ELS, Netural, ELKS,
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Document History			
Ver.	**Date**	**Changes**	**Author**
V1.0	10.4.2013	Skeleton	Brigitte Fass
V2.0	22.5.2013	Document structure	Brigitte Fass
V2.1	24.7.2013	Document improvement	Peter Knackfuß
V2.2	12. 9.2013	Exploitation strategy	Peter Knackfuß
V2.3	31.10.2013	Restructuring Document	Brigitte Fass/ Peter Knackfuß
V2.4	12.12.2013	Inserting exploitation strategy of partners	Brigitte Fass
V2.5	17.12.2013	Document improvement	Brigitte Fass
V2.6	14.02.2014	Document improvement	Zvika Popper/ Brigitte Fass
V2.7	17.02.2014	Final version and proofreading	Peter Knackfuß
V2.8	29.02.2014	Formatting	Brigitte Fass

Content

List of Abbreviations

Abbreviation	Stand for…
ALT	Assisted Living Technology
B2B	Business to Business
B2C	Business to Consumer
BP	Business Plan
CAGR	Compound Annual Growth Rate
COGS	Expected Costs of Goods Sold
GDP	Gross domestic product
GP	General Practitioner
HCP	Home-Care program
IPRs	Intellectual Property Rights
M&A	Merger & Acquisition
NCF	Net Cash Flow
NPV	Net Present Value
PBT	Pay Back Time
PDA	Personal Digital Assistance
PPI	Public Procurement of Innovative solutions
R&D	Research and development
RCT	Randomized Controlled Trial
RMT	Remote Monitoring and Treatment
ROI	Return of Invest
SCS	Shared Care Scheme
WP	Work-Package

1 Executive summary

Aim of the deliverable

The aim of this deliverable is to give an overview about the market of ambient assisted tools and an exploitation strategy for the result of the SafeMove project as a whole and exploitation strategies for the individual results of the partners.

Brief description of the sections of the document

Chapter 2 introduces the used methodology.

In Chapter 3 the SafeMove packages and the market research is explained.

The next chapter deals with the Ambient Assisted Technology market and the role of the insurance companies.

Chapter 5 explains the exploitation strategy of the project results and contains a first draft of the partner's business plan and exploitation strategy.

In chapter 6 we have laid down our conclusion.

Chapter 7 contains the annex.

Mayor achievements

The SafeMove components have been defined from a business point of view. A preliminary research related to the market of the SafeMove products has been performed based on an extended market survey. First agreement on the Business concepts, both for the SafeMove result as a whole and from the perspective of individual partners IPR has been reached.

Summary of the conclusions obtained

This initial version of the deliverable is based on an extended market survey and the related market analysis for the SafeMove components. Results of the discussion on common and individual business strategies within the Consortium have been documented. The deliverable is well suited to derive more detailed exploitation agreements and business plans.

2 Methodology

2.1 Introduction

This chapter describes the methodology used to disseminate and exploit the results of the SafeMove project.

1. Scenario definition: starting from the assumption that, as SafeMove is a modular, multi-purpose system, the SafeMove components could lead to several different functions of use, thus to different fields of application, we will introduce a framework summarizing the guidelines for detecting market opportunities. The adoption of this framework will lead to the detection of different scenarios where it is possible to apply SafeMove. Each of the scenarios will be described in terms of target market and key-functionalities.

2. Market research: a competitive analysis will be performed in order to compare market offering and SafeMove solutions.

3. Demand estimation: once defined the scenarios, we will describe how to get a demand forecasting. We will start from prevalence data to set different demand scenarios (an optimistic, a neutral and a pessimistic scenario) for feeding the business planning activities.

4. Cost modelling: starting from future demand estimations, we will introduce the system of hypothesis adopted for estimating costs.

5. Revenue modelling: the different scenarios will involve the healthcare systems, physicians, general practitioners, specialists and patients/users in different ways, so that different revenue models will be hypothesized, also in the glance of field studies aimed at understanding the target markets' willingness to buy/willingness to spend. Integrating demand data with revenue modelling will give us the possibility, in the business planning phase, to estimate future revenues in the different scenarios. Furthermore, the combination of revenues and cost data will provide grounding for defining the financial plan for the different scenarios.

6. Scenario benefits: considering the scientific literature we will describe and - whenever possible - estimate the benefits that may result from the adoption of the SafeMove solution in the different scenarios.

2.2 Scenario definition

In order to understand the possible fields of application for SafeMove it is salient to fix the key features enabled by SafeMove.

SafeMove is a **Support and Motivation System** for elderly persons with mild dementia**.** SafeMove aims to encourage self-confidence in their own abilities by providing home-based

physical and cognitive training as well as location-based aids during outdoor life activities. IT training devices will be developed to enhance the fitness of the elderly in an interactive and pleasurable way. From the new training methods, persons with light dementia are supported to find their way outside their home, in public traffic or at social events. They will get help to remember daily life tasks like dressing themselves according to the weather conditions or to take the keys with them when leaving the house.

Caregivers will have the opportunity to supervise the health related behaviour, e.g. the drinking behaviour, of their clients remotely and could support them in keeping them healthy and mobile.

The overall SafeMove system is composed of three main components:

1. SafeMove Assist
    a. Access to social networks for elderly persons
    b. Assistance by family/friends
    c. Assistance by care service provider
2. SafeMove at Home
    a. Therapeutically activation of elderly persons, e.g. training for outdoor actions, training of confidence in own capability, cognitive and physical fitness training;
    b. Contact to social networks e.g. special social networks for activities of elderly people;
    c. Access to SafeMove Assist e.g. help during outdoor actions, medical aid;
3. Safemove on Tour: This component supports the elderly performing activities outside his home. Main functions are:
    a. Reminder functions when starting the activities, e.g. dressed with appropriate clothing, all necessary items collected, light switched off;
    b. Reminder to perform activities, e.g. take medication, leave for theatre;
    c. Navigating to activity locations, e.g. super market, medical doctors, theatre;
    d. Support to enter public transport, e.g. lead to stops, identify correct side of the street, remind steps;

One of the biggest challenges of the coming years is to find solutions for the demographical change, more precise how to cope with the raising number of elderly persons who will need support in their daily lives. The percentage of elderly persons is growing all over the world and with it the raising cost for health care and decreasing jobholders the current health and care systems need to adapt to this new situation.

Web2.0 and internet are giving good possibilities to introduce new products to face the challenge, because it opens new ways to solve the health system's dilemma. SafeMove is one of

those tools. The purpose is to enable the elderly with minor dementia to stay at home self-determined as long as possible with the user friendliness of SafeMove interface.

SafeMove is able both to monitor the condition of the elderly person using SafeMove Assist in combination with SafeMove at Home and to support the person in his outdoor activities by using SafeMove Assist and SafeMove on Tour. In this way the elderly person can be supported in his normal social environment.

- In the first scenario the elderly person with light dementia is supported by SafeMove to practice his cognitive and physical condition by pleasurable therapeutic games at home on his computer. This part allows the elderly to activate his physical and cognitive fitness by using special developed games. He/she can plan for social activities as the relevant information are implemented on the computer at home. The computer at home is also connected to the care centre and is the platform for different kinds the serious games to gain back or keep physical and/or cognitive fitness. The suitable game is sorted out by the care giver. The aim is to inspire confidence in the user's ability.

- The second scenario is SafeMove on Tour: This portable navigation unit enables the planning of outdoor activities and a safe navigation to the defined destination. It is also connected to the care centre to enable support if the user loses the orientation or needs medical help. The aim is to inspire confidence in the user's outdoor actions.

- The third scenario is SafeMove Assist: This unit is the connecting device between the parts described before. The care centre is connected to their clients via computer and can assess the physical fitness of his elderly client and can support him in searching for suitable social outdoor activities. Incoming emergency calls are answered and help is offered whether medical help or help during an outdoor excursion. The aim is to handle several clients in a short time.

- SafeMove Tutorial: is part of the units mentioned above

SafeMove at Home and SafeMove on Tour can be used independently from each other, if clients of home care providers are involved they need additional connection to SafeMove Assist.

To find possible fields of application a brainstorming with SafeMove project partners will be performed. Results will be the SafeMove main features necessary in the different application fields.

To identify the key-benefits from a user perspective, different groups (patients, healthy people, physicians and marketing scholars & consultants) will be interviewed. This methodological step enables not only the identification of the customer needs related to system functionalities, but allows naming of intangible benefits as well. Understanding what the perceived

advantages will be for the customer and discovering the mental associations with the product is a well suited way to understand possible product extensions and to seek new markets and new applications.

European health care systems build on health insurances in most countries. In other countries health care is free. To involve the national health and home care system when introducing Assisted Living Technology - ALT solutions for elderlies to national markets needs for detailed understanding of the role of related insurances and public authorities thus enabling acceptance of ALT solutions as reimbursable services.

The main area of application of SafeMove will be will be the Assisted Living Technology - ALT market as shown in the figure below:
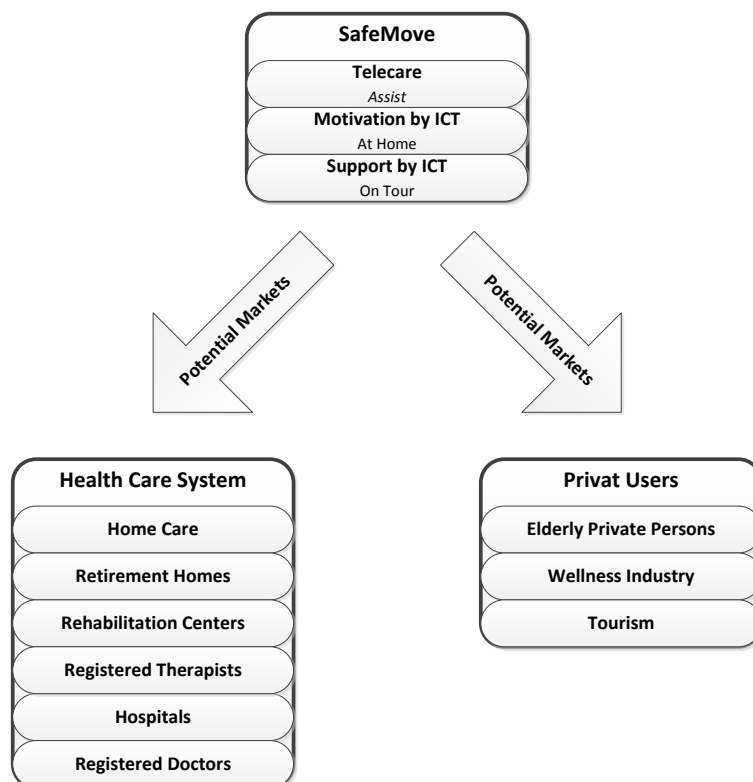
Figure 1: Potential SafeMove Markets

The initial intention of SafeMove is to enter the home care market for telecare products. The exploitation plan will however investigate the potential of similar telecare markets as shown above as well.

2.3 Market research

The SafeMove system has been considered in detail in order to identify the existing product and/or service that may represent potential competitors. The starting point of the analysis has been the "unbundling" of the platform and the identification of possible "packages" to be used as reference during the competitive analysis. The "unbundling" consists in the process

of resolving a product into its components. It allows identifying the system modules/functionalities that – for exploitation purposes – may be combined offering "different solutions".

The aim of the market research was to identify the products and the companies producing telecare devices and providing services that can be compared to SafeMove in order to identify the potential competitors and their business models. For the market research three aspects were identified. One research of available and in-development technologies was conducted on the outdoor navigation solutions for healthy adults and elderly with physical, cognitive, visual or auditory impairments.

Another research of available and in-development technologies was conducted on the indoor daily activities solutions for healthy seniors and elderly with physical, cognitive, visual or auditory impairments.

The third research was done on social media sites that focus on elderly population and neglected sites for the general population that may attract elders as well.

2.4 Demand estimation

Once the scenario and the target user are defined, we will forecast the demand. This will be done by:

1. Macro-demand analysis: this phase is aimed at qualifying and quantifying the market. This means, for each scenario, to define the composition and to estimate the size of:
    a. Potential market: users who profess a particular level of interest in the specific market offer (defined by the scenario) and have an adequate income level or the availability to access the offer.
    b. Available market: users who are able to use/buy and effectively express their intention to buy.
    c. Served market: users who are the target of the SafeMove marketing actions and communication, i.e. markets reached by the result of SafeMove exploitation
    d. Penetrated market: users who are actually going to implement SafeMove
2. Micro demand analysis: in-depth analysis of the benefits to seek the buying behaviour and the consumption patterns in the different scenarios to identify a possible business model for SafeMove in each of them.

The fundamental questions are:

1. Who is really going to use SafeMove in the different scenarios?
2. Who is really going to pay for SafeMove in the different scenarios?
3. How is it possible to meet market needs through an unbundling and re-bundling of SafeMove?

2.5 Cost modelling

The value proposition suggests the key benefits to provide the market with. The cost modelling is aimed at identifying:

1. The components/modules to be provided in the bundle suited for the scenario. In this perspective, during the micro-demand analysis ad-hoc studies aimed at identifying which of the modules/components were considered the most attractive by the stakeholders will be performed.
2. The costs associated to the production of the suited components/modules under the demand hypothesis developed in demand estimation phase.

By combining the information, an estimation of the manufacturing costs will be performed.

2.6 Revenue modelling

Revenue modelling depends on two key variables:

1. Demand, forecasted in the demand modelling phase and refined in the glance of the outcomes of the value proposition and of the business model
2. Pricing policies, i.e. definition of the ways through which the services provided by SafeMove are paid. Actually, three main types of revenues are identifiable (and they may exist or not in the different scenario in the glance of the value proposition and of the business model):
   a. Revenues from the sale of SafeMove system: the user or the customer becomes the owner of SafeMove, and pays for such an ownership
   b. Revenues from the provision of telecare services: the customer pays for the service of SafeMove
   c. Revenues from consultancy: the customer pays the SafeMove manufacturers for providing consultancy

The definition of the level of revenues depends on the outcome of a scenario-specific analysis of the willingness to buy and to pay by the different stakeholders. By putting together demand and pricing information, an estimation of the future revenues is obtained.

The integration of the outcomes of the revenue modelling and cost modelling phases (in some cases refined with data derived from the financial flows analysis) will lead to the definition of:

- Payback time
- Expected operating profit
- Expected cost of goods sold – COGS
- Expected turnover

These indicators will, in turn, suggest important insights in detecting the actual appeal of the different scenarios.

2.7 Benefits evaluation

Benefits for each scenario are estimated using a two-tier approach:

1. Literature analysis: it is useful to identify and compare similar experiences with respect to the actors involved, and the goals and benefit pursued. We focus on:
    a. Outcomes of telecare experiences, e.g. quality of life, healthcare costs and so on.
    b. Estimation of the utilization of resources and the associated costs, e.g. human resources (nurses, professionals), healthcare resources (laboratory, exams).
2. Benefit estimation: the aim is to translate theoretical benefit into the real SafeMove scenarios. Using – if available – the data reported in the scientific literature, we estimate the potential savings for each relevant outcome.

3   SafeMove Packaging and Market Research

In this chapter we describe the activities carried out in order to study the potential SafeMove market.

First, we "unbundled" the SafeMove system and isolated several different "packages"; this enables us to identify potential competitors, in terms of existing products and/or services.

Second, we analyse the telecare market.

Least, we select a group of competitors in order to analyse their competitive positions.

3.1   The SafeMove telecare product components

An overview of the SafeMove architecture is reported in the SafeMove deliverable D2.1 SAFEMOVE Operational Infrastructure Specification Document (a, b)

In this paragraph, the system is unbundled in order to identify the (group of) modules that might represent a scalable offer for the markets. The "unbundling" consists in the process of resolving a product into its components. It allows identifying the system modules/functionalities that – for exploitation purposes – may be combined offering "different solutions". Apart the system functionality SafeMove systems need a host to provide an interface to the internet. Considering the SafeMove architecture these "packages" have been identified:

Table 1: SafeMove packages

SafeMove Component	Description
SafeMove at Home	Physical and cognitive training will help persons with light dementia to increase their health and to stay independently at home a longer time. Gamification will keep the person active in exercising.
SafeMove Assist	This part is helping the care givers or family members to support the elderly with light dementia in their daily life. With special programmes these persons are included in the social life of the community. Caregivers can supervise their clients in a remote way.
SafeMove on Tour	Outdoor navigation helps the elderly person with light dementia to orient himself in his environment. If the person has the feeling of being lost, he can get help by this device, also in case of an emergency outside their home. For outdoor activities the calendar and reminder function will be a relevant support tool.
SafeMove Help System	Online tutorial explaining and detailing the functions of the system in a fashion that is easy to use and to comprehend.

3.2 Preliminary market survey

A preliminary market research was done reviewing public materials, written in English, made available prior December, 2012. In addition, we screened the media in order to determine if the available technologies are indeed suitable for the purpose of our deliverable. We excluded market surveys conducted prior 2010. Our aim was to identify a broad range of products and services that could potentially be **of use for the SafeMove development** to identify possible features of the SafeMove products **or be compared to the SafeMove ideas** in order to identify the different market segments where SafeMove might be introduced. Therefore we used key words like: social networks over 50s, internet, social media for elderly, indoor navigation, healthcare gaming, elderly gaming, outdoor navigation, mobile positioning, GPS systems….

In particular, we identified and analysed solutions suitable to elderly persons with slight dementia.

In the Annex (see chapter 7), a detailed description and analysis of the most remarkable products and services is reported. In particular, gathered results are presented following three macro-categories:

- Navigation
- Home telecare and monitoring
- Social media for elderly people

In each of these sections, first a summary of available technology was carried out, and then a short description of the available products was done. The preliminary market analysis allowed us to identify several solutions available on the telecare market. Nevertheless, in order to have a complete view, further steps were necessary and they are described in the following paragraphs.

3.3 Potential competitor's analysis

For the competitor analysis we haven't investigated the research programme FP7 of the Commission, because the time to market being too long. But we have investigated the AAL programme projects which are working in a similar field as SafeMove.

The table below mentions the projects that are conform to Safemove in at least two points to identify potential competitors in a first way.

Table 2: Potential competitors

Item / Short name	Description	Company / Funding Body	Care pro-vider link	Motiva-tional training	Social Network	Outdoor navigation	Appoint-ments / Reminder
AGNES	Successful Aging in a Net-worked Society	AAL	√	√	√		
Happy Aging	A Home based APProch to the Years of AGING	AAL		√		√	√
ROSETTA	Technology development pro-ject	AAL	√	√			√
V2ME	Virtual Coach Reaches Out to ME	AAL		√	√		
ASSAM	Assistants for Safe Mobility	AAL	√			√	
ASSISTANT	Aiding SuStainable Independ-ent Senior TrAvellers to Navi-gate in Towns	AAL				√	√
COM'ON	Confident Motion	AAL	√			√	
COFIDENCE	Mobility Safeguarding Assis-tance Service with Community Functionality for People with dementia	AAL	√			√	
EMOSION	Elderly friendly mobility service for Indoor and Outdoor scenar-ios	AAL	√			√	
MOB MOTIVATOR	Mobility Motivator	AAL	√	√		√	
MOBILE.OLD	Residential & outdoor services advancing the mobility of older persons	AAL	√	√		√	

Item Short name	Description	Company / Funding Body	Care provider link	Motivational training	Social Network	Outdoor navigation	Appointments / Reminder
2PCS	Personal Protecting & Caring System	AAL	√			√	
ALFA	active living for Alzheimer-patients	AAL	√	√			
ENTRANCE	Innovative platform for trip planning, indoor/outdoor navigation and Internet service use	AAL		√		√	
INCLUSION SOCIETY	The connected system for assisted living	AAL	√	√	√		
Mobile Sage	Situated Adaptive Guidance for the Mobile Elderly	AAL	√			√	
EDLAH	Enhanced Daily Living and Health	AAL	√	√			√

3.4 Conclusion

There is a need to improve the situation of elderly persons in our society to enable them living at their home as long as even possible to assure them a good quality of life and also to reduce the costs for caring for them. For this target group a lot of different help systems are on the market, or on their way to market, as our research has shown (Table 2). We also found out that the importance of social networks is growing, especially those that specifically carter to the needs of elderly persons and those suffering from slight dementia. Our research has shown that the SafeMove project has a unique place in the field of such assistance systems, as it combines five different functions into one package. This is an advantage not to be taken lightly, considering that the target demographic, by definition, needs an easy to handle device enabling a multitude of different functionalities within the same general interface structure. We therefore consider the value proposition of SafeMove to be very attractive to potential customers. It is, due to its combination of automated help functions, for example the guidance system SafeMove On Tour, and those enabling contact with caretakers and healthcare professionals, i.e. SafeMove Assist, useful for a wide variety of customer / patient types.

4   The Ambient Assisted Technology – ALT market

Our understanding is that the ALT market is useful for persons with light physical or psychological impairment as well as for persons with light dementia. Because of the demographic challenge all over the world it would become necessary to increase the AAL support as far as possible to assist the diverse care systems and to assure the target groups a longer healthy and independent live at their own homes.

4.1   Market for SafeMove telecare scenarios

The explosion of the aging population in Europe is a challenge for the European society. Together with aging there is also an increase of life expectancy including mental and physical health problems. Because of this demographic shift in Europe technological innovation is needed to improve the living conditions of the older and physical impaired population. Services have financial pressure: on one hand they need to reduce the cost but on the other hand they need to keep or to increase the quality of care. Also the traditional family system is broken. Children are moving away from their parents because of job commitments. The living situation of families has changed. Today's families are small units living in small houses and often they are not able to take over the care of a family member because of lack of space or time. Most of the tradition is overcome that women take care of impaired family members as they are nowadays earning money, too. Even in each European country the demographic shift might be different, it will call for actions to face the future.

For the market analysis of the ALT market we are referring to figures of the EU funded report "Assisted Living technology, a market and technology review"[1].

Up to 2015 75 million people are expected with an age of above 65 living in Europe. 2009 the market for ALT in Europe was valued at $154.7 million and estimated to be at $525.7 million in 2015. Germany, UK and Scandinavia are expected to be the driver countries in the ALT market as in these countries the expectance of the ALT is high. A part of this niche market is the telecare market.

One definition of telecare is "the use of information and communication and sensor technologies to provide social care and support to people to help them live independently away from the hospitals with settings consistent with their needs."[1]

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[1] Report available at: Assisted Living Technology, A market and technology review, by Life Sciences-Healthcare and the Institute of Bio-Sensing Technology for the Microelectronics and Biomedical iNets, funded by ERDF

The main contributor to the ALT market are Germany and UK whereby Italy, Spain and Benelux together are contributing less due to a relative low percentage of elderlies (see be-low Table 3).

Table 3: ALT market share of some European countries

Country	Market share
United Kingdom	27.8%
Germany	32.9%
France	16.0%
Scandinavia	14.7%
Spain, Italy, and Benelux	8.6%

The Table 4 shows the ALT market segmentation and projected growth (2007-2015). The main factor for the growth is seen in the acceptance of these technologies. In return this is influenced by factors like product acceptance by the customers, affordable prices, and the readiness to accept technology.

Table 4: European ALT market segmentation and projected growth (2007-2015)

Country	Market	Revenue (2007-2015)								
	2009	2007	2008	2009	2010	2011	2012	2013	2014	2015
Germany	32.9%	$24.7	$36.4	$50.9	$65.5	$81.9	$100.3	$120.4	$142.8	$171.9
UK	27.8%	$20.5	$30.4	$43.0	$55.5	$69.3	$84.7	$101.6	$120.4	$141.0
France	16%	$13.8	$20.4	$24.7	$31.8	$39.7	$48.5	$58.3	$69.3	$85.8
Scandinavia	14.7%	$7.8	$14.5	$22.8	$31.3	$40.6	$50.9	$62.1	$74.4	$90.9
Italy	4.1%	$3.8	$4.9	$6.4	$7.8	$9.3	$10.9	$12.7	$14.7	$17.4
Spain	3.0%	$2.6	$3.5	$4.6	$5.7	$6.8	$8.1	$9.4	$10.9	$12.9
Benelux	1.5%	$1.5	$1.9	$2.3	$2.8	$3.3	$3.8	$4.4	$5.1	$5.8
	100%	$74.7	$112.0	$154.7	$200.4	$250.9	$307.2	$368.9	$437.6	$525.7

Looking at the ALT market in institutions it shows again Germany, the United Kingdom, France and Scandinavia in a leading position. The market was valued at $115.5 million in 2009 and is expected to grow at an average rate of 20.2 % per annum between 2010 and 2015.

Table 5: ALT market in care institutions

Country	Revenue in millions	Market share
United Kingdom	$35.1	30.4%
Germany	$34.8	30.1%
France	$18.2	15.8%
Scandinavia	$16.8	14.5%

In residences the ALT market is expected to grow at a CAGR of 28.5 % between 2009 and 2015 and reach a market size of $177.2 million in 2015.

The increasing number of elderly in Europe will lead to more investment on the government's side on home-based solutions to reduce the cost for care and to bring new technology to the elderly who need assistance in daily life to sustain the service provider (formal and informal carer).

To handle the ALT market industries have to cope with challenges like end-user issues, governmental regulations or new opportunities. It is important to increase the awareness of benefits for these technologies not only to the elderly but to communities or insurance companies. Currently there is only a low market penetration which could become an opportunity in future.

The telecare market, a submarket of ALT, is still to be developed. To reach a greater penetration of the market it is necessary to make telecare more mainstreaming involving policy makers, cares and the elderly themselves by removing legal barriers and simplifying the social care system in providing telecare. As the aging is a global phenomenon, telecare products (innovative ICT products) and services can become a substantial export base in the global market.

The objective to overcome is to create technology which is suitable for elderly and disabled persons as e.g. easy to handle, interoperable and standardised. Home and social care systems in Europe need to be optimised to prevent organisational problems and to achieve maximal benefits by using telecare.

The telecare market it is the "natural" opportunity for the exploitation of SafeMove solution. Considering the original SafeMove system and its potential evolutions through (un)bundling and upgrades, in the telecare market there are several possible applications that address different clients and have different goals. The application of SafeMove can vary from wellness of citizens to intensive management and treatment of dement elderlies or slightly disabled clients.

4.2 Telecare for clients

4.2.1 Rationale for telecare for persons with dementia

It is assumed that the life expectancy for persons aged 65 will rise in the EU as a whole during the next decades by 5.2 year for males and 4.9 years for females[2]. A longer life does not always mean a healthy life. With the increasing age often long and severe illnesses are appearing like dementia and other handicaps. The health systems in Europe are very different. A common challenge is that the health care systems have to cope with the situation seriously to find a way between raising patient numbers and restricted finances avoiding the collapse.

Telecare as a part of the home care market and a section of the health care system offers different segments of support: mobility, health care, housing and social care. The challenge

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[2]http://ec.europa.eu/economy_finance/publications/european_economy/2012/2012-ageing-report_en.htm   The 2012 Ageing Report, page 25

is to mainstream telecare in these sectors as a positive support for persons with dementia. Generally the benefits for the target group and the health care system will be:

- A better quality of life in the home of elderly persons with light dementia
- The need for a care home place can be delayed
- An admission or re-admission to hospitals can be avoided
- Persons can be discharged from hospital earlier

4.2.2 Telecare for persons with light dementia
This scenario describes the use of SafeMove systems for elderly persons with light dementia helping them to stay longer independently at their own home.

4.2.2.1   Scenario definition

Elderly person with light dementia tend to start action but not finishing these. Some reasons are:

- Physical, sensory and cognitive impairment
- Less concentration on what they are doing
- Obstacles during outdoor mobility like stairs, use of public transport, crossing roads

These are some factors that could make them feeling unsafe outside. This leads to less social contacts and cultural interests which end up in social isolation and psychological sickness.

A technical solution is offered by SafeMove systems with the following elements:

Table 6: SafeMove components

SafeMove Component	SafeMove Package
SafeMove at Home	Physical training
	Cognitive training
	Motivation / Gamification
SafeMove Assist	Family/friends support
	Social inclusion
	Telecare environment
SafeMove on Tour	Emergency handling environment
	Outdoor navigation
	Safe outdoor activity support
	Calendar and reminder function
SafeMove Could Service	Data repository
SafeMove Help System	Component dependent help system

The main actors for this scenario, as shown in the figure below, are:
- The elderly person with light dementia
- Family/friends

- Telecare/formal care givers

The figure below demonstrates how the devices of SafeMove Systems are linked together and what benefits the users will have.
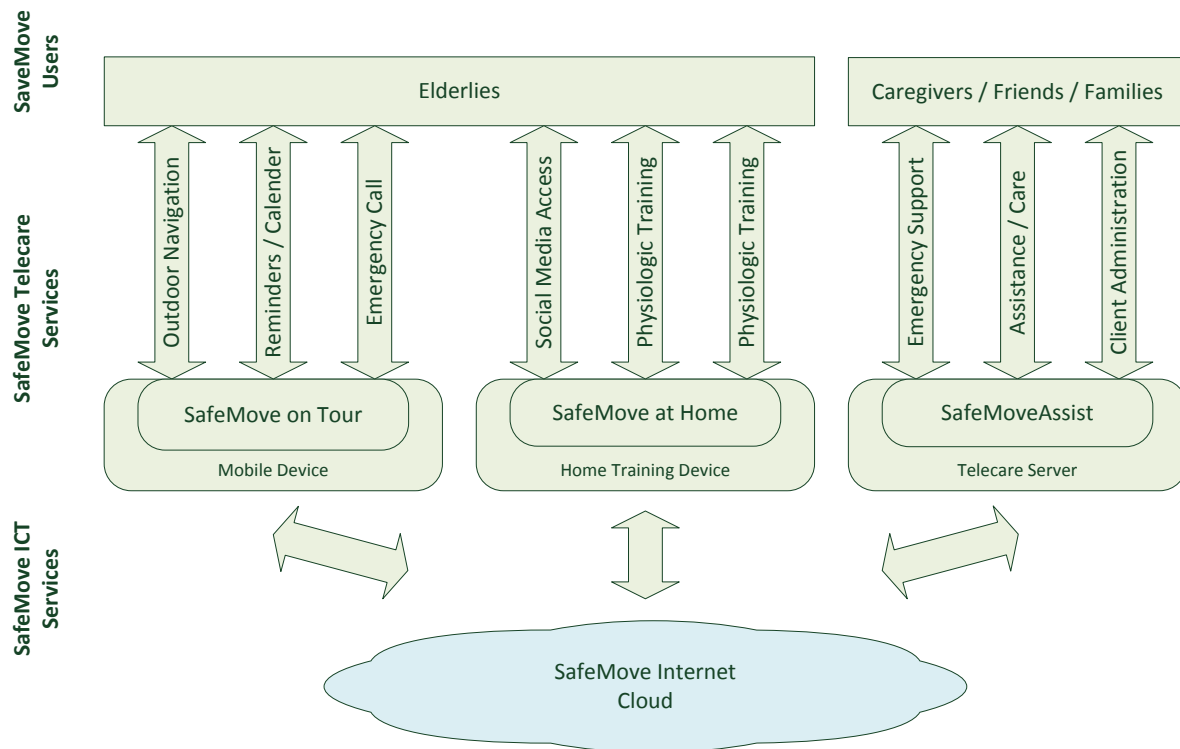

Figure 2: SafeMove Telecare Service Model for Elderly with Light Dementia

In Figure 2 the clients with light dementia and the formal and informal care provider are benefiting of SafeMove systems as users. Persons with light dementia use the SafeMove Telecare Services provided at home and on tour to them and they assist the caregiver in his office. SafeMove on Tour helps the clients performing outdoor activities like a safe navigation from home to a friend's place. The user is supported by a calendar service providing an overview on the daily activities and a reminder service that helps him to perform activities e.g. visiting a friend or taking his medicine in time. The emergency call service offers help to the elderly in difficult or emergency situations connecting him with the caregivers immediately.

Via his home training device the client uses the social media access service enabling communication to social communities with similar interests. This unit hosts the physiological and mental training services as well. They enable exercises prescribed by the doctor and configured accordingly and supervised by the caregiver via his assistance/care service. This will help to keep the client fit and to adjourn the worsening of dementia as long as possible.

The SafeMove Assist components used by the caregivers, family or friends of the different clients. By the emergency support service the care persons in charge answer support and emergency calls by the clients. The Administration service enables the persons in charge to administer and archive of his client's data in an secure way.

The three parts of the system Safemove on tour, at home and assist exchange data vie the private SafeMove Internet cloud by the SafeMove ICT services.

4.2.2.2   Introducing SafeMove Systems

The figure below illustrates how the SafeMove system can be introduced to the market.
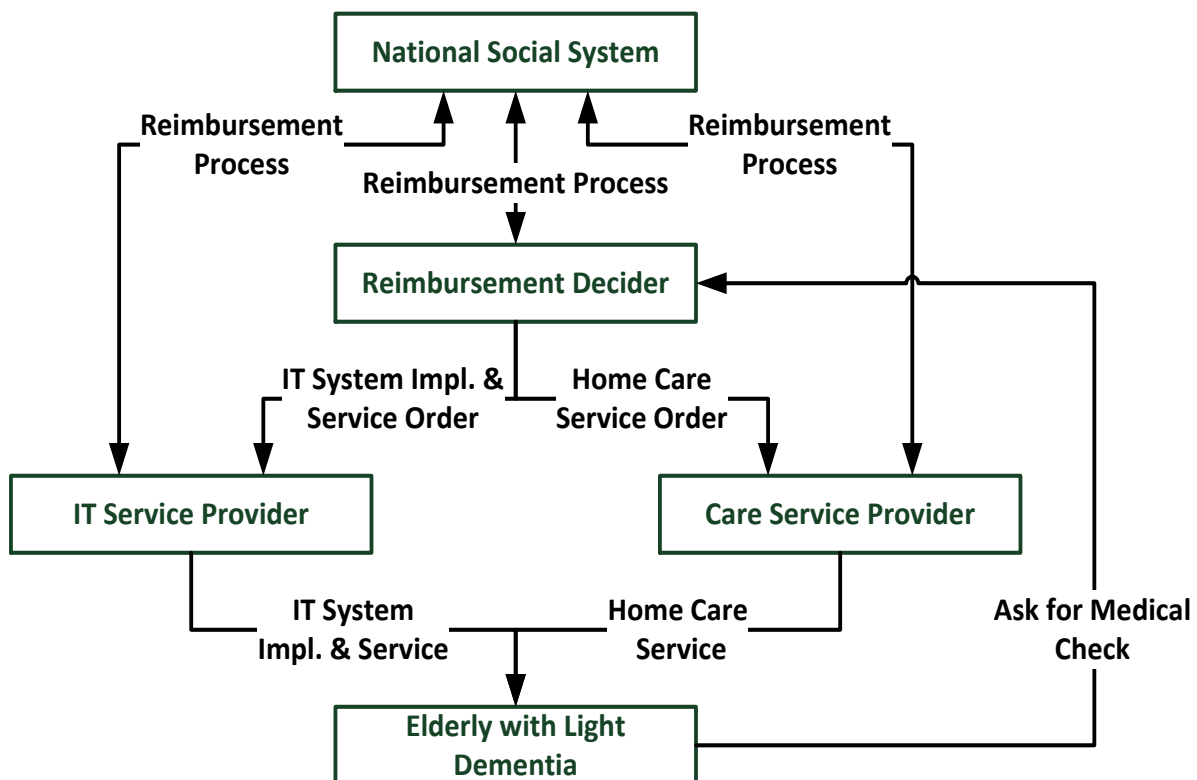
Figure 3: Introducing SafeMove Systems

We assume the SafeMove telecare service is financed by the national health social systems. The client with light dementia will need to ask for a medical check, if he wants to use SafeMove systems. The request is answered by a reimbursement decider, e.g. a doctor. If the answer is positive the reimbursement decider will sent out an IT system implementation and service order to an IT service provider and a home care service order to a care service provider. This means the doctor agrees to the use of SafeMove systems. The IT service provider will than do the IT system implementation and later on the related services at the home of the client. If this has been done the care service provider can take up the home care service via SafeMove Systems. For the reimbursement of the costs the IT provider, the care

service provider and the reimbursement decider will enter into a reimbursement process with the national social system.

This cycle will be more or less similar in the different European countries.

4.2.2.3   Demand estimation

Potential users of this service are persons with light dementia living at home but who need regular contact to their formal and informal caregivers. It is estimated that 8% of the people over the age of 65 and more than 30% of nonagenarians are afflicted by Alzheimer's or some other form of dementia (Schweizerische Alzheimervereinigung and own calculations). The table below summarises the demand estimation.

Table 7: Persons with dementia, demand estimation (8% over 65years)

Country	Number of person with light dementia		
Year	**2010**	**2020**	**2025**
EU27	7.000.000	8.300.000	9.100.000
Germany	1.350.000	1.520.000	1.650.000
United Kingdom	840.000	950.000	1.000.000
Austria	118.000	134.000	146.000
Switzerland	108.000	122.000	129.000
Israel	61.000	82.000	95.000

For mild dementia, there are no exact numbers. Approximately one third or half of all Persons with dementia are in an early stage. It is assumed that far more than half of all senior citizens (over the age of 65) were never diagnosed with dementia.

Table 8: Persons with light dementia

Country	Number of person with light dementia		
Year	2010	2020	2025
EU27	3.500.000	4.150.000	4.550.000
Germany	675.000	760.000	825.000
United Kingdom	420.000	475.000	500.000
Austria	59.000	67.000	73.000
Switzerland	54.000	61.000	64.500
Israel	30.500	41.000	47.500

For the estimation of the market penetration for the SafeMove system as shown above we are using an optimistic penetration on 10%, a neutral penetration of 6% and in a pessimistic case 3%.

Table 9: Telecare market penetration, persons with mild cognitive impairment (MCI) or light dementia

Year	2010	2020	2025
Estimated market penetration EU 27			
Persons with light dementia	3.500.000	4.150.000	4.550.000
Low market penetration (3%)	105.000	124.500	136.500
Medium market penetration (6%)	210.000	249.000	273.000
High market penetration (10%)	350.000	415.000	455.000
Estimated market penetration for Austria			
Persons with light dementia	59.000	67.000	73.000
Low market penetration (3%)	1.770	2.010	2.190
Medium market penetration (6%)	3.540	4.020	4.380
High market penetration (10%)	5.900	6.700	7.300
Estimated market penetration for Germany			
Persons with light dementia	675.000	760.000	825.000
Low market penetration (3%)	20.250	22.800	24.750
Medium market penetration (6%)	40.500	45.600	49.500
High market penetration (10%)	67.500	76.000	82.500
Estimated market penetration for United Kingdom			
Persons with light dementia	420.000	475.000	500.000
Low market penetration (3%)	12.600	14.250	15.000
Medium market penetration (6%)	25.200	28.500	30.000
High market penetration (10%)	42.000	47.500	50.000
Estimated market penetration for Switzerland			
Persons with light dementia	54.000	61.000	64.500
Low market penetration (3%)	1.620	1.830	1.935
Medium market penetration (6%)	3.240	3.660	3.870
High market penetration (10%)	5.400	6.100	6.450
Estimated market penetration for Israel			
Persons with light dementia	30.500	41.000	47.500
Low market penetration (3%)	915	1.230	1.425
Medium market penetration (6%)	1.830	2.460	2.850
High market penetration (10%)	3.050	4.100	4.750

4.2.2.4   Cost modelling

This chapter will report the cost for the technical solutions of SafeMove systems as calculated on the costs of the prototype for this scenario.

This chapter is still being developed and will be implemented in a later version.

Table 10: Cost for each component of the prototype

Components	Prototype Cost
Physical training	
Cognitive training	
Motivation / Gamification	
Family/friends support	
Social inclusion	This table will be filled in the final version of this document
Telecare environment	
Emergency handling environment	
Outdoor navigation	
Safe outdoor activity support	
Calendar and reminder function	
Data repository	
Component dependent help system	
Total	

Out of this prototype calculation the cost for the first 1.000, 10.000 and 100.000 pieces will be calculated. We assume in this model a reduction rate of 0,5 of the cost of developed devices for the first 1.000 pieces and will have the same reduction by an applied increase of factor 10.

Table 11: Cost reduction for large-scale production

Components	Reduction rate	Industrial cost x 1.000	Industrial cost x 10.000	Industrial cost x 100.000
		This table will be filled in the final version of this document		
Total				

4.2.2.5   Pricing Policies

We assume that the system will be implemented at care givers institutions which are monitoring elderly persons with dementia at their homes and in institutions or retirement homes.

This scenario targets different sources of income for the providers of the SafeMove services:

Table 12: "SafeMove for the Dementia Patient" components' pricing policy

SafeMove Component	Pricing Policy
SafeMove at Home	The SafeMove at Home system aims to motivate the patient and enhances his condition by physical and cognitive training. This component will be implemented as at the patient's home and is connected to SafeMove Assist via the SafeMove Cloud. Pricing could be done as a: • Software license to the elderly • On basis of a monthly service fee to the elderly • Software license bought by the care providers applying the system for their patients • Monthly service fee to the care providers applying the system for their patients
SafeMove Assist	SafeMove Assist comprises the telecare environment and the communication with family members, friends and social networks. This component will be implemented at the Care Provider/Family members. Pricing could be done as a: • Telecare Software license bought by the care providers applying the system for their patients • Monthly telecare service fee to the care providers applying the system • Family connection license for the elderly • Monthly family connection service fee • Connection to social service as a free add-on financed by advertising of elderly specific offers
SafeMove Cloud	The SafeMove Cloud maintains the SafeMove common data repository SafeMove Cloud will be implemented at a cloud service provider's server farm. • Pricing could be done as a monthly fee for the ICT service provided (Backup, database maintenance …)

SafeMove Component	Pricing Policy
SafeMove on Tour	SafeMove on Tour guides the patent during his outdoor activities, It supports him to perform his outdoor activities by calendar and reminder functions and it contains an environment to handle emergency situations connected to the care service provider Pricing could be done as a: • License fee for a smartphone app paid by the elderly • In-app yearly fees for different mobility services to the elderly • Software license package bought by the care providers applying the system for their patients • Monthly service fee to the care providers applying the system for their patients
SafeMove Help System	The SafeMove Help System introduces the different System Components and their use to the patient and supports him interactively when using the system The according part of the SafeMove Help System will be sold together with the four components mentioned above: Pricing could be done as a: • Percentage of the component price agreed by a Exploitation Agreement within the Consortium

4.2.2.6   Benefits

Benefits will be on the side of the family and friends and the formal care givers and insurance companies:

- Persons with light dementia can longer life self-confident at home,

- These persons are trained to participate in social life again slowing down worsening of dementia which needs for moving to a nursing home,

- The physical fitness of the patients involved is improved by serious game exercises,

- Video communication permits staying in contact with family and friends. Thus social relations are kept active,

- Social contacts can be improved by participation in elderly focused social networks,

- Safe outdoor activities enable participation in social life again,

- Rescue functions help to overcome health problems and assure patient's safety,

- The limited resources of care organisations will be multiplied by the SafeMove system,

- Clients can get continuous tele-communication support by the care provider,

- Care givers can concentrate more on patients with severe problems,

- Home care cost per person can be reduced.

The SafeMove systems contribute to solve the European challenges of health and aging, enable mobility of persons with light dementia and support their societal integration.

4.3 The role of insurance companies

On principle the AAL-users are distinguished between several target groups which differ between the degrees of personal involvement:

- Primary users:

    Persons in need of support (elderly people, chronically ill people, handicapped people etc.)

    Lifestyle costumers – the healthy elderly (comfort, safety, health, wellness, prevention etc.)

- Secondary users:

    Fostering/supporting relatives

    Services for the public and Social Service (mobile fostering, nursing homes, ect.)

    Health services (family doctors, hospitals, ect.)

    Employers (of elderly of handicapped employees)

- Tertiary users:

    Social insurance agency, federal social welfare office, job market service

    Private insurance companies

Overview:

Because of the often not financially feasible nursing service 60 to 80% of the in need of care is fostered at home. The total costs that the state of Austria alone has to spend on the support of these people are estimated to be around 4 billion Euros which is expected to rise to 5 billion Euros until the year of 2020 (Statistik Austria 2012).

If one expects that AAL can serve both as prevention as well as tech support for care and fosterage then there lays the greatest demand and therefore greatest market potential.

Private insurance companies have already realized this and offer nursing insurances. Currently there are 11 providers in the market, whose rates are difficult to compare and are only paid off at high "Pflegestufen". Transparency of services and technological equipment is needed.

The funding of AAL as alternative of treatment and stationary care or as prevention usually has to be paid by the affected themselves.

Considering the enormous potential of preserving the self-reliance of the affected for a long time, it is incomprehensible why so little was undertaken up until now. Possibly high price

start investments usually end up profitably very soon. "Buy cheap, pay dearly." fits the situation quite well: at every point only the cheapest type of care is paid, but over the entire course this ends up being the pricier variant. This also means for example that higher investments by the Ministry of Social Affairs could end up saving proportionally more money spend by the Ministry of Health.

Account of the essential stake holders

Politics

The Ministry for Traffic, Innovation and Technology (BMVIT) supports research and development of products and services for elderly people based on the use of information- and communication-technology using the program benefit for cooperative projects on a national level since 2008. It is involved in with the Ambient Assisted Living Joint Program (AAL JP) on a European level. In 2013 the first AAL JP test region was launched with 50 Smart Home housing units in Austria in Burgenland. Here the outcome of the first 5 years of development will be assembled and long-term evaluated.

Public authorities (State, countries, communities)

In the area of the public authorities the demographic change has already become a high priority topic and therefore the necessity of allowing the elderly to remain in their own homes is widely acknowledged - especially regarding the future budget and the relief of capacities. However, very little is thought ahead. Technological possibilities are barely embraced for. Most of the time, Ministries are thinking only for themselves which has to be considered on how to address and choose the best possible cooperation partners.

The interest in AAL mostly depends on the on the responsible people (innovative / conservative). It ranges from restrained to open minded. Depending on the position and engagement of the function owner a different approach and grasp of the subject is to be expected. AAL is not yet deep-seated in the public sector - albeit certain local administrations of Health and Social Affairs with above average awareness rising can be identified.

Social insurance

The AAL matter doesn't seem to spark interest with this stake holder group yet. The situation of the insurances can be characterized with the splintering of budgets and cognizance. The participation of the social insurances in the subjects of health promotion, prevention and rehabilitation of elderly would be interesting especially for AAL. The emphasis of health promotion currently however is focused on the job and education sector. A basic approach to age specific prevention however can be recognized in Austria (bill of health). The notorious underfunded insurance companies have to support the system of "repair medicine". Funding for projects that only in the future will relieve the budget is very difficult.

The funding of social services has to be viewed from the angle of the share based type of funding of the several branches of the legal social insurances (health, rent, foster, accident and unemployment insurance).

It remains to verify from case to case in how far health insurance, aliments, nursing insurance, accident insurance or rent insurance (for the rehabilitation service) are legally allowed to fund the development of these support systems.

4.4 Health insurance overview

Health insurance is insurance against the risk of incurring medical expenses among individuals. By estimating the overall risk of health care and health system expenses, among a targeted group, an insurer can develop a routine finance structure, such as a monthly premium or payroll tax, to ensure that money is available to pay for the health care benefits specified in the insurance agreement. The benefit is administered by a central organization such as a government agency, private business, or not-for-profit entity.

Germany has Europe's oldest universal health care system, with origins dating back to Otto von Bismarck's Social legislation, which included the Health Insurance Bill of 1883, Accident Insurance Bill of 1884, and Old Age and Disability Insurance Bill of 1889. As mandatory health insurance, these bills originally applied only to low-income workers and certain government employees; their coverage, and that of subsequent legislation gradually expanded to cover virtually the entire population.

Currently 85% of the population is covered by a basic health insurance plan provided by statute, which provides a standard level of coverage. The remainder opt for private health insurance, which frequently offers additional benefits. According to the World Health Organization, Germany's health care system was 77% government-funded and 23% privately funded as of 2004.

Germans are offered three kinds of social security insurance dealing with the physical status of a person and which are co-financed by employer and employee: health insurance, accident insurance, and long-term care insurance. Long-term care (Pflegeversicherung) is covered half and half by employer and employee and covers cases in which a person is not able to manage his or her daily routine (provision of food, cleaning of apartment, personal hygiene, etc.). It is about 2% of a yearly salaried income or pension, with employers matching the contribution of the employee.

Swiss:

The current Swiss healthcare system came into effect in 1996 under the Health Insurance Law (LAMal) of 18 March 1994, which sought to "introduce a perfect managed competition scheme across Switzerland, with full coverage in basic health insurance". The LAMal en-

larged the package of services previously covered by statutory health insurance and made this 'basic package'– defined by the Swiss federal government and regulated by the Federal Office of Public Health – compulsory across the Swiss confederation. The idea behind this new law was to define the level of health care that patients may expect as given, but allow competition between insurers to drive up standards and drive down the cost of the insurance premiums. In order to avoid discrimination insurers must accept all applicants ('open enrolment') and cannot vary premiums based on the health of each consumer; nor can they make a profit on basic package plans. Beyond the basic package individuals are still allowed to purchase supplementary insurance to fund any additional health care, but the same regulations do not apply with regards to open enrolment, for-profit status and premium variations.

The Swiss system is highly decentralised, meaning that the 26 Swiss cantons are largely responsible for the provision of health care and insurance companies operate primarily on a regional basis. Meanwhile, the role of national government is restricted by the constitution to one largely of public health and regulation.

The UK's National Health Service (NHS) is a publicly funded healthcare system that provides coverage to everyone normally resident in the UK. It is not strictly an insurance system because (a) there are no premiums collected, (b) costs are not charged at the patient level and (c) costs are not pre-paid from a pool. However, it does achieve the main aim of insurance which is to spread financial risk arising from ill-health. The costs of running the NHS (est. £104 billion in 2007-8) are met directly from general taxation. The NHS provides the majority of health care in the UK, including primary care, in-patient care, long-term health care, ophthalmology, and dentistry.

Private health care has continued parallel to the NHS, paid for largely by private insurance, but it is used by less than 8% of the population, and generally as a top-up to NHS services. There are many treatments that the private sector does not provide. For example, health insurance on pregnancy is generally not covered or covered with restricting clauses. Typical exclusions for Bupa (British United Provident Association) schemes (and many other insurers) include:

ageing, menopause and puberty; AIDS/HIV; allergies or allergic disorders; birth control, conception, sexual problems and sex changes; chronic conditions; complications from excluded or restricted conditions/ treatment; convalescence, rehabilitation and general nursing care; cosmetic, reconstructive or weight loss treatment; deafness; dental/oral treatment (such as fillings, gum disease, jaw shrinkage, etc.); dialysis; drugs and dressings for out-patient or take-home use*; experimental drugs and treatment; eyesight; Hormone Replacement Therapy (HRT) and bone densitometry; learning difficulties, behavioural and developmental problems; overseas treatment and repatriation; physical aids and devices; pre-existing or special

conditions; pregnancy and childbirth; screening and preventive treatment; sleep problems and disorders; speech disorders; temporary relief of symptoms. (* = except in exceptional circumstances)

Austria:

The main principles of the Austrian health care system are solidarity, affordability and universality.

In Austria, health care is based on a social insurance model that guarantees all inhabitants equitable access to high quality health services – irrespective of their age, sex, origin, social status or income.

Comprehensive social health insurance coverage is a major feature of the Austrian health care system: 99% of the population is protected.

The Austrian health care system is based on statutory social insurance. Access to services is regulated by law, the most important legislative basis being the General Social Insurance Act (ASVG). All insured people have a legal right to a large number of benefits.

Israel:

The National Insurance Law provides for a standardized basket of medical services, including hospitalization, for all residents of Israel. Medical services are supplied by the country's four comprehensive health insurance schemes, which must accept all applicants regardless of age or state of health.

The main sources of funding are a monthly health insurance tax of up to 4.8 per cent of income, collected by the National Insurance Institute, and employer participation in the cost of insurance for their employees. The insurance schemes are reimbursed according to a weighted average number of insured persons, calculated by age, distance of home from a health facility, and other criteria determined by the Ministry of Health.

4.4.1 Insurance companies and telecare

This chapter will be detailed in a later version of this deliverable.

4.4.2 Risk-Sharing agreements and telecare

It is planned to have interviews with social insurances regarding risk-sharing agreements and telecare.

5 SafeMove Exploitation Strategy

5.1 SafeMove Ways of Exploitation

The SafeMove exploitation needs to build on a clear agreement about IPR within the Consortium.

This overview has to be completed by an IPR analysis to get clear definitions of all the IPRs involved. The IPR analysis needs to be agreed and documented to enable all further steps.

Once this step is completed two directions towards exploitation can start:

- Exploitation of the project result as a whole. This needs for an Exploitation Agreement to be prepared. The Exploitation Agreement will clarify questions like how to distribute revenues among the IPR owners. The SafeMove Common exploitation strategy is defined in chapter 5.2 below.
- Exploitation of products based on the single partners IPR driven by these partners (see chapter 5.3 Partner's exploitation strategy and Business Plan)

5.2 SafeMove Common Exploitation Strategy

5.2.1 Steps towards a common product

If the IPRs are clarified a common branding of the SafeMove product could already be defined. However at this point in time the (sub-) consortium interested in common exploitation of the SafeMove product still needs to do commercialisation steps to the components developed.

To do this in a first step the consortium agreed on commercialisation of a product related to telecare for persons with light dementia (see chapter 4.2.2). Lessons learned from exploitation and commercialisation of former research project results were gluing the partners together during a commercialisation needs for a pilot customer. Convincing a pilot customer without a reference implementation at a customer using the software on day to day basis is a very hard task. Proposing such an implementation based on research results by an international consortium needs for a lot of trust by the customer.

It seems to be easier to implement a partly funded commercialisation project. In the 7th Framework Programme the European Commission started to implement a funding programme tackling this need the Pre-Commercial Procurement / Public Procurement of Innovation – PCP/PPI funding instrument.

The new funding instrument builds on two pillars. PCP deals with public procurement of research towards companies working in competition on feasibility studies, concepts, prototypes

and test series to solve a public challenge, whereas PPI deals with public procurement to-wards companies or consortia commercialising existing research results solving public challenges for the procurers (see Figure 1).
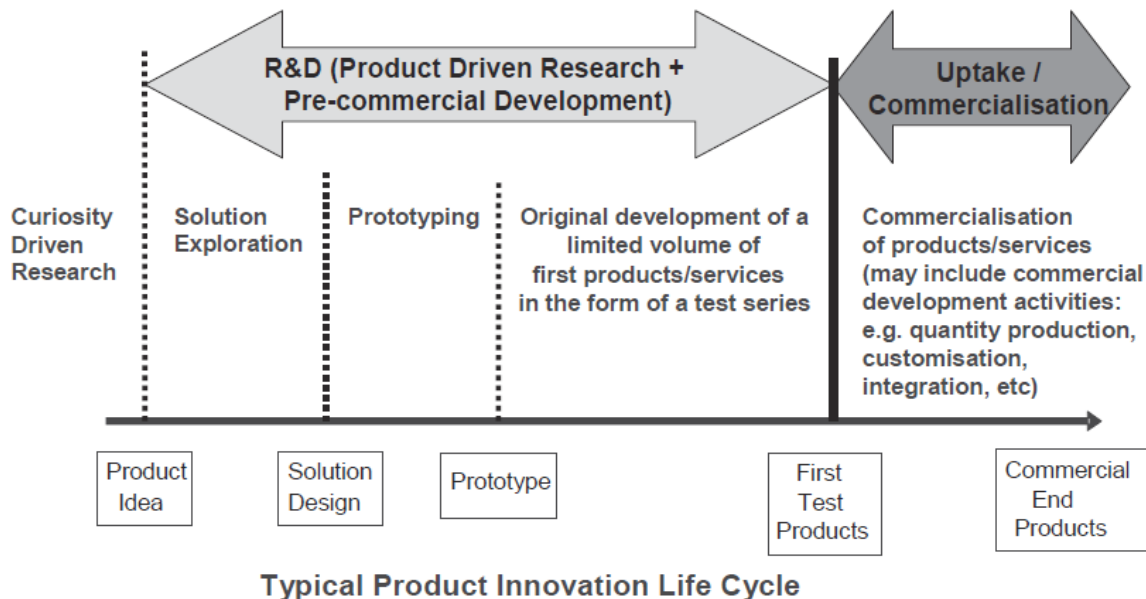

Typical Product Innovation Life Cycle

Figure 4: R&D versus commercialisation[3]

PPI acts as a launching customer or first buyer of commercial end-solutions newly arriving on the market but not yet on a large-scale commercialisation basis to meet the price/quality requirement for the mass deployment.[4]

PPI will be offered for e-Health in the Horizon 2020 programme of the European Union. A PPI project seems to be the ideal instrument for Commercialisation of the SafeMove results.

The hope of SafeMove is to motivate a public procurer network, e.g. from Austria, Germany and Switzerland calling for home care solutions. Thus bidders offering different technical solutions could be given an equal chance. Out of these proposals the procurers could choose the best solutions the competitors can offer to get their problems solved.

If the SafeMove developers would have the chance to finalise their products within a PPI project this would have the following advantages during the commercialisation phase of the SafeMove results:

- Prove the SafeMove partnership under real market conditions;
- Verification of the exploitation agreement when performing a first commercialisation of the common SafeMove results;

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[3] Pre-commercial procurement, ISBN 978-92-79-09259-6 page 3

[4] http://cordis.europa.eu/fp7/ict/pcp/docs/faq-v9.pdf page 21

- The consortium wins a first set of reference customers SafeMove that can demonstrate application of the system in practice to similar care institutions;
- The configuration of the product can be tested in different countries under different application conditions.

Once the SafeMove product has been commercialised and real market conditions glued the implementers, exploitation could be consolidated by further activities:

- Constitute an association or a new company owned by the implementing partners aiming for sales of the common SafeMove solution and of its components;
- Create a sales network composed of IT service providers related to care institutions distributing the different packages of the SafeMove solution.

The hope of this concept is to bring the SafeMove implementing partners in the possession to sell the bundles of the SafeMove Product described above at a European or even worldwide level improving Europe's position in the international health and care market.

5.2.1.1   Exploitation Agreement

Details of the exploitation agreement will be given in the second version of this deliverable due month 36.

5.2.1.2   Assumptions and Investments

We will focus on the scenario described above and on all participating partner countries. Specific assumptions for the calculations and working hypotheses have to be defined.

- The population of elderly over 65 year is increasing in the following years.
- Telecare market will increase through the awareness of policy makers and users

5.3 Partner's exploitation strategy and Business Plan

In this chapter each commercial partner is detailing its business strategy independent of the common SafeMove exploitation strategy explained in chapter 5. It contains the initial business plan of each commercial partner. The final business plans will be completed in the second version of this deliverable due in project month 36.

5.3.1 Individual Exploitation Strategy of megatel

5.3.1.1   Product and service definition

The Integration Service Assist:

- Telecare for formal and informal caregivers (relatives)
  - o Option for integration into existing caregiver back-end software
- Web based service for caregivers mobile / TV based solution for person in need.

- Flexible reporting / monitoring on
  - Plugin software (licensed serious games) like motivational / physical / cognitive serious games
  - Appointments
  - Location
  - Reminder (e.g. meds check)
- Calendaring appointments shared between participants

@Home platform (small set top box online on the internet and TV)

- Messaging incl. Photo sharing
- @Home Navigation services:
  - Personalized route training
  - Personalized route training at home in Augmented VR environment

Outdoor Navigation on smart devices (phones / tablets)

Including options:

- Tasks monitoring
- Reminder
- Notes
- Distress call / alarm / panic button
- Messaging between peers and caregivers
- @Home Navigation services:
  - Personalized route training
  - Personalized route training at home in Augmented VR environment

The service includes box at home for the @Home, an Internet option, a mobile device option, installation and maintenance of the service. The service is bundled into packaged options, which can be ordered as add-ons.

5.3.1.2   Target market and size

Service is offered to the persons in need via the caregiving branches offering home care services; like charitable organizations e.g. Volkshilfe, Johanniter, DRK, AWO and Foundations.

5.3.1.3   Business Plan of Megatel

An individual exploitation strategy for the megatel elements of the SafeMove project would try to harvest most of the original assets. An attempt to license the ELS games would be undertaken potentially also their @Home launcher software. The design work from Netural for the UI Elements has to be licensed or substituted if no agreement can be established.

This renders the product as consisting of the known three elements Assist, @Home and On-Tour.

5.3.2 Individual Exploitation Strategy of Neusta

5.3.2.1   Product and service definition

The product would be a tool or framework to create applications maps, routes, scenarios and the necessary user interfaces.

Services would be those to enable others to exactly develop individualized maps, routes, scenarios and the necessary user interfaces. A support tool will be for annotations during the requirements elicitation process. Furthermore we work on a method to evaluate the suitability and acceptance of the above mentioned products. The necessary training material will be suitable for exploitation.

5.3.2.2   Target market and size

This chapter is still under investigation

5.3.2.3   Business Plan of Neusta

We see direct and indirect options to commercialize the SafeMove results.

For a direct exploitation as well the product as services are possible.

The indirect exploitation consist on the one hand in increased competences for further projects in the domains of pedestrian navigation, route planning for the elderly citizen, scenario design for serious games suitable for training and customization purposes. The competences cover indoor as outdoor navigation, interface design and evaluation methods for the target group. Furthermore we will produce with SafeMove further references in our application domain of healthcare, AAL, Google Maps, Navigation and caregiver support by backend systems.

5.3.3 Individual Exploitation Strategy of Netural

5.3.3.1   Product and service definition

Software Licenses

Netural´s contribution to the SafeMove project consists of custom user interface designs for all three project components/products, namely SafeMove On Tour, SafeMove At Home and SafeMove Assist. Netural´s user interface designs represent both the gateway and the roadmap to all three SafeMove components/products. It is an integral element of the function of all three components/products. The quality and functionality of these designs is of key importance to the project´s overall success. Using proprietary research, know---how and data from repeated product tests, Netural tailors the interfaces to the physical and cognitive needs of elderly users in general, with special consideration given to the needs of patients suffering

from dementia. The goal is creating low---threshold, intuitive access and orientation in a family of software tools which help users to overcome challenges in everyday life.

Training and consulting

Netural provides consulting on usability and technical devices and also on social media integration.

5.3.3.2   Target market and size

Netural´s interface designs are key parts of all three components of the SafeMove project. The target markets are therefore identical with those of the respective components.

5.3.3.3   Business Plan and ROI projection

- 10% share of the overall revenues (excluding revenues from services / consulting provided by other project partners) per year, starting with the end of the project, and charged as software licence fees.
- Revenue from support and consulting (not to be shared with other project partners). Expectation: about € 20.000,-- per year.
- Revenue shares should, at least, be sufficient to cover the running costs for development, support and exploitation/marketing costs after the end of the project.

5.3.4 Individual Exploitation Strategy of InfoConsult GmbH

5.3.4.1   Product and service definition

The contribution of InfoConsult is in the design and evaluation of the graphical user interface and the implementation of the calendar and the related reminder functions. The graphical user interface is developed especially for persons with light dementia and easy to use. The reminder function is designed to relieve the family members or care providers from the necessity of looking after the loved ones all the time if they are well and taking their medicine, but if the reminders are not consequently answered by the client a supporting person will be informed via SafeMove Assist.

Services offered by InfoConsult:

- Training of the care provider during the implementation phase of the SafeMove system;
- Training of the care provider related to system introduction at the client's home;
- Regional offer related to system implementation and maintenance at the homes of elderly persons with light dementia;

- Offer of an APP for mobile devices supporting elderly with light dementia. This will be done in close cooperation with megatel.

5.3.4.2   Target market and size

5.3.4.3   The target market will be the German speaking countries in Europe. We see our market in the increasing number of elderly persons with light dementia who will need some kind of help to manage their daily life. Care providers have to cope with the raising number of elderly people with light dementia who wish to life self-contained in their homes and need to be taken care of. SafeMove system enables the related services via ICT. Basic Considerations for a Business Plan

Income will be generated by:

- Revenues from support and training during the implementation phase
- Revenues from local maintenance of the home installations
- Revenues from the software licence of the reminder function
- Revenues acting as a multiplier for other components of the SafeMove system

Expenditures have to be paid for

- IT service personnel
- IT sales personnel
- Training material
  Post project developments

5.3.5 Individual Exploitation Strategy of eLearning Studios

5.3.5.1   Product and service definition

The following marketable services and products will be derived from the SafeMove project

- **SafeMove at Home interface**: To collect, distribute, and provide information about the SafeMove Product which includes integration with SafeMove Assist and SafeMove on Tour
- **Software Licences**: These will cover licences of the software running on the Kinect system and licences of the software which will allow, on the client side, to read and exploit the data available through the Kinect including updates
- **Software integration services**: These will cover integration of the system with other existing information systems-SafeMove Assist and SafeMove on Tour;
- **Installation and Training**: these will cover all installation services aiming at a smooth introduction of the system into operational use

5.3.5.2   Target market and size

The world's population is aging at an accelerated rate. Declining fertility rates combined with steady improvements in life expectancy over the latter half of the 20th century have produced dramatic growth in the world's elderly population. People aged 65 and over now comprise a greater share of the world's population than ever before, and this proportion will increase during the 21st century. This trend has immense implications for many countries around the globe because of its potential to overburden existing social institutions for the elderly.

The number of elderly persons increased more than threefold since 1950, from approximately 130 million (about 4 percent of global population) to 419 million (6.9 percent) in 2000. The number of the elderly is now increasing by 8 million per year; by 2030, this increase will reach 24 million per year. The most rapid acceleration in aging will occur after 2010, when the large post World War II baby boom cohorts begin to reach age 65.

By 2050, two billion people – or nearly one out of every four people – will be older than 60 years. As people age, they are more likely to experience mobility difficulties and chronic conditions such as cancer, stroke and dementia. They are also more vulnerable to depression, as many face loneliness and poverty.

The elderly population itself is also growing older. The "oldest old" (80 and older) population is the fastest-growing group among the elderly. Levels of illness and disability among this group far exceed those for other age groups, and thus the needs of this group are likely to increase substantially in the 21st century.

The key target market will be:

- Care Homes
- Carers

5.3.5.3   Business Plan and ROI projection

The developing partners have a longstanding experience in similar markets. A widespread current practice in selling products is done by mixing of licence fees for a basic platform, plus software customisation and integration services. This will be applied for marketing the **SafeMove at Home**. The pricing scheme is based on these experiences:

Revenues:

Sales price: €500 (price of the Xbox One) plus €40 for the SafeMove at Home licence.

Services: 30% of the package price will be additional revenue for consulting, customisation and training;

Maintenance: 20% of the package price will be charged per year. It is included in the licence price for the first year. This will include updates and support

Costs:

Development: 170.000 € net investment by the ELS (Total cost – EU funding);

Sales + Support: 90.000 € per person-year initially including overheads and technical equipment for sales / support staff (1/8 person in first commercialisation year, y1: 0,25, Y2: 0,5, Y3: 1);

Post-project improvements: ½ Person years per year after the end of the project.

Advertising: 5 % of the total revenue will be reinvested.

The ELS conservatively estimates that the **SafeMove at Home** can be sold to 30 of Care Homes until the 2018, which would be a market share of about 1,5%. This is a conservative figure. With the SafeMove Total System, this figure will be 10 times as more.

These assumptions sum up to a business plan as depicted below:

	2015	2016	2017	2018	
in Euro	y0	y1	y2	y3	Sum
REVENUES [Euro]					
Licences sold	15	60	120	240	435
Licence revenue	11.250 €	45.000 €	90.000 €	180.000 €	326.250 €
Services	4.500 €	18.000 €	36.000 €	72.000 €	130.500 €
Hardware Sales	3.750 €	15.000 €	30.000 €	60.000 €	108.750 €
Maintenance	- €	2.250 €	9.000 €	18.000 €	29.250 €
Total	19.500 €	80.250 €	165.000 €	330.000 €	594.750 €
COSTS [Euro]					
Net investment	170.000 €				170.000 €
Sales + Support	11.250 €	22.500 €	45.000 €	90.000 €	168.750 €
Post Project Development	22.500 €	45.000 €	45.000 €	45.000 €	157.500 €
Marketing material	975 €	4.013 €	8.250 €	16.500 €	29.738 €
Total	204.725 €	71.513 €	98.250 €	151.500 €	525.988 €
NET PROFIT	-185.225 €	8.738 €	66.750 €	178.500 €	68.763 €

The breakeven point is reached in 2018 which is a good indicator for a very probable commercial success of the project.

5.3.6 Individual Exploitation Strategy of Methodica

5.3.6.1   Product and service definition

As part of the Safemove consortium, Methodica has undertaken the role of developing and creating a versatile, customized and multi-platform orientation kit, which will be designated for the users, caregivers, family members and various stakeholders such as: physicians, therapists, home-care units, healthcare providers, government officials, potential customers, potential business partners etc. Based on their subcontractor - Edna Pasher PhD & Associates' expertise in User Centered design and Human-Computer interaction, Methodica will create a highly customized and effective orientation kit.

The orientation kit is aiming to achieve the following outcomes:

- To create a positive approach towards the SafeMove system
- To create an inviting and engaging interface and initial interaction
- To describe the key features and benefits of the SafeMove system
- To improve the exploitation potential of the system
- To encourage curiosity towards the SafeMove system

The orientation kit will be comprised of the following elements:

- Main Video Clip - One minute presentation, exposing the system's features based on various scenarios
- A "How To?" Environment - dedicated simulation clips explaining various platforms functionalities: PC, Video-game console, Mobile phones and Tablet computer.

In order to increase even further the accessibility of the system for elderly user, we will pre-pare a hard copy Handbook, since we assume that some of the users will find this traditional platform to be more inviting and understandable. This will allow us also to extend our reach to users with a more "traditional" way of thinking.

The development of the orientation kit provides additional values to the project by creating a high-level, unified graphical, textual and conceptual interface which strengthens the position-ing of the system as one integrated system while increasing the acceptance by the users and stakeholders.

Another beneficial development will be two dissemination video clips, in English & German; each of them is stand-alone and as such can be used, when needed, for demonstrations at workshops, presentations, conference, social networks, various web-platforms etc.

Methodica, together with its subcontractor Edna Pasher & Associates, have provided addi-tional contribution to the project so far, such as: State-of-the art analysis, dissemination and exploitation plan, stakeholders' analysis and dissemination activities such as presentations and a workshop.

5.3.6.2   Target market and size

Based on our understanding of the emerging market of adult learning education, and the need of bridging the gap between the senior citizens and the ever evolving technology, our developed capacities will enable us to provide solutions for every technological device\ soft-ware\ system that requires the engagement and understating of senior citizens. Our devel-opments could be used on various platforms and together with our expertise in identifying and engaging our stakeholders into the developments process; we provide a state-of-the art and comprehensive solution.

5.3.6.3   Business Plan of Methodica

Methodica will detail its business plan in the final version

6 Conclusion

The deliverable is based on an extended market survey and the related market analysis for the SafeMove system. We looked at the telecare market as well. Telecare, the market of the SafeMove products, is a promising sector with high growth rate for the next years. The legal framework for the use of telecare is uncertain and the reimbursement models have to be clarified in different countries and adapted so that products like SafeMove systems can be implemented and the services can be provided to care providers and their clients. Deciders and law makers have to become more aware of the value of the telecare market and its advantages.

The reimbursement has an impact on the business plans of SafeMove system. Therefore, in this document the partners laid down their individual business strategy within the consortium. This is a good basis for more detailed exploitation agreements and business plans in the next, final version of this document.

The SafeMove system combines several aspects of care services and is able to close the gap between the needs of the care provider and the needs of persons with light dementia. This kind of IT system is not yet offered at the market and we hope that a lot of end users will benefit from the SafeMove system.

7 Annex: Market Survey

7.1 Global Market of Outdoor Navigation Technologies for Elderly People Report

7.1.1 Introduction

The world's population is aging at an accelerated rate. Declining fertility rates combined with steady improvements in life expectancy over the latter half of the 20th century have produced dramatic growth in the world's elderly population. People aged 65 and over now comprise a greater share of the world's population than ever before, and this proportion will increase during the 21st century. This trend has immense implications for many countries around the globe because of its potential to overburden existing social institutions for the elderly.

The number of elderly increased more than threefold since 1950 - from approximately 130 million (about 4% of global population) to 419 million (6.9%) in 2000. The number of elderly is now increasing by 8 million per year and by 2030, this increase will reach 24 million per year and as such, by 2050, two billion people – or nearly one out of every four people – will be older than 60 years. As people age, they are more likely to experience mobility difficulties and chronic conditions such as cancer, stroke and dementia. They are also more vulnerable to depression, as many face loneliness and poverty.

The elderly population itself is also growing older. The "oldest old" (80 and older) population is the fastest-growing group among the elderly. Levels of illness and disability among this group far exceed those for other age groups, and thus the needs of this group are likely to increase substantially in the 21st century.

When addressing this arising market, it is important to relate to its three different segments – Telecare (Social Care), Telehealth and Smarthomes - each of them with its own specific costs, services, technologies etc. The ALT services market can also be divided in two – ALT at home and ALT in a formal institution. Based on the architecture of the SafeMove solution, we have focused on two key sectors:

> 1) Global Market of Outdoor Navigation Technologies for Elderly People which includes sales of Ambulatory Aids, Wheelchairs, Scooters and Accessories, Motor Vehicle Conversions, and Navigation Aids.

> 2) The SmartHomes market which includes: Home Telehealth and monitoring, Wonder management, Medication, Management Technologies, Smart Mobility Devices, Fall management, Physical and Cognitive Fitness Gaming and Hard Hearing and Vision Aids.

As in any other market, also here we have to analyze the drivers and barriers of introducing the newly growing Telecare market into the mainstream and traditional healthcare system.

The key drivers, as they appear from our survey, are based mostly on improved technologies that will lead to interoperability of systems using open platform software, the ability to provide access to systems globally, raising population, Standardization, demand for managed and personalized healthcare, which will increase customization of products to suit individual needs. While considering the market barriers, a report made the WHO[5] (indicates that the leading barriers in Europe are derived for Legal and Cost related issues concerning patients' privacy, competing health system priorities, and a perceived lack of demand.

The HaCRIC report[6] Estimates the European market size for telehealth in 2014 to range from €165m to €429m depending on the definition of telehealth and the potential remote care market in the UK for example will be 3.2M Users in 2050 (in comparison to an actual remote market of 350K users in 2010).

When looking at the bigger picture - the BCC report[7] states that the global telemedicine market is expected to grow from $9.8 billion in 2010 to $27.3 billion in 2016, the telehospital/clinic market segment is expected to grow from $8.1 billion in 2011 to $17.6 billion in 2016, demonstrating a CAGR of 16.8% between 2011 and 2016 and the telehome segment is growing faster than the telehospital\ clinic segment. This market segment was valued at $3.5 billion in 2011, and this revenue is expected to grow at a CAGR of 22.5%, reaching $9.7 billion in 2016.

Based on a report made by the Deloitte Centre for Health Solutions[8],The combined Telecare and Healthcare markets' revenue in Europe are expected to raise from 303£ million in 2010 to 573.5£ million in 2015, which represents a CAGR of 12.2%. In 2009 these markets were dominated by the UK and Germany (25% and 21% respectively) followed by France and Italy both with 15%.

One of the leading paradigm concerning this market is using telehealthcare as a tool to cut down healthcare costs and bring about mammoth savings. In the near to mid-term, telemedicine technologies offer one of the few ways of enabling healthcare personnel to meet the increased demand without unacceptable delays or other forms of de facto rationing.

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[5] "Telemedicine opportunities and developments in member states", WHO, 2010.

[6] "Developing the capacity of the remote care industry to supply Britain's future needs", Barlow, J., et al. HaCRIC, 2012.

[7] Global Markets for Telemedicine Technologies, BCC Research, March 2012.

[8] Primary Care: Working differently Telecare and Telehealth – a game changer for health and social care. Deloitte Centre for Health Solutions, 2012.

We can strengthen the above conceptions that telehealthcare will lead to reducing the cost of treatments in relation to the traditional home\ hospital care systems, by researches such as the one conducted in 2005 at Maisonneuve-Rosemont hospital in Canada,[9] showed that the saving derived from Telehomecare in comparison to the traditional methods varied between -121% (due to phone intervention) and up to 65% (due to reducing the need for hospitalization) and a total savings of 13%.

In a study published in 2013[10] showed that the three main home-services that the elderly require are handling practices, accompaniment outside home and companionship and socialization (62.38%, 37.1% and 30.77% respectively). These results strengthen the market potential of the SafeMove solution since it provides the users with two of the leading requirements – companionship and outdoor guidance.

7.1.2 Methods

7.1.2.1 Search strategy

A search of available and in-development technologies was conducted on the outdoor navigation solutions for healthy adults and elderly with physical, cognitive, visual or auditory impairments.

The review is based on public materials made available prior to December, 2012. In order to identify relevant technologies, we searched in different market survey publishers such as Market Research, BCC Research, Frost & Sullivan, Global Industry Analysts, American Geriatric Association. In addition, we screened the media in order to determine if the available technologies are indeed suitable for the purpose of our deliverable. The searching technique focused on combinations of the following key words: Outdoor navigation, navigation, mobile positioning, real time locating systems, GPS systems, elderly assistive, and disability assistive.

7.1.2.2   The inclusion criteria

We included technologies oriented to elderly and disabled assistive technology dedicated to navigation and orientation for outdoor use. Solutions were targeted at a population of totally physical blind, hearing-impaired, deaf-blind, or cognitively impaired subjects. In addition, only data written in English was included.

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[9] Guy Paré, Claude Sicotte, Danielle St-Jules and Richard Gauthier, "Cost-Minimization Analysis of a Telehomecare Program for Patients with Chronic Obstructive Pulmonary Disease", Telemedicine and e-Health, Vol. 12 (2006), No. 2, pp. 114-121.

[10] Cavallaro, F.I., Facal D., Pigini, L., Mast, M., Blasi L. (2013) Multi-Role Shadow Robotic System for Independent Living (SRS).

7.1.2.3   The exclusion criteria

We excluded market surveys conducted prior to 2010, in-door navigation market reports and technologies, outdoor navigation systems for uses other than elderly assistive techniques such as aviation, marine, automotive.

7.1.3 Results

The systematic market search resulted in over 1500 market reports. Applying the inclusion and exclusion criteria 11 were found relevant. These market coverage reports were reviewed and the product profiles of each company were screened. Moreover, free Google search was performed for identifying additional innovative products.

7.1.3.1 Study overview

The eleven market overview reports were classified into two categories: studies on elderly and disabled technologies, studies on tracking and locating technologies. The report focus was on enhancing mobility and navigation solution.

According to BCC Research (July, 2011), in 2010 the U.S. market for elderly and disabled mobility aids technologies was projected to grow from $2 billion in 2010 to $2.7 billion in 2016, a compound annual growth rate (CAGR) of 6% between 2011 and 2016. The assistive technology market includes sales of Ambulatory Aids, Wheelchairs, Scooters, and Accessories, Motor Vehicle Conversions, and Navigation Aids for the Blind.

7.1.3.2   The Outdoor Navigation Technologies for Elderly People Market

In this section we included technologies oriented to elderly and disabled assistive technology dedicated to navigation and orientation for outdoor use. Solutions were targeted at a population of totally physical blind, hearing-impaired, deaf-blind, or cognitively and emotionally impaired subjects. In addition, only data written in English was included.

Outdoor navigation aids can be divided into 4 application categories:

- **Navigation aids for Blind –** Navigation aids for visually impaired and blind ranges from simple electronic magnifiers and talking GPS systems to complicated blind rehabilitation assistive technologies. The table below summarizes available technologies and technologies in development.
- **Tracking and locating applications -** This report cannot neglect the complimentary growing market of tracking technologies. These technologies are mostly used for consumer, outdoor navigation, and fitness applications based on smart phones' platforms as well as handset devices. This market's segment in global sales in 2010 totaled approximately $2 billion. The people and animal tracking devices sales were expected to reach $2.2 billion in 2011 and will further grow to $3.6 billion for a CAGR of 10.0% between 2011 and 2016. A simple search on "Google Play" finds over 1,000 tracking application. 355 are aimed for fitness and 307 are aimed for family and

friends' location tracking. The table below summarizes few examples of Phone applications in addition to several outdoor sports devices available on the market.

- **Navigation aids for cognitive and physically disabled –** At least 20% of older adults living in the community have problems with walking. This increases to approximately 50% in adults 85 years old and older. Most of these problems are associated with underlying diseases, especially severe diseases. Navigation aids for cognitive and physically disabled includes walking aids such as canes, wheelchairs, electric wheelchairs and scooters. In the table below we summarized state-of-the-art walking aids.

- **Fall detections & alerts** – According to WHO falls are the second leading cause of accidental or unintentional injury related deaths worldwide. Each year an estimated 424,000 people die from falls globally. The financial costs from fall-related injuries are substantial. For people aged 65 years or older, the average health system cost per fall injury in the Republic of Finland and Australia are US$ 3611 and US$ 1049 respectively. There are several technologies available for fall alerts of which many are suitable for indoor use and are covered in section 7.1.3.5. In this section we include fall alert systems suitable for outdoor use.

The Outdoor navigation aids which are relevant to our project are tracking and locating applications and navigation aids for cognitive and physical disabled. To summarize the key takeaways from the research conducted:

1. A growing number of technologies are available for improving mobility in elderly: systems that promote outdoor mobility and navigation, technologies that enhance security and safety of elderly people and navigation aids for the blind and the visually impaired.

2. As Smartphone penetration rates are growing, there is a verity of applications based on built-in technology of GPS, shock detectors, and accelerometer for tracking and locating people, navigations, activity tracking and rewarding, and fall detectors targeting the older population and caregivers.

3. Product prices ranges dramatically from online free phone applications to thousands of USD.

We believe that product cost should lead innovation in elderly and disabled outdoor navigation. The elderly and disabled population is on average of low-medium socioeconomic percentiles. Thus, price is a main decision factor in adopting new technologies. In addition, since aged-population and healthcare costs are a major concern worldwide, health systems around the world are pressured to cut costs and adopt cost-effective solutions.

Open-platform technologies are growing rapidly, leading to a rising number of Smartphone free applications which can offer many of the benefits of standalone products with a huge advantage of costs and convenience. Thus, innovations should be based on Smartphone capabilities   to   leverage   elderly   outdoor   navigation   and   safety.

The following table summarizes the technologies divided into category:

Category	Product/ Company	Key Technology	Availability	Target population	Price range
Navigation aids for the blind	**Wicab Inc. Brainport Vision**	translating information from a digit al video camera to the user's tongue, using gentle electrical stimulation	Investigational	Blind	NA
	Bay Advanced Technologies K-Sonar	ultrasonic sensing device	worldwide	Blind	£475
	Human Ware Trekker Breeze	Talking GPS	worldwide	Blind	$699
	Human Ware BrailleNote GPS	GPS for the BrailleNote line of prod-ucts	worldwide	Blind	$498-$1388
	Human Ware SmartView	Handheld electronic Magnifiers	worldwide	Low Vision	$149-$695
	StepHear	orientation, information and audio messaging system based on RF com-minacation		Blind	Base $130 Activator $25
	Routeme² Technologies PadNev	Android application for planing daily activities when moving around and interacting with an urban environment	Not available	Not Specified	Off the market
	HapticTorch	ultrasonic sensing device	Research project	Deaf and blind	NA
	Freedom scientific	Range of electronic magnifiers	worldwide	Low Vision	$545-$1195
	Optelec BV	Range of video magnifiers	worldwide	Low Vision	$395-$595

Category	Product/ Company	Key Technology	Availability	Target population	Price range
Tracking and Locating Applications	**iWalker**	Family and friends tracking Android App	worldwide	All	Free - $5
	GPS Tracking Pro	Family and friends tracking iPhone and Android app	worldwide	All	Free
	MapMyWalk	Phone app that tracks the route, distance, and pace in real-time using GPS	worldwide	All	Free
	UA E-39	Compression shirt fitted with electronic sensors	US not launched yet	Sports	NA
	IEGLO	GNSS Receiver for Personal Mobility	Research	Elderly with Altziemer	NA
	FitnessKeeper RunKeeper	Phone app for tracking, measuring, and improving fitness	worldwide	All	Free
	Garmin Connect Mobile	Software for real-time tracking	TBL	All	NA
	Garmin GTU™ 10	GPS-enabled locator with web-based tracking service	worldwide	All	$199.99
	Holux GPS Tracker 007 & GPS Tracker 005	Combining with GPRS and high performance GPS	worldwide	All	NA
	Medical Guardian	Outdoor medical alert system	worldwide	Elderly	
	Aerotel GeoSkeeper™	Wristop Cellular Communicator	worldwide	Elderly and children	

Category	Product/ Company	Key Technology	Availability	Target population	Price range
Walking Aids	**Otto Bock Healthcare GMBH Xeno**	Special mobility device that lifts people from a sitting position to a standing position	worldwide	Disabled	£14,394
	Otto Bock Healthcare GMBH SuperFour	Outdoor vehicle	worldwide	Elderly and Disabled	$447,580
	Otto Bock Healthcare GMBH ActiGait	A foot lifter stimulator implant	worldwide	Stroke patients	£11,360 (Surgical kit)
	Pride Mobilty	Variety of scooters	worldwide	Elderly and disabled	$800-$5000
Fall Alerts and Detection	**IEGLO**	Builtin fall detection and emergency call	Research	Elderly with Altziemer	NA
	Smart Fall Detection	Smart Phone App.	worldwide	Elderly	Free
	Spantec Fall Detector	Android application	worldwide	Elderly	Free
	iFall	Smart Phone app.	Research		Free
	Fall Detection V1.0	Android application	Research	Elderly	Free
	Cradar	Smart Phone app.	worldwide	Sports	Free
	T3Lab Fall Detector	Smart Phone app.	worldwide		Free
	iCare	Smart phone app.	worldwide	Elderly	$1
	Smart Help	Smart phone app.	Beta testing	Elderly	Free
	Buddi	Stand-alone device	UK	Elderly	£750

7.1.3.3   Navigation Aids for the Blind: Product profile

7.1.3.3.1 BrainPort® V100

Website: http://www.wicab.com/

- **Technology:** The BrainPort V100 includes a video camera mounted on a pair of sunglasses. The camera works in a variety of lighting conditions and has an adjustable field of view (zoom). The tongue array contains 400 electrodes and is connected to the glasses via a flexible cable. White pixels from the camera are felt on the tongue as strong stimulation, black pixels as no stimulation, and gray levels as medium levels of stimulation. Users report the sensation as pictures that are painted on the tongue with tiny bubbles. The brain eventually learns to interpret and use the information coming from the tongue as if it were coming from the eyes. A small hand-held unit provides user controls and houses a rechargeable battery. The system will run for approximately 3 hours on a single charge.
- **Target Population:** The BrainPort V100 has been tested by individuals with no usable vision, both congenitally blind and with acquired blindness. Usually, users will have completed conventional blind rehabilitation and be comfortable using conventional assistive tools prior to starting BrainPort V100 training.
- **Training:** Supervised training is necessary prior to using the BrainPort V100 device independently. Training requirements and content are customized to the individual user. Typically, individuals complete a minimum of 10 hours of one-on-one training over one to two consecutive weeks. The training sessions cover proper interpretation of sensory information and operation of the device controls.

7.1.3.3.2 BAT K-Sonar

Website: http://www.batforblind.co.nz/

The 'K' Sonar uses KASPA (Kay's Advanced Spatial Perception Aid) technology to mimic the bat's sonar capability of perceiving the surroundings in the same way that a flashlight enables one to see in the dark. The 'K' Sonar enables blind persons to perceive their environment through ultrasound and be more mobile in their need to travel. The 'K' Sonar has been designed to be attached to a long cane. It also can be used without the cane as an independent travel aid for those who have learned to use it well in suitable, familiar, recognizable situations.

Silent ultrasonic waves bounce off objects sending back information about objects and their location. Sonar information is collected from the path ahead by the 'K' Sonar providing a mental map of objects in front and to the sides of the user as the cane is scanned. The tip of the cane acts as a safety backstop by coming into contact with an object that was not avoided.

Scanned objects normally produce multiple echoes, translated by the 'K' Sonar receiver into unique invariant 'tone-complex' sounds, which users listen to and learn to recognize. The human brain is very good at learning and remembering these sound-signature se-

quences in a similar way that it learns a musical tune. The sound signatures vary according to how far away the 'K' Sonar is from the object, thus indicating distance. The user listens to these sounds through miniature earphones and can detect the differences between sound sequences thus identifying the different objects.

7.1.3.3.3 Humane Ware Trekker Breeze

Website: http://www.humanware.com/en-international/home

The Trekker Breeze handheld talking GPS can be controlled by one hand for pedestrian and vehicle. It verbally announces names of streets, intersections and landmarks on the go. The Trekker Breeze provides information on the location on the spot and what is around in the spot location (public services and businesses). It allows retracing steps if one gets lost by a press on button. In addition, it allows recording the routes when learning them with sighted people so that one can use them later without assistance, and recording landmarks along a route, for example to get to a favorite restaurant or a friend's house.

7.1.3.3.4 Human Ware BrailleNote GPS

Website: http://www.humanware.com/en-international/home

Location information and mapping tools to augment independent travel for people who are blind or visually impaired for the BrailleNote line of products. Feature includes:

- Runs on Multi-use devices
- Includes over 15 million points of interest to increase navigation success and enhance decision making
- Features exclusive LookAround capabilities to give the user information about their surroundings including points of interest
- Utilizes an external GPS to ensure the latest GPS technology for best positioning ability
- Provides output in both Speech and Braille
- Built-in speaker
- Choice between Braille or QWERTY keyboards
- Built-in human sounding text-to-speech
- Shoulder strap and carrying case for secure transportation

7.1.3.3.5 Human Ware SmartView Versa Products

Website: http://www.humanware.com/en-international/home

SmartView Versa products are handheld electronic magnifiers with 4.3 inch color LCD display, magnification up to 15X, autofocus for optimal distance, and multiple high contrast modes. Advanced product version combines multimedia features for music, recordings, and movies. It can help read street signs, scan written materials such reports,

books, tests and exams, view function keys on a phone, record voice notes, and write messages for colleagues and friends.

7.1.3.3.6 Step-Hear

Website: http://www.step-hear.com/

The step-hear&trade system provides directional information. The step-hear&trade system is based on Radio Frequency (RF) technology and is comprised of two units: a transmitter/base and a small receiver/activator. Installed at strategic locations, the base sends out a continuous signal. When the activator, held by the user, is within the range of the base, it vibrates and beeps. Pressing a button on the activator will trigger a pre-recorded voice message from the base. This helps the user to obtain information and become oriented toward the location, be it an office, an elevator or a bus. The step-hear&trade system can be used virtually anywhere: Government & Municipal buildings, Post Offices, Schools and Universities, Museums, Conferences and Exhibitions, Hospitals, Nursing-homes, Banks, ATM machines, Stores, Hotels, Transportation vehicles, Recreational places, and more. Designed with universal recognition, users will ultimately be able to use their activators anywhere in the world, simplifying and enhancing international travel.

7.1.3.3.7 Routme2 Technologies PedNav

Website: http://www.routeme2.com/

PedNav™, an application that helps plan daily activities when moving around and interacting with an urban environment. It can be thought of as a location-aware personal assistant that helps people keep track of what's important to them. PedNav™, is inspired by the founders protpotype of a Bluetooth-based pedestrian navigation for the visually impaired at the University of California, Santa Cruz, as part of the Universal Real-time Navigational Assistance (URNA) research project.

PedNav is aware of the location and schedule of relevant "venues" (like restaurants, offices, shops or attractions) near you and of the necessary transportation (bus or trains) to reach these venues. Based on the information you provide, and on the schedules of venues and transportation, PedNav creates a personalized "itinerary": a time-orderly list of events for the day, specifying when to go where, and how to get there.

PedNav was available for mobile devices running the Android platform but it is no longer found in Google Play Store. Company future plans included allowing third parties to provide data sources for use with PedNav, so that anyone with a compelling LBS idea may deploy it to handsets running PedNav.

7.1.3.3.8 HapticTorch

Website: http://cmsws1.rdg.ac.uk/isrg/isrg-haptic-torch.aspx

The Haptictorch is a research project from University of Reading at UK, which provides a method of alerting users to presence of potential hazards using non-contact measurement techniques. A subtle tactile (touch) interface conveys relevant information to the user while not interfering with other senses. Designed to be intuitive, familiarization with the device takes less than a minute.

By providing constantly updating analogue range information the user can determine the distance to an object and any changes in object position. This permits easy navigation of doorframes, optimum path identification between obstacles, location of objects in open spaces and most importantly the ability to plan a path over 3meters prior to reaching a hazard. The result is graceful movements taken mid-stride with the large reliable aura of perception increasing confidence and speed in the user.

7.1.3.3.9 Freedom Scientific

Website: http://www.freedomscientific.com/

Freedom Scientific manufactures and commercializes a number of portable handheld magnification solutions. Powerful on-the-go magnification with a 4.3-inch, full color, high-contrast video screen. It slips into a pocket or purse for visiting the grocery store, pharmacy, bank, library, restaurant, or almost anywhere else.

7.1.3.3.10 Opletec BV

Website: http://www.optelec.com/

Opletec commercializes a range of video maginifiries differentiating in size and price. The Compact products offer bright and clear images. A full color, 4.3-inch widescreen offer up to 10 times variable magnification, with multiple high-contrast viewing options. Compact comes with a rechargeable battery, offering 2.5 hours or power. Also, standard, off-the-shelf AA batteries can be substituted when there is no opportunity for recharging.

7.1.3.4   Tracking and Location product profile

7.1.3.4.1 Under Armour E39

Website: http://www.underarmour.com

E39 is an electrical compression shirt which uses sensors to track and transmit heart rate, breathing, g-force and horsepower. This smart t-shirt is based on Zephyr Technologies, who make similar gear for the US special forces, and has a removable "bug" sen-

sor equipped with a triaxial accelerometer, processor, and 2GB of storage flanked by additional monitors that measure heart rate and breathing. In addition, the software provided by Zephyr can then record and transmit wirelessly all the relevant biometric data about the athlete's movements to a number of devices such as laptops and cell phones and help identify performance issues.

7.1.3.4.2 The European IEGLO project

IEGLO stands for ´Infrastructure Augmented Galileo/GNSS Receiver for Personal Mobility´ and is being conducted by a consortium of technology companies and research centers. The goal of IEGLO is to develop a handheld tracking device for elderly or Alzheimer disease people.

IEGLO incorporates seamless indoor and outdoor positioning and emergency call services for healthcare applications. The concept of IEGLO consists on a smartphone with special SW incorporating (A)GNSS, EGNOS/EDAS and infrastructure-based technologies (WLAN, RFID, .) for basic positioning, WLAN and GSM network links as communication channels and an accelerometer orthogonal triad for collapse detection. A second part of the development is a web-based service center with a Man-Machine Interface (MMI) which visualizes the monitoring status and administrates the individual settings.

7.1.3.4.3 Garmin Connect Mobile

Website: http://www.garmin.com/en-US

Garmin Connect Mobile turns Garmin Edge® 510 or 810 cycling computer into a connected device capable of sharing activities as they happen and wirelessly uploading to Garmin Connect™. The app also puts weather data and allows to wirelessly download courses to use on rides. With the live tracking feature, friends and family can follow user races and training activities in real time using smartphone. Also it allows to get real-time weather conditions, forecasts and alerts directly on Edge 510 or 810 when it's paired with Garmin Connect Mobile on the phone.

7.1.3.4.4 Garmin GTU10

Website: http://www.garmin.com/en-US

GTU 10 is a GPS-enabled locator that combines a web-based tracking service with GPS technology to help keep track of a family member, pet, vehicle or other valuable property. The GTU 10 is small, lightweight and waterproof. It attaches to a backpack, pet collar or whatever is important to the user. It enables to view the location of GTU 10 on a map from a computer or a smartphone, view track history of where GTU 10 has been.

7.1.3.4.5 Holux GPS Tracker 007 & GPS Tracker 005

Website: http://www.holux.com.tw/

Both tracking devices are a multi-functional tracker. Combining with GPRS and high performance GPS, the devices can be used to track and report device's position and status to mobile phone through SMS or Main Data Server (MDS) through HTTP. The operation modes include continuous tracking and position lock (park). SOS buttons can be used to send emergency call. All configurations can be set through SMS or USB interface. The wireless communication includes UDP, TCP/IP, HTTP and SMS. With MTK EPO, it can get shorter TTFF at distressed environment.

7.1.3.4.6 Aerotel GeoSkeeper™

Website: http://www.aerotel.com/en/

GeoSkeeper is a Wristop Cellular Communicator with Emergency Response, GPS Tracking and Geofencing. GeoSkeeper sounds an alarm, locates and communicates anytime, anywhere. GeoSkeeper is offering a safety beyond existing PERS (Personal Emergency Response System) or traditional social alarm systems. Fitted with a distress button and integrated active GPS system, it provides accurate location tracking with immediate assistance when and where it is needed.

7.1.3.5 Walking Aids: Product Profile

7.1.3.5.1 Otto Bock Healthcare GMBH Xeno

Website: http://www.ottobock.com/

Xeno power wheelchair with a standing function allows changing from a sitting position to full extension of the entire body takes 20 seconds. Switching between a standing and sitting position helps prevent complications and promotes circulation, joint function and digestion.

The strap and pad system offers secure support and even allows driving standing up. The S3 (single servo steering) independent steering system features superior maneuverability and optimum operating performance, even in restricted spaces.

7.1.3.5.2 Otto Bock Healthcare GMBH SuperFour Outdoor Vehicle

Website: http://www.ottobock.com/

The SuperFoor outdoor vehicle can tackle inclines of up to 40% and master the most difficult terrain. 4-wheel drive and single-wheel suspension allows the SuperFour to pass in any terrain, whether in the rugged Dolomite Mountains or trips to the beach. Thanks to its

hybrid drive, the SuperFour has a range of more than 200 km and should the batteries happen to run out, an almost noise-free gas engine will generate extra power.

The SuperFour also features a seat unit, which slides toward the front of the vehicle for easy boarding or exiting. The seat remains comfortably level during descents. The individually adjustable automatic seat tilt prevents driver from sliding off the seat, even on 40% grades.

7.1.3.5.3 Otto Bock Healthcare GMBH ActiGait

Website://www.ottobock.com/

Weakness of dorsiflexion of the foot is a frequent problem after a stroke. Because of the paralyzed muscles, the foot is not raised sufficiently when walking. ActiGait® is a foot lifter stimulator implant that assumes the task of initiating the lifting action of the foot when walking.

Scientific studies prove that ActiGait® noticeably increases walking speed and significantly increases walking safety. ActiGait® can be implanted under the skin of the thigh in a day surgery procedure. After the wound has healed, the stimulator is individually adjusted to patient needs. The function control unit is easy to handle even with impaired arm functionality.

7.1.3.5.4 Otto Bock Healthcare GMBH STIWELL med4

Website://www.ottobock.com/

Functional electrotherapy promotes the rehabilitation of motor functions following a stroke or after damages to the central nervous system e.g. incomplete paraplegia. STIWELL med4 can offer improvements: The processing of myoelectric signals with four independently adjustable stimulation channels and two measurement channels open up a very broad field of application ranging from neurological indications to incontinence therapy. The multi-channel control also allows the stimulation of complex movement sequences.

The therapy goal, namely to restore lost mobility and autonomy, is accelerated with the use of biofeedback functions. These are based on the ability of the human brain to recreate structures in non-damaged areas that are no longer available in the damaged areas. Of crucial importance during the targeted training is the link of technical movement stimulation and deliberate movement intention.

7.1.3.5.5 Pride Mobility Scooters

Website://www.pridemobility.com/

Pride mobility offers a range of scooters for indoor and outdoor navigation. GO-GO is a compact in-door scooter, Pride scooter is an outdoor scooter with high speed capabilities, Jazzy scooters with increased wight capacity are suitable for indoor maneuverability, and Q6 for indoor/outdoor maneuverability with six wheels on the ground for maximum stability and power elevating seat. All scooters come with cup holders, cane holders, and oxygen holders.

7.1.3.6 Fall Alerts and Detection product profile

7.1.3.6.1 Smart Fall Detection

Website: https://play.google.com/store/apps/details?id=com.fall

Smart Fall Detection application was developed as result of master research in field of computer and artificial intelligence, by Hamideh Kerdegari under supervision of Dr. Khairulmizam Samsudin, Department of Computer and Communication Systems Engineering, University Putra Malaysia (UPM). Smart Fall Detection uses Artificial Neural Network (ANN) to process the acceleration signals. The ANN was trained with 1000 samples of fall and non-fall patterns to detect the fall among elderly and helps them by increasing their independency. This application follows three states: Fall-checking state, Long-lie state and Fall-state. In Fall-checking state system looks for occurrence of fall by reading the acceleration data and using ANN. When ANN detects the fall, the system enters to Long-lie state. In this state the system checks the long-lie and if any movement happens it turns back in Fall-checking state, otherwise after at least 30 seconds it enters to Fall-state. In this state the siren plays back and after at least 60 seconds a help request text message will be sent to specified emergency contact by SMS and whenever GPS data is available, second text message including the exact location of falling will be sent by SMS.

7.1.3.6.2 Spantec Fall Detector

Website: https://play.google.com/store/apps/developer?id=Spantec+GmbH

Spantec Fall Detector is a specialized application designed to monitor human activity, alerting to falls and inactivity using the Android phone facilities for communication. This application is designed to observe if the user Falls, or is Inactive for a period of time, and is the result of extensive research on the subject of human activity and movement.

Twitter integration is a key feature of this release, and allows care givers to monitor users from the comfort of their environment. In addition, users can choose to send an SMS Alert message to a caregiver's telephone number when Fall or Inactivity events occur.

7.1.3.6.3 iFall Falling Monitoring System

Website: https://play.google.com/store/apps/developer?id=FSU+Mobile+Solutions

iFall tracks the phones accelerometer and tries to detect when a fall has occurred. There are three stages to a fall: 1) the fall, 2) impact with the ground, 3) a long lie indicating the user is injured and needs assistant. In the case a fall is detected the user is issued a prompt. This prompt is to the give users a change to reduce false positives. If the alert has timed out without user response, their emergency contact (set in alert settings menu) is automatically called to further evaluate the situation.

7.1.3.6.4 Fall Detection V1.0

Website:https://play.google.com/store/search?q=fall+detection+v1.0&c=apps

Fall Detection Android application is being researched and developed in Letterkenny Institute of Technology (LYIT) in Co. Donegal, Ireland. The system will begin by checking for the occurrence of a fall. Once it has been verified that a fall has taken place, the system will check to see if any significant movement has taken place i.e. is the person still on the ground? If there is no movement, an alarm will sound for a period of time and a message will be sent to an emergency contact alerting that the person in question has incurred a significant fall.

7.1.3.6.5 CRADAR

Website: https://play.google.com/store/apps/developer?id=ActionXL

CRADAR detects a fall and sends a text message to an emergency contact. CRADAR (CRAsh Detection And Response) is a man-down application that uses the accelerometer to detect a fall and sends a text message alert to a specified emergency contact, using the GPS to include a link to a map with your exact location.

7.1.3.6.6 T3Lab Fall Detector

Website: https://play.google.com/store/search?q=t3lab+fall&c=apps

Fall Detector application allows to send alarm messages when the user falls down. The alarm is sent, as a text message, to mobile phones of people in a user emergency contact list. Optionally, the message may contain information about the user's GPS location and an emergency call may be started.

7.1.3.6.7 iCare

When a fall has been detected, iCare will alert a predefined list of caregivers SMS or phone call, or both. iCare addresses the shortcomings of existing fall detection apps through:

More efficient power management with partial wake lock and using GPS only in the event of a fall - that means less drain on the battery. Up to 5 caregivers contact numbers can be configured. All these caregivers will be alerted in the event of a fall. Customers fall message loud speaker is used when phone call to caregiver is made, so that the communication is possible even the smartphone is out of reach. Sensitivity of fall detection algorithm can be adjusted to reduce false detection. Other settings can be configured: use of audio, vibration, location (GPS) reporting, how much time is given to user to cancel a false detection before alert SMS/phone call is made.

7.1.3.6.8 Smart Help

This Application (Beta testing) will monitor phone's sensor to calculate the force generated by the device and based on few algorithms the application will determine automatically if one needs any help or not. As a result the application will automatically send SMS with the location (optional) and will call a caregiver selected on LOUD SPEAKER. The application has two stage warning:

Stage 1: It senses a force equivalent to fall, and it alerts within 25 second warning, asking if help is needed, if no response it will do nothing.

Stage 2: The force calculated is very high, yet it will display an alert for 25 seconds as in Stage 1, but if no response occurs the application will automatically send the distress message and will place a call to primary emergency contact.

This app can automatically detect if aerobic activity is taken and algorithm will tune itself.

7.1.3.6.9 Buddi

Website: http://www.buddi.co.uk/

Buddi is a mobile personal alarm system that provides push button emergency alarm, automatic fall alert, location finder, and 24/7 emergency monitoring center. It utilizes satellite and mobile phone technology.

7.1.4 Discussion

The purpose of this study was to conduct a review on technical solutions available for enhancing outdoor mobility in elderly. Based on the results, the findings are discussed below.

To summarize the key takeaways from the research conducted:

1) A growing number of technologies are available for improving mobility in elderly: systems that promote outdoor mobility and navigation, technologies that enhance security and safety of elderly people and navigation aids for the blind and the visually impaired.
2) As Smartphone penetration rates are growing, there is a verity of applications based on built-in technology of GPS, shock detectors, and accelerometer for tracking and

locating people, navigations, activity tracking and rewarding, and fall detectors targeting the older population and caregivers.

3) Product prices ranges dramatically from online free phone applications to thousands of USD.

We believe that product cost should lead innovation in elderly and disabled outdoor navigation. The elderly and disabled population is on average of low-medium socioeconomic percentiles. Thus, price is a main decision factor in adopting new technologies. In addition, since aged-population and healthcare costs are a major concern worldwide, health systems around the world are pressured to cut costs and adopt cost-effective solutions.

Open-platform technologies are growing rapidly, leading to a rising number of Smartphone free applications which can offer many of the benefits of standalone products with a huge advantage of costs and convenience. Thus, innovations should be based on Smartphone capabilities to leverage elderly outdoor navigation and safety.

7.1.5 Limitation of the review

We used a broad search strategy on the themes of outdoor mobility, assistive technology, navigation, orientation, cognitive, visual and elderly - which was extended with additional search terms and databases. However, it is possible that technologies were missed that are described by other key words that were not included in the search strategy. We may also have missed products reported in languages other than English.

Nevertheless, the strength of this review is that it provides insights into several aspects of assistive devices. The obvious increase of elderly population experiencing vision and cognitive problems associated with mobility and independence requires special attention for development of the new technologies. These assistive technologies will help to reduce functional decline, encourage independent functioning, and improve their quality of life.

7.1.6 Conclusions

As elderly population is growing substantially worldwide, many innovative solutions are developed around the world. There is a verity of mobility applications and solutions addressing the elderly need for independency and security. There is a growing market trend of Smartphone applications enhancing elderly safety: tracking and locating applications and fall detection alerts.

In addition, as navigation technology advances, many solutions are also developed for the visually impaired and the blind population.

Since the majority of elderly and disabled are of low-medium socioeconomic percentiles, low-cost technology solutions should be developed.

7.2 Global Market on Indoor Elderly Care Technologies

7.2.1 Introduction

Most elders want to stay independent regardless of age and sex. However, injuries such as falls, burns, and poisonings are among the most common accidents jeopardize their independence and living at home. Older adults have a high chance of being injured in accidents because they may be less able to take quick action in case of an emergency due to problems with walking, seeing, memory, or hearing, be taking medicines that slow their thinking, and live alone and have accidents when other people are not around to help. Unfortunately, older adults who live alone may also become the victims of criminals who target older people.

Falls account 40% of all nursing home admissions 40% of those admitted do not return to independent living. Many falls do not result in injuries, yet a large percentage of non-injured fallers (47%) cannot get up without assistance. For the elderly who fall and are unable to get up on their own, the period of time spent immobile often affects their health outcome. Muscle cell breakdown starts to occur within 30-60 minutes of compression due to falling. Dehydration, pressure sores, hypothermia, and pneumonia are other complications that may result.

As such, there are a growing number of technologies available and being developed in order to provide elders an independent safe environment within their own homes. Such technologies can be divided into 7 categories: Telehealth and monitoring systems, medical alert systems, fall detection and prevention, smart home solutions, wondering management, medication management and Physical and Cognitive Fitness Gaming.
According BCC Research, the global market for elder-care technology products is worth approximately $2.6 billion in 2010 and should grow to about $4 billion in 2015, at a compound annual growth rate (CAGR) from 2010 to 2015 of 8.7%. Where, safety monitoring technologies are valued at $2.3 billion in 2010 and are expected to reach $3.4 billion by 2015, a compound annual growth rate of 8.2%. And home tele-health technologies are worth $371 million in 2010 and are expected to increase at a compound annual growth rate (CAGR) of 11.2% to reach $631 million in 2015.

Another important market segment is the healthcare gaming market. According to Jurriaan Van Rijswijk, chairman of the Games for Health conference, the industry as a whole was worth some $1.2 billion in 2010, and is estimated to grow to $10 billion by 2015. While, the size of global videogame-market revenue — including games on smartphones and tablets— is estimated to be $78.5 billion for 2012.

Games have a number of applications in healthcare:

- Patients suffering from chronic diseases such as diabetes, asthma, heart disease and cancer can use games such as **Re-Mission** to manage condition.
- Games can be adopted in virtual and real physical *therapy (e.g.* **Wii-Habilitation***)*.

- Games with build in *health education* offer an alternative to traditional learning methods and can significantly improve health knowledge. *Professional medical training* games such as **Burn Center™** can also be used in clinical practice.
- *Wellness promotion* games promote healthy lifestyle and behavioral change and can be classified into four main categories. *Exercise games, or 'exergames'* (*e.g.* **Wii Fit Plus**) involve physical activity, *healthy eating games* improve eating habits and knowledge on nutrition and weight management, *mental health games* are designed to improve cognitive abilities and s*moking cessation games* help smokers quit in an entertaining way.

According to Ambient Insight research, the US market for technology-based cognitive learning products is growing at 5-year compound growth rate of 32.5%. The annual consumer expenditure totalled $61.1 M in 2009. The most significant catalyst in the consumer segment is the interest in brain fitness coming from aging population. This is a huge marketing opportunity for game manufacturers since the aging population is growing rapidly and already 563 million people in 2012 and expected to reach 714 million in 2020.

7.2.2 Methods

7.2.2.1 Search strategy

A search of available and in-development technologies was conducted on the indoor daily activities solutions for healthy seniors and elderly with physical, cognitive, visual or auditory impairments.

The review is based on public materials made available prior to December, 2012. In order to identify relevant technologies, we searched in different market survey publishers such as Market Research, BCC Research, Frost & Sullivan, Global Industry Analysts, and American Geriatric Association. In addition, we screened the media in order to determine if the available technologies are indeed suitable for the purpose of our deliverable. The searching technique focused on combinations of the following key words: indoor navigation, elderly assistive, disability assistive, chronic disease, elderly, eldercare, mobility aids, hearing aids, communication aids, vision aids, healthcare gaming, and educational gaming, elderly gaming, and gaming by age.

7.2.2.2 The inclusion criteria

We included technologies oriented to elderly and disabled assistive technology dedicated to indoor and residence daily activity. Solutions were targeted at a population of totally blind, hearing-impaired, deaf-blind, physical or cognitively impaired seniors. In addition, only data written in English was included.

7.2.2.3 The exclusion criteria

We excluded market surveys conducted prior to 2010, in-door navigation market reports and technologies, technologies for uses other than indoor elderly assistive techniques.

7.2.3 Results

The systematic market search resulted in approximately 100 market reports. Applying the inclusion and exclusion criteria 4 were found relevant. These market coverage reports were reviewed and the product profiles of each company were screened. Moreover, free Google search was performed for identifying additional innovative products.

7.2.3.1   The Indoor Technologies for Elderly

Indoor elder-care can be divided into the following categories:

- **Home telehealth and monitoring:** The home telehealth market was valued at $3.5 billion in 2011. It is expected to continue growing rapidly at a CAGR of 22.5%, reaching $9.7 billion in 2016. There are over 100 market players ranging from multinational technology companies such IBM, Phillips, Bosch to niche national telhealth focused companies such as American Telecare, Boso, BodyTel. This market segment includes companies offering telemedicine technologies for remote patient physician communication, web-based data management systems for single or multiple diseases, and integrated systems for vital signs measurement, data transfer, data management and telemedicine services. The following table summarizes their technology and product offerings. Another growing market niche Smartphone applications for chronic disease management. There are over than 300 Smartphone applications for heart rate monitoring available and over 1000 applications related to Diabetes management, and 260 medication reminders.

- **Wander management**: Dementia, of which Alzheimer's is the most common form, is one of the fastest growing diseases in the world. Estimates indicate that there are more than 24 million individuals of all ages suffering from some form of dementia worldwide. This number is expected to more than triple by 2050. One of the most widespread and potentially dangerous behaviors for persons with Alzheimer's or other forms of dementia is the tendency to wander. As many as 60% of people affected by Alzheimer's wander at some point, and are often unable to return safely without assistance. Nearly 70% of individuals that wander will do so repeatedly, and of those not found within 24 hours, up to half suffer serious injury or death. One of the most effective ways to help protect people that are prone to wander is through the use of advanced location tracking devices and software. Wonder management solutions are included in tracking and locating market quantified in section 2.1. The table below summarizes the product offerings.

- **Smart home:** According to Markets and Markets report, the European smart homes market is estimated to grow from $1,544.3 million in 2010 to $3,267 million in 2015, at an estimated CAGR of 16.2% from 2010 to 2015. Rising demand for energy efficient systems, growing number of venture capital funding, rising security issues and increasing aging population have increased the demand for smart homes in Europe. Amongst all the smart homes applications, security market generated the highest revenue of $380.5 million in 2010 and is expected to reach $741.6 million in 2015, with a CAGR of 14.3% from 2010 to 2015. In the table below we summarize solutions targeting elders.

- **Fall management:** Each year, up to a third of older adults living in the community suffers a fall. This number increases to almost two thirds among older adults who

have a history of a fall in the past year. About half of all people in nursing homes fall each year. There are many fall detectors available in the market both for residential and long-term healthcare facilities. Some companies provide fall monitoring sensors as part of a turnkey telecare solution. Other companies provide a standalone fall detectors. In the table below we summarized product available in the market and in development process.

- **Medication Management Technologies:** Approximately 1 out of 10 hospital admissions are the result of the incorrect use of medications. It is also the leading reason seniors and disabled lose independence and register into long-term healthcare facilities. There are many solutions available for medication management ranging from simple pill boxes to electronic alarms and reminders including electronic dispensing devices. In addition there are 263 medication reminders applications available in Google Play. The table below summarizes electronic solutions.

- **Smart Mobility Devices:** This section summarizes state-of-the-art mobility solutions. Many are complex robotic solutions which are in different stages of research and development. These solutions are expensive and are not applicable for mass manufacturing at this point of time.

- **Hard Hearing and Vision Aids:** This section overviews technology solutions available for indoor hearing and low vision and blind solutions. We do not cover numerous hearing aids available but rather other communication aids which can also serve seniors with hearing vision impairment in-door daily activities.

- **Physical and Cognitive Fitness Gaming:** In addition, we review the healthcare gaming market. A systematic research shows that this market is growing rapidly and there are clinical studies which support the benefits of gaming to the elderly population and Alzheimer patients. According to Ambient Insight research, the US market for technology-based cognitive learning products is growing at 5-year compound growth rate of 32.5%. The annual consumer expenditure totalled $61.1 M in 2009. The most significant catalyst in the consumer segment is the interest in brain fitness coming from aging population. This is a huge marketing opportunity for game manufacturers since the aging population is growing rapidly and already 563 million people and expected to reach 714 million in 2020. There was $53.6 M invested in brain fitness companies in 2007. In this review we focus on healthcare gaming brands that target elderly population. The table below summarizes available technologies. A search in Google Play also resulted in over 1000 brain training games and tests for children and adults of which 399 applications targeting adults and 90% of the applications are free. In this review we summarized only few examples.

The following table summarizes technologies available:

Category	Product	Main Technology	Availability	Target Population
Home Telehealth and Monitoring	1Tempus Health Management Solutions	data transfer		Healthcare providers
	A&D Medical	Monitoring equipment		Chronic disease
	Abbott Freestyle	Glucose monitoring	worldwide	Diabetic
	Aerotel	Telehealth systems		Healthcare providers
	Alere Health Management		worldwide	Chronic disease
	Alere Home Monitoring		worldwide	Anticoagulation impariment
	Alive Technologies	Wireless monitoring equipment	worldwide	Chronic disease
	AMD	Telemedcine equipment	worldwide	Healthcare providers
	American TeleCare	Video confrencing	USA	Healthcare providers
	AxSys Group Excelicare™	Personal Health Records	worldwide	Healthcare entriprizes
	Bayer Contour™	Blood Glucose meter	worldwide	Diabetic
	BL Healthcare	Telehealth system	USA	Healthcare providers
	Biotronic	Cardio automatic information system		Heart disease

Category	Product	Main Technology	Availability	Target Population
	BodyTel Europe GmbH	Monitoring and telemedicine	Europe	Chronic disease
	Boso	Blood pressure monitoring	Germany	Heart disease
	Bosch USA	Monitoring and web-based telehealth	USA	Chronic and mental diseases
	Broomwell Healthwatch, Ltd.	ECG telehealth interpretation service	UK	Healthcare providers
	Cardiocom	Telehealth services	USA	Healthcare providers and chronic disease
	Cardionet	Wireless ECG	USA	Arythmesis
	Cardiophonics	Telehealth services	USA	Heart disease
	Carematix	Wireless monitoring		Chronic disease
	Confidant	wireless diabetes management system	USA	Diabetic

Category	Product	Main Technology	Availability	Target Population	Price Range
Medical Alert System	Care Electronics "Pull for Help" Emergency Caller	Wireless emergency caller	USA	Elderly	$200
	Health Sense Pers+		USA	Elderly	
	Philips LifelineMedical Alert		USA	Elders	
	Cadex Alert Watch	Watch and EMR	worldwide	Chronic Disease	$100

Category	Product	Main Technology	Availability	Target Population	Price Range
Wander Management	Aerotel SKeeper	Wirst wireless communicator	worldwide	Elederly & Children	
	August Development EarlyResponse	Integration of various residencde house technologies	USA	Residence houses	
	Care Electronics	Mobility monitor	USA	Residence houses	$59-$89
	Care Electronics	Home Wander System	USA	Alzheimer's Residents, Developmentally Disabled, Dementia Sufferers	$775
	Care Trak Inc.	Radio signal based alarm system	USA	Alzheimer, Autism, Down Syndrome, Prader-Willi Syndrome, Williams Syndrome, Soto Syndrome, Fetal Alcohol Syndrome	
	Ekahau Patient tracking	WiFi tracking system	worldwide	Hospitals	
	Locator Systems International	VHF locating system	USA	Alzheimer, Autism	$99 + $30/Month
	Mobile Help	Mobile alert system	USA	Elderly	$443/year

Category	Product	Main Technology	Availability	Target Population	Price Range
	OmniLink FocalPoint™	GPS tracking device	USA	Dementic	$700
	RF Technologies Code Alert	RFID tracking system	worldwide	Residence home	
	Philips Senior Living Solutions	Residence safety system	worldwide	Residence home	
	Vigil Health Solutions	Infra red motion detector	worldwide	Residence home	
	Rondish Wonder alert devices	Range of alert systems	Hong kong	Healthcare facilities	
Smart Home	BIME	Integrating multiple technologies including Infra red, temperature, pressure, etc.	Research	Dementia	NA
	CASAS	Multidisciplinary research project	Research	Elders	NA
	CloseBy Networks		USA and Ireland	Elders	
	Georgia Institute of Technology Aware Home	Interdisciplinary research program	Research	General and Elders	NA

Category	Product	Main Technology	Availability	Target Population	Price Range
	Grandcare Systems	Combining tele-health assessment, activity monitoring, medication management, video chat, smart home automation, virtual communications & social networking	USA and Canada	Elders	
	Healthsense eNeighbor®	Monitoring system for daily activity, wonder, and fall detection	USA	Elders and homecare	
	Home for Life Solutions	Safety Sensors	USA	Elders	
	MARC	Smart home project for surveillance	Research	Elders	NA
	Oragon Health and Science University	Machine learning algorithms	Research	Elders	NA
		Reports and alerts can be viewed from smartphone	USA	Elders	
	Honeywell Total Connect	Vidio based system	worldwide	General and Elders	
	CERT	Smart Home Project	Research	Elders	NA

Category	Product	Main Technology	Availability	Target Population	Price Range
	Tynetec	Telecare system	UK	Elders and cognitive disabled	
	OttoBock Output Devices	environmental control	worldwide	Physically disabled	
Fall Monitoring	Safe T Mate	Under seat fall monitor Personal fall monitor	USA	Disabled	
	AliMed	Bed Fall Pad	worldwide	Elders and Disabled	$180/monitor $54/pad
	AliMed Wheelchair Fall monitors	Belts and cushions	worldwide	Disabled	$100-$700
	CERT	Passive sensing and GIAT Analysis	Research	Elders	NA
	DCT Associates PTY LTD Falling Alarms	Radio signal	Australia	Elders	
	Reconfigurable Embedded Systems for Medical Applications	Smart cane	Research	Geriatric	NA

Category	Product	Main Technology	Availability	Target Population	Price Range
	iLife Solutions	Radio transmitter and Accelerator based technology	USA	Elders and disabled	
	MARC	Giat fall monitoring	Research	Elders	NA
	RF Technologies Code Alert	Matrices pads	USA	Long-term facilities	
	RF Technologies Sensatec®	Cushion alert system	USA	Long-term facilities	
	Tunstall	Waist auto alert system	UK	Elders	
	Visonic MCT-241	Waterproof Pendant PowerCode Wireless Transmitter	worldwide	Elders	
	Zenio	Have Bluetooth capabilities			
Medication Monitoring	AmeliaPlex OnTimeRx®	Phone Appl.	worldwide	Chronic Disease	Free- $5
	Tunstall MedSmart	Medication reminder and dispenser	USA UK	Chronic Disease	

Category	Product	Main Technology	Availability	Target Population	Price Range
	Cadex Automomatic pill dispenser	electronic pill dispenser	worldwide	Chronic Disease	$289
	Compumed	Pill Dispenser	worldwide	Chronic Disease	$800
	Database Systems Corp.	Call service	USA	Elders	
	Global Assistive Devices, Inc. VibraLite	Watches and clocks	worldwide	Chronic Disease	$50-$100
	Innovative Product Source My Tiny Reminder	Alarm reminder	worldwide	Alzheimer and cognitive disabled	$20
	MedMinder	Pill dispenser with Cellular connectivity	USA	Elders	$40-$60/M
	Philips	Medication dispenser	worldwide	Elders w/ chronic disease	
	SimPill	Pill reminder	UK	Chronic disease	
	Vacia SimpleMed	Pill dispenser	worldwide	Chronic Disease	$295

Category	Product	Main Technology	Availability	Target Population	Price Range
	Vitality GlowCaps	Standard medication bottle cap with wireless chip	worldwide	Medication users	$10 + $15/M
Smart Mobility Devices	ARGO Medical Technologies Rewalk	Robotic leg support mimics natural walking, sitting	Europe	Physical disabled	$71,000
	Cyberdyne HAL	Robort utilizes bio-electric brain singals from the skin	Research	Physical disabled	NA
	Utah University iWalker	Locating rollator based on RFID	Research	Altzheimer	NA
	CyberNorth	Voice recognition	Research	Physical disabled	NA
	Fraunhofer Institute Care-O-bot	Household Assistance	Research	Physical disabled	NA
	Gecko Systems CareBot	Remote medical monitoring system	USA	Elders	
	Gecko System SafePath	Artificial intelligence to interpret joystick signals	TBL	Physical Disabled	NA
	ShoeSense	Remote phone operation	Research	Disabled	NA
	Exact Dynamics	Arm robot		Physically disabled	

Category	Product	Main Technology	Availability	Target Population	Price Range
	MARC Walker	Abstacle guided walker	Research	Elders	NA
	RoboSoft	Campanion robot	In-Developmen t	Eldres	NA
	TopChair	Climbing steps wheelchair	Grance and Intr.	Disabled	$18000
	Toyota	Walking robot	In-Development	Physically disabled	NA
Vision & Hearing Disabled Solutions	Global Assistive Devices, Inc. Alarm clocks	Bed shakers and led equipted alarm clocks	worldwide	Hard Hearing and deaf/ early risers	$50-$60
	Cobolt	Wide range of Talking household electronic devices	UK mostly	Dementia, cognitive impaired, Visually impaired and Blind	$60-$1,500
	Freedom Scientific	Desktop screen magnifiers	worldwide	Visually impaired and blind	
	Humanware	MaxEvent	worldwide	Visually impaired	
	Krown Manufacturing	Text telephone	worldwide	Hall	$239
		Amplified telephone	worldwide	Hard hearing	$150
Cognitive Gaming	Dakim	Specializes in gaming to improve cognitive ability Dementia	USA	Dementia	$250 annually

Category	Product	Main Technology	Availability	Target Population	Price Range
	Nintendo Wii	Physical and cognitive programs	worldwide	Adults	$20-$25
	Xbox360	Full body workout based on Kinect technology	worldwide	General	$25
	Xbox	Brain Challenge	worldwide	General	$20
	UniSoft	BrainSpa	worldwide	Adults	$9
	PositScience	BrainHQ	worldwide	Adults	$99 annually
	MindGames	Smartphone application	worldwide	Adults	Free
	Brain trainer	Smartphone application	worldwide	Adults	Free
	Brain Age	Smartphone application	worldwide	Adults	Free
	GestureTek IREX	Video game	worldwide	Rehabilitation facilities	$10,000-$15,000
	Kinect for Windows	Sensor	37 Markets[11]	General	$215

[11] Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, India, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, the United Arab Emirates, the United Kingdom, and the United States.

7.2.3.2   TeleHealth Product Profile:

7.2.3.2.1 1Tempus Health Management Solutions

Tempus systems are available as software only or as holistic solutions. Tempus solutions include a multi user screening system, a home monitoring system, a pharmaceutical system, and an occupational health system. They offer tailored solutions on demand.

Tempus solutions allow a high degree of configurability. As such, standard solutions can be used to satisfy a wide range of clinical requirements, including the ongoing management of long-term conditions, the essential screening and early treatment of these conditions, as well as short term out-patient monitoring. All the solutions are designed to reduce the high demands being placed on the NHS.

7.2.3.2.2 A&D Medical

A&D Medical provide monitoring equipment: activity monitors, weight scales and blood pressure monitors with Continua compatible connectivity to smart phone, tablet, or personal computer. A&D software solution allows to collect, store and view healthcare information and track progress on a regular basis. User can choose to share this information with doctor, care giver, wellness coach or friends.

7.2.3.2.3 Abbott Freestyle

Abbott Freestyle is product family of home glucose monitoring devices which data can be uploaded to PC and stored and tracked using CoPilot Health Management System. CoPilot is used by health care providers to review and evaluate all key information, test results, and trends.

7.2.3.2.4 Aerotel

Website: http://www.aerotel.com/en/

Aerotel provides complete solutions for telemedicine, telehealth and telecare applications. Aerotel patient monitoring systems consist of medical call center software and transtelephonic and digital monitoring devices that effectively transfer vital medical or lifestyle data over the telephone, the Internet or wireless networks. Whether it is an ECG, blood pressure values, blood glucose level, pulse oximeter, weight, or other vital sign, our modular monitoring systems reliably transfer essential data to a monitoring center enabling accurate diagnosis. The patient information and the transmitted data can be viewed locally or via the Internet.

7.2.3.2.5 Alere Health Management

Website: http://www.alere.com/ww/en.html

Alere™ Health Management programs connect a range of devices and services that actively integrate data collection to empower individuals to make better choices.

7.2.3.2.6 Alere™ Home Monitoring

Website: http://www.alere.com/ww/en.html

Alere™ Home Monitoring, Inc. is a home anticoagulation monitoring service. A portable INR monitor allows patient to take test at the home stting and send the results to the healthcare provider.

7.2.3.2.7 Alive Technologies

Website: http://www.alivetec.com/about.htm

The company develops wireless health monitoring systems for screening, diagnosis and management of chronic diseases, and for consumer health and fitness. Applications include the management of atrial fibrillation and heart failure, cardiac rehabilitation and fitness monitoring.

7.2.3.2.8 AMD Telemedicine

Website: http://www.amdtelemedicine.com/

AMD Global Telemedicine is a supplier of medical technology for telemedicine with installations in 90 countries. This includes medical devices, complete Telemedicine Encounter Management solutions and application software for both live and store and forward telemedicine.

7.2.3.2.9 American TeleCare

Website: http://www.americantelecare.com/

American TeleCare offers a line of products to service telehealth needs. American TeleCare offers complete products for monitoring patients and conducting video visits of patients. Offering healthcare providers a complete system that takes the burden of added infrastructure away, it minimalizes the footprint in the institution to reduce over-head costs.

7.2.3.2.10 AxSys Excelicare

Website: http://www.axsys.co.uk/index.php

AxaSys Group design, develops, and deploys, clinical software applications. Excelicare™ Personal Health Record is a secure and confidential way to empower patients to engage

with their own clinical record. Some of the biggest healthcare enterprises in the USA and Canada are using Excelicare, as well as more than 50 organizations in the United Kingdom and Ireland – covering more than 40 clinical specialties.

7.2.3.2.11 Bayer Healthcare Contour™

Website: http://healthcare.bayer.com

Bayer's Medical Care division offer blood glucose monitoring devices such as the single-strip Contour™ system and the multi-strip Breeze™ system. Bayer also market the Contour™ USB meter, which features integrated diabetes management software and direct plug-in to computers, and the A1CNow™ system for determining long-term blood glucose control (A1c). Outside Europe, these products are generally sold to consumers through pharmacies, drugstores, mass merchants, hospitals or wholesalers. In Europe, they are sold mainly through pharmacies.

7.2.3.2.12 BL Healthcare

Website: http://www.blhealthcare.com/products.html

BL Healthcare provides an integrated solution that connects health care providers to their patients where they live and work. Dedicated Healthcare Access devices for patients make health status information, multimedia health education, interactive questionnaires, health-related messages and reminders and video conferencing with health care professionals and family caregivers. Using an embedded system approach, BL Healthcare build devices with no moving parts and no hard drives. Built-in wireless, Ethernet and telephone connectivity ensures patient access from almost anywhere.

7.2.3.2.13 Biotronik

Website: http://www.biotronik.com/wps/wcm/connect/int_web/biotronik/home

Home Monitoring is an internet-based, automatic remote monitoring system that uses the cellular phone network to enable physicians to remotely monitor their patients' clinical status and their device status no matter where they happen to be. The way it works is simple. The implanted device transmits diagnostic, therapeutic, and technical data automatically and silently to a small external patient communicator, the CardioMessenger®, via an integrated antenna – all without the slightest patient interaction.

7.2.3.2.14 BodyTel Europe GmbH

Website: http://www.bodytel.com/

BodyTel products automatically document and transfer of the measured body values as well as record of relevant additional information and thus the development of complete

patient files. The BodyTel products GlucoTel™, PressureTel™, and WeightTel™ are based on a central infrastructure. All devices possess an integrated Bluetooth module, with which the measured body values are automatically and wirelessly sent to a transfer station (patient's home gateway or cell phone). In turn, this station fully automatically forwards the received values to a secure online database, using a protected internet connection (SSL encryption). The entire transfer process takes place automatically and in real time, without the patient having to do anything else.

The BodyTel system including its vital sensors, the hardware and software of the transfer stations, and the database are certified and approved in accordance with the current Medical Devices Directive.

7.2.3.2.15 Boso Bosch +Sohn GmbH U. Co. KG

Website: http://www.boso.de/en/home.html

A German blood pressure device company for home and hospital care. The devices' data can be uploaded to the PC. Boso software creates long-term graphs of blood pressure results, calculates average values to enables physicians to make a detailed blood pressure diagnosis.

7.2.3.2.16 Bosch USA

Website: http://www.bosch-telehealth.com/en/us/startseite/home.html

Bosch Telehealth provides over 100 health management programs in more than 30 medical conditions; these programs support home care, transitional and long-term care coordination for patients with chronic conditions and serious mental illness.. The Bosch Health Buddy System includes the easy-to-use Health Buddy four-button device, the web-based Health Buddy Desktop application for providers and health management programs for a variety of single and co-morbid conditions. It is used for long-term care coordination of patients with chronic conditions (360 day programs) and for patients with chronic conditions who are post-discharge from the hospital (60 day programs).

7.2.3.2.17 Broomwell Healthwatch, Ltd.

Website: http://www.broomwellhealthwatch.com/index.php

Brommwell Healthwatch offers ECG interpretation & reporting service using 12 lead ECG, Arrhythmias, and Holters. Broomwell Healthwatch provides ECG interpretation service via telephone or internet enabling remote cardiac diagnoses within every surgery.

7.2.3.2.18 Cardiocom

Website: http://www.cardiocom.com/

Cardiocom® is a developer, manufacturer and clinical telehealth solutions provider offering Integrated Clinical Telehealth Services. Cardiocom's home telemonitoring equipment and telehealth services enable health professionals to identify symptomatic Heart Failure, COPD, Asthmatic, Diabetic, and Hypertension and Obese patients. In addition, Cardiocom offers Telehealth Nurse Services for clients who prefer a turn-key program. The call center specializes in telemanagement.

7.2.3.2.19 Carionet

Website: https://www.cardionet.com/mcot.htm

CardioNet is a supplier of Mobile Cardiac Outpatient Telemetry™ (MCOT™). CardioNet provides the ambulatory cardiac monitoring service, real time analysis, automatic arrhythmia detection and wireless ECG transmission. The device provides remote activation, automatic detection and wireless data transmission, and 30 days of continuous memory and enhanced software and components support additional sensor integration.

7.2.3.2.20 Cardiophonics

Website: http://www.cardiophonics.com

Cardiophonics can interactive telehealth technology and communication network. Cardiophonics provides round-the-clock services (24/7/365) through its patient monitoring centers. Certified clinicians and nurses who are skilled in telemedicine help patients transmit their objective data through telephonically systems, online computers and mobile technology. They then prepare detailed analyses of the data for the prescribing health care provider.

Cardiophonics also offers clinical research monitoring services, which provide consistent and high quality research, pharmaceutical and biotechnology companies.

7.2.3.2.21 Carematrix

Website: http://www.carematix.com/

The Carematix Wireless Remote Patient Monitoring System collects data from monitoring devices and transmits data wirelessly to healthcare providers. Customers have several options to upload readings, collect patient surveys, and give opinions. These include IVR (interactive voice response) and SMS on mobile phones. Users can also set up to receive SMS reminders to take a reading. Carematix collaborates with blood pressure, weight, blood glucose, pulse oxymeter and peak flow meters manufacturers and offers a range of multiple data collection. In addition, Carematix offers the Carematix hub for data transmission eliminating the need for phone line or cellphone.

7.2.3.2.22 Confidant

Confidant System is a wireless diabetes management system enables blood sugar level readings to be conveniently transmitted over the cell phone network and then have them stored and managed by healthcare providers through the company's web-enabled diabetes management software. The system can readily collect and then transmit blood sugar readings from most any of the glucose meters available in the US market today. Confidant's 3.0 System consists of the Confidant 3.0 Connector device, Confidant 3.0 software application and the Confidant 3.0 PC interface module. The hardware enables the transmission of blood sugar readings from glucometers via any GSM cellular network. The software application stores and manages patients' data. The PC-interface module enables patients' data to be graphically viewed on computers or PDAs connected through the Internet. Upon receipt of newly submitted patient data, Confidant Systems' server software generates and sends feedback messages directly to the patient, via cell-phone or personal computer. The feedback messages are selected by the system based on the patient's currently submitted and historical data.

- Corscience GmbH & Co. KG
- Corventis
- Critical Signal Technologies
- Cybernet Systems Corp.
- Delphi Corp.
- Diabetech
- Docobo, Ltd.
- eDevice
- eHIT, Ltd.
- et Medical Devices SpA
- ExpressMD Solutions
- Eurotech
- FORA Care, Inc.
- H3 System
- Healthanywhere
- HealthFrontier, Inc.
- HealthPia
- HemoSense eNeighbor Vitals™
- eNeighbor Vitals supports blood pressure monitor, glucometer, pulse oximeter and scale. The system makes custom automated calls to remind staff or resident to complete a reading or task. Also custom threshold settings can trigger phone calls or emails to caregivers if a reading is out of range. All events are logged, time-stamped and stored securely in the Healthsense data centre.
- HMD BioMedical, Inc.
- Home Diagnostics, Inc.
- Honeywell HomMed, LLC
- IBM

- IVT Corp.
- Ideal Life, Inc.
- iMetrikus, Inc.
- Infopia Co., Ltd.
- Intel
- InterComponentWare AG
- IntraMed
- I-Sens
- International Technidyne Corp.
- KORE Telematics, Inc.
- Lifeclinic Intl., Inc.
- LifeScan, Inc.
- LifeWatch AG
- Maestros Mediline Systems, Ltd.
- MedApps
- Medic4All
- Medtronic
- Medtronic Diabetes
- MIR Medical International Research, Inc.
- Mondial Lifeguard Technologies
- Motorola
- Nonin Medical, Inc.
- NMT, Inc.
- nSpire Health, Inc.
- Omron Healthcare, Inc.
- Orange
- Philips Home Healthcare Solutions
- Polymap Wireless, LLC
- QRS Diagnostic
- RDSM N.V.
- RS TechMedic B.V.
- Roche Boehringer-Mannheim
- Salveo
- ScottCare Corp.
- Sedona Strategies, LLC
- Sensatex
- SHL Telemedicine http://www.shl-telemedicine.com/
- Sorin SpA
- Sotera Wireless, Inc.
- Spacelabs Medical, Inc.
- St. Jude Medical, Inc.
- t + Medical
- Telehealth Solutions, Ltd.
- Telus
- Tynetec, Ltd.

- Tunstall Healthcare (UK) MyMedic
  The mymedic unit prompts the user, at a set time each day, to begin taking their vital signs. Key features and benefits: vital signs and health questions are configured to the patient's individual needs, large colour display, large soft-touch buttons and multi-language audio announcements via clear loudspeaker, multiple inputs – Bluetooth, serial cable and infrared.
- Viasys Healthcare Hong Kong, Ltd.
- Vitalograph, Ltd.
- Vitaphone GmbH
- Visual Telecommunications Network, Inc.
- Vodafone Group, plc
- Zargis Medical
- ZydacroN Austria GmbH

7.2.3.3   Medical Alert Systems Product Profile

7.2.3.3.1 CareElectronics "Pull for Help" Emergency Caller

Website: http://www.careelectronics.com/

The Pull-for-Help Emergency Caller is activated by a cordless "Pull for Help" transmitter or one-touch emergency button. It sends a personalized, pre-recorded emergency voice message (up to 20 seconds in length) three times to four different phone numbers.

The Emergency Caller automatically skips to the next number when a busy signal is detected or when the phone is not answered. The Emergency Caller keeps calling back until the message is delivered or until the unit is deactivated.

7.2.3.3.2 HealthSense Pers+

PERs+™ is an emergency call system enhanced with a passive daily check-in sensor. The sensor is placed in a part of the residence that has routine activity, like the bedroom hallway, and automatically "checks-in" the resident during the day.

7.2.3.3.3 Philips Lifeline Medical Alert System

Website: http://www.lifelinesys.com/content/home

Philips Lifeline offers an emergency calling system at the push of a button. Lifeline provides standard service of fast access to trained Response Associates, 24 hours a day, 365 days a year. The system comprises of an emergency push button which can be worn on wrist or around the neck, and a communicator. Lifeline developed a new auto alert button which can automatically place a call for help if it detects a fall and the user is unable to push the button. The communicator offers a range of features including: answer calls remotely by just pressing Personal Help Button, Hear conversations more

easily with voice amplification on the speaker phone, connects to Response Associates in case of an emergency.

7.2.3.3.4 Cadex Alert Watch

Website: http://www.cadexwatch.com/

Medical alert bracelet disguised as a normal looking sport watch. No one has to know you're wearing a medical alert bracelet unless they press the ALERT button. It works like a medical ID bracelet (no need for engraving, a computer, internet etc.). In an emergency if user is unable to speak, the CADEX Medical ALERT Bracelet will convey their medical condition / special needs to emergency responders. Critical medical information is relayed to emergency responders immediately, without connecting to a computer or Internet. The CADEX Medical ALERT bracelet can list critical medical information.

7.2.3.4 Wander Management Product Profile:

7.2.3.4.1 Aerotel SKeeper™

Website:http://www.aerotel.com/images/products/prod_pdf/LifeCare/lifecare_skeepe.pdf

SKeeper is a personal wristop cellular communicator with emergency response LifeCare Aerotel. Fitted with a distress button and built-in cellular communicator, it can activate a warning signal when needed, enabling wearers to get immediate care and help from a telecare monitoring center. Using its embedded GSM module and built-in speakerphone, SKeeper enables cellular voice calls to be made to pre-defined numbers (e.g. a relative or a family doctor) or to be received from any caller or from the remote monitoring center when in need. SKeeper can take advantage of operator provided location based services. In the event that the wearer wanders outside a specified zone (e.g. neighborhood or home) the system can send an alert to the monitoring center and /or to another mobile phone.

7.2.3.4.2 August Development Corp. EarlyResponse

Webseite: http://www.augdev.com/index.asp

EarlyResponse is a resident management system that integrates various manufacturers' equipment into a seamless notification and reporting system for long-term care institutions and hospitals. EarlyResponse works with many nurse call, wander prevention and personal emergency response systems on the market.

7.2.3.4.3 Care Electronics Mobility Monitors

Mobility Monitors alert a caregiver when a resident attempts to leave the safety of a chair or bed. These monitors use an adjustable cord that is attached to the alarm box. The

cord is clipped to the resident's clothing and activates an alarm when the cord and alarm box are separated as the resident gets up.

7.2.3.4.4 Care Electronics WanderCare

WanderCARE 100T is a monitoring system for home residence at risk of wandering. The system alerts the caregiver when the wanderer goes beyond a set range and provides tracking capability up to 1 mile so that the wanderer can be located and returned. WanderCARE 100T monitors using a transmitter that is worn on the wrist, ankle, waist, or in a special fanny pack. This transmitter reports every 12 seconds, sending information on the activity level and location of the individual being monitored. The caregiver can set a specific range of movement for the resident, which can be changed as needed. When the wanderer moves out of this set range and fails to return within a preset amount of time, an alarm will notify the caregiver. The WanderCARE can also be connected to a dialer, which will notify up to 4 phone numbers of an emergency. It can provide remote audible alarms when used in facilities.

7.2.3.4.5 Care Trak Inc.

Website: http://www.caretrak.com/index.asp

The system is comprised of three parts: the Primeter, the mobile locator and the wrist transmitter. The system establishes an adjustable boundary anywhere it is set up at. The adjustable area set by the caregiver is from about 50ft to 300ft depending on weather and environmental conditions. As long as the user is wearing a Care Trak transmitter is within the boundary, nothing will happen. If they leave and cross the invisible boundary an alarm will sound alerting the caregiver. The Perimeter System is portable, sets up in minutes; there is no installation required and no buried wires. The Care Trak Mobile Locator tracking unit can find a lost person up to a mile away* day or night, inside or outside in minutes. The ultra-sensitive tracking unit receives the radio signal pulsating from the wrist or ankle transmitter. The tracking unit utilizes a yagi hand held directional antenna. When the antenna is in line with the transmitter the signal comes in stronger and louder. By moving the antenna to the right or left the signal fades.

7.2.3.4.6 Ekahau Patient Tracking Solution

Website: http://www.ekahau.com

The Ekahau RTLS solution helps hospital staff keep track of patients and alerts of events or incidents that require immediate attention. By leveraging a hospitals existing Wi-Fi network, Ekahau RTLS sees where all tagged patients are at anytime, anywhere within the footprint of the network- indoors or outdoors. If a patient is in his room or on

his assigned floor, Ekahau RTLS will locate them. Should a confined patient walk into the fire escape, Ekahau RTLS will alert staff members and security officers about the event. The rechargeable EkahauT301W wristband tag can be worn by a patient around their wrist or ankle depending on the type of patient and situation. A patient wearing the T301W can have specific mobility rules applied to them, such as "should not leave this floor" or "allowed full mobility – but alert if they go outside". A mobility profile can be configured for each tag or group of tags. If a patient wanders, but within limits allowed by the system, caregivers can see this on a general system status screen.

7.2.3.4.7 Locator Systems International

Website: http://www.locatorsystemscorp.com

Locator Systems International Corporation is a wholly owned subsidiary of LoJack Corporation that develops and manufactures advanced tracking and location equipment. Locator Systems' VHF transmitter and receiver technology has been sold for location services for individuals with Alzheimer's, autism and other cognitive conditions. The equipment is part of the LoJack SafetyNet System, which also includes integration with law enforcement, a secure database of key client information to assist in search and rescue operations and 24x7 emergency caregiver supports.

7.2.3.4.8 Mobile Help

Website: http://www.mobilehelpnow.com/

Mobile Help offers several home locating devices. Their Flag product is Duo, two systems in one, a Base Station and Mobile Device Working Together. Wrist Button and Neck Pendants work with both the Base Station and Mobile Device. Duo System expands the voice and sound coverage in the home. Mobile device works inside and outside the home via Cellular/GPS Tracking. US Based 24 x 7 Emergency Monitoring Service.

7.2.3.4.9 Omnilink

Website: http://www.omnilink.com/index.html

Omnilink provides the location-enabled tracking solutions through its award-winning technology platform, FocalPoint™. Using the FocalPoint™ platform, almost any location-enabled tracking device can be used to monitor the location of a specific individual. Omnilink's solution has the ability to track devices, both indoors and outdoors, in real time. Functionality, like the enter and exit zones included in solutions built on FocalPoint™, enable users to receive automatic alerts if the person deviates from designated safe zones. Caregivers have the ability to access the FocalPoint™ tracking functionality

through a web-based platform from any Internet access point. Information can be provided directly to emergency workers or search and rescue teams to help ensure that people with dementia that wander are found as quickly as possible.

7.2.3.4.10 RF Technologies Code Alert

Website http://www.rft.com/

The Code Alert wondering management solution monitors residents at risk of elopement. Resident wears a wrist or ankle transmitter. An antenna recognizes when a transmitter is too close to a monitored exit and simultaneously arms the door automatically and notifies caregivers through paging system, mobile phone, PC control station, and LED display. Incorporating alarm escalation to ensure every call gets a quick response.

7.2.3.4.11 Philips Senior Living Solutions

Website: http://philipsseniorliving.com/content/index.jsp

The CarePoint resident safety system offers fully-integrated controlled access functionality, as well as wander management capability for those with cognitive impairment. Schedule the accessibility of community doors and selectively restrict access on a by-resident basis, all from a centralized monitoring station. Know what doors were accessed when, and have the peace of mind that certain doors cannot be accessed by residents or even staff when they shouldn't be. Wander management is simple as well. Through complete integration, CarePoint leverages patented RoamAlert® technology. This allows resident access right prescription based on their level of cognitive ability or degree of memory loss. Wandering residents wear an electronic ID/tag, and each access event is logged and can be added to management reports.

7.2.3.4.12 Vigil Health Solutions Dementia System

Website: http://www.vigil.com/?Welcome

The Vigil Dementia System's software and passive sensors continually monitor resident rooms to detect unexpected behavior for example: extended time out of bed or in the restroom, leaving the room, even incontinence. Incidents are automatically reported to the appropriate caregiver via silent pager, wireless phones or email enabled smart phone, facilitating a calm home-like environment, and eliminating the need for audible alarms or flashing lights that agitate residents.

7.2.3.4.13 Rodish

Website: http://www.rondish.com

Rodish is a Hong Kong based security company. Rodish offers a range of wondering alert system to serve long-term healthcare facilities including: bed monitors, chair pressure monitor, anti-wonder floor matrices, door connectors, and nurse callers.

7.2.3.5 Smart Home Product Profile

7.2.3.5.1 Bath Institute for Medical Engineering BIME

Website: http://www.bath.ac.uk/bime/index.htm

BIME is a nonprofit organization aimed to improve the quality of life of children and adults with disabilities and healthcare problems through the use of technology. BIME have been collaborating for several years with Dementia Voice and Housing 21 to develop technology for use in a smart house for people with dementia. The collaboration is a user-led design exercise involving many people with dementia and their carers in order to design and develop smart home technologies that could assist with various problems that had been identified from surveys with personal carers. A lot of work has been completed evaluating individual components of the smart home, such as automatic taps, cooker monitors, etc. and these were originally demonstrated at the Gloucester Smart House. Complete installations are now being evaluated initially in Deptford in London, with excellent results. With enabling smart technology the house itself reacts to any issues that arise, and rarely needs to call for outside assistance. It does this through automatic equipment, and verbal prompts and reminders.

7.2.3.5.2 CASAS Project

Website: http://ailab.wsu.edu/casas/

The CASAS Smart Home project is a multi-disciplinary research project at Washington State University focused on the creation of an intelligent home environment. The project's approach is to view the smart home as an intelligent agent that perceives its environment through the use of sensors, and can act upon the environment through the use of actuators. The home has certain overall goals, such as minimizing the cost of maintaining the home and maximizing the comfort of its inhabitants. In order to meet these goals, the house must be able to reason about and adapt to provide information. The project is currently recruiting volunteers to participate in a study.

7.2.3.5.3 CloseBy

Website: http://www.closebynetwork.com/

The CloseBy Network supports a variety of products. This flexibility makes it easy to create a system that can expand as needed to address different issues that arise during care giving. The system includes: Network, infra-red motion detectors, chair and bed oc-

cupancy detectors, contact sensors, temperature sensors, smoke detector, telephone and doorbell notification, contact me button, and video support. Notification and alerts are sent to care givers phone, email and network gateway. In addition the caregiver can check the loved one via internet at time.

7.2.3.5.4 Georgia Institute of Technology Aware Home

Website: http://awarehome.imtc.gatech.edu/

The Aware Home Research Initiative (AHRI) at Georgia Institute of Technology is an interdisciplinary research endeavor aimed at addressing the fundamental technical, design, and social challenges for people in a home setting. Central to this research is the Aware Home, a 3-story, 5040 square foot facility designed to facilitate research, while providing an authentic home environment. Aware Home Research Initiative researchers are interested in three main research areas: Health and Well-being, Digital Media and Entertainment, and Sustainability, investigating how new technologies can impact the lives of people at home.

7.2.3.5.5 GrandCare Systems

Website: http://www.grandcare.com

The GrandCare System is connected to any dedicated internet connection and communicates with "wireless" sensors throughout the residence. Designated caregivers can log into the GrandCare website to send communications to the loved one, view activity & digital health sensor information, and customize the automatic caregiver alerts. A caregiver may choose to receive a call, email or text message if specified conditions occur (medication noncompliance, unusual activity, door opens at unusual time, etc.). Caregivers access the features of the system by going online, logging in, and opening the Care Menu. The Care Menu allows for adding communications to the touchscreen, for viewing activity graphs and medication information, and for setting up alert rules.

7.2.3.5.6 Healthsense eNeighbor®

Website: http://healthsense.com/

eNeighbor® remote monitoring uses monitoring technology on a scalable Wi-Fi platform. With eNeighbor, caregivers can automatically detect emergency situations like falls, as well as emerging health concerns before they turn into emergencies. Monitors and sensors combine to meet the specific health needs of a resident, both on campus and in the community. Features include Automatic fall detection, Emergency call pendant, Custom monitors designed for wandering, falls, or missed medication, Custom voice reminders for staff and residents, and Activities of Daily Living (ADL) reports to track health and

wellness indicators. eNeighbor uses sensors to track Activities of Daily Living (ADLs). The sensors work with Healthsense software to establish the typical levels of daily activity, or a "routine" for each resident. This "routine" becomes the benchmark for establishing when the resident may need assistance without the resident actively needing to ask, check in, push a button, or pull a cord.

7.2.3.5.7 Home for Life Solutions

Website: http://www.homeforlifesolutions.com/

Home for Life Solutions Safet and security division provides a range of detectors to build a smart home system. The detectors include: Caresse+ Personal Emergency Response System, Amie Pendant, CookStop (a built-in motion detector that monitors the user's movements. If the user doesn't return within a specific time frame, the stove shuts off automatically), Fall Detector worn on belt, Pull Cords, Flood Detector, Pressure Mat, Motion Detector, Bed Occupancy Sensor, Enuresis Sensor, Emfit Movement Sensor , Extreme Temperature Sensor, Smoke Detector, CO Detector, and Wireless Keypad.

7.2.3.5.8 Medical Automation Research Center (MARC)

Website: http://marc.med.virginia.edu/projects_smarthomemonitor.html

MARC at the University of Virginia has developed technological solutions for in-home monitoring of residents in order to provide quality of life indicators. The in-home monitoring system is composed of a suite of low-cost, non-invasive sensors (strictly no cameras or microphones), and a data logging and communications module, in addition to an integrated data management system, linked to the Internet. MARC has generated preliminary data from an activity monitor that logs the activities of the subjects onto a computer database. The system can provide: general health and activity levels, Activities of Daily Living (ADL), most Instrumental Activities of Daily Living (IADL), index of well-being, and a measure of the decline in ability over time. These observations may yield early indicators of the onset of a disease. Additionally, a sudden change of activity (or inactivity) can indicate an accident. Although the system is not meant as an emergency prompt system, the caregiver may receive alerts over the Internet or urgent notifications over the phone in case of such sudden accident indicating changes. Software tools can generate reports of health/ activity indicators and the overall wellbeing of the individual. Feedback reports can be sent to monitored subjects, their designated informal caregiver and their health care provider. Feedback to the individual can encourage the individual to remain active.

7.2.3.5.9 Oregon Health and Sciences University

Website: http://www.orcatech.org/

In home-health monitoring system tracks mobility, location, and other movement metrics of a person within their living environment (home or assisted care facility) and attempts to infer cognitive and physical characteristics from these mobility metrics. The system includes both a body-worn tag and also incorporates a tag-free method for monitoring movement of the resident. The researchers are currently developing machine learning tracking and classification algorithms for determining position of the resident within the home as well as activities of daily living. The system is currently being deployed within the ORCATECH Living Labs, which are homes of older adults living within the community that have agreed to have their homes out-fit with various sensing technologies.

7.2.3.5.10 Xanboo Healthcare Enhanced

Website: http://www.xanboo.com/

Remote monitoring system allows to know when someone gets up from bed, or if they failed to get up by a pre-determined time, to be aware if someone is waking up often during the night and going to the bathroom, alerts if someone gone into the bathroom, and not come out for a long period- a potential slip & fall, reports daliy activity level, alerts a bathtub or toilet overflow, room temperature, door contact sensor.

7.2.3.5.11 Honeywell Total Connect

Website: http://homesecurity.honeywell.com/solutions-family/elderly/index.html

Honeywell Total Connect helps maintain remote connection to elderly relatives who live independently. It provides video image of the premises or pressed a panic pendant for emergency help in the event of a medical crisis, fire or burglary. The system monitors hallways, staircases and doors with video and be notified if a bathtub or toilet is overflowing or if extreme temperature has been sensed—alerting of potential slip-and-falls and dangerous living conditions. Suitable for the visually impaired, there are alarm keypads with bright screens and large, easy-to-read text or models that announce system status in clear, spoken English.

7.2.3.5.12 Center for Eldercare and Rehabilitation Technology (CERT)

Website: http://eldertech.missouri.edu/overview.htm

CERT develops an **In-Home Sensor Networks for Detection of Early illness and Functional Decline.** Sensor networks have been installed in TigerPlace apartments since Fall, 2005. The suite of sensors includes motion sensors, chair pads, a stove sensor, and a bed sensor capturing restlessness, and low, normal, and high pulse and respiration rates. CERT have developed an integrated intelligent monitoring system that reliably captures data about the residents and their environment in a noninvasive manner

and balances the needs of health and safety and privacy, developed algorithms to extract patterns of activity from the collected sensor data and generate alerts that indicate a potential health change, evaluated the usability of the interfaces, and investigated the acceptability of the technology by seniors.

7.2.3.5.13 Tynetec Telecare System

Website: http://www.tynetec.co.uk/products/independent-care-for-you

Telecare is a service that helps to support and enhance the opportunity for people to continue to live in their own home and/or maintain an independent lifestyle with the appropriate level of carer support. An at home alarm unit, Tynetec Reach, is plugged into a telephone line and the user is provided with a personal pendant, Tynetec Touch. Once pressed the call is automatically forwarded to a monitoring center, family member or friend who can then assess the situation and provide the necessary care and support. Telecare is customizable to most individual's situations by the simple addition of telecare peripherals such as a fall detector, flood sensor or smoke alarm.

7.2.3.5.14 OttoBock Output Device

Website: http://www.ottobock.com/cps/rde/xchg/ob_com_en/hs.xsl/1335.html?openteaser=1

The optional LCD screen with the integrated infrared/Bluetooth* environmental control combines numerous functions in one remote control; it enables to change the TV programme, turn on the light or use the phone - from the comfort of a wheelchair.

7.2.3.6   Fall Monitoring product profile

7.2.3.6.1 Safe T Mate

Website: http://www.safetmate.com/

Safe T Mate offers two products options for wheelchair users: under-seat fall monitor and personal fall monitor. The under-seat unit is fully adjustable to fit any width wheelchair and is compatible for use with seat cushions. The detachable alarm box features a tamper resistant switch, low batter warning, LED Indicator, full perimeter silicone jacket, Velcro mounting strap with upholstery clip, 9 volt battery included. The personal fall monitor has a switching mechanism uses a surface mounted magnet that releases in any direction.

7.2.3.6.2 AliMed Bed Fall Monitor

Website: http://www.alimed.com

Bed fall monitor is an alert system in case of a fall from bed utilizes bed pad sensors used for 6 months and a cordless alarm unit.

7.2.3.6.3 AliMed Weelchair Fall Monitor

Website: http://www.alimed.com

AliMed offers a range of wheelchair fall monitoring products, mainly a variety of cushions and belts.

7.2.3.6.4 CERT Passive Fall Detection and Gait Analysis for Fall Risk Assessment

Website: http://eldertech.missouri.edu/overview.htm

This approach to fall detection does not require the client to wear anything, push any buttons, or charge any batteries. Rather, CERT have been investigating sensing that can be embedded in the environment, including vision, depth images (e.g., the Kinect), acoustic arrays, and radar12-14. Likewise, fall risk assessment is accomplished through daily monitoring in the home, also using sensing installed in the environment 15-18, to capture gait changes that may indicate problems in physical or cognitive health.

7.2.3.6.5 DCT Associates PTY LTD Falling Alarms

Website: http://www.dctassociates.com.au/falling.htm

DCT developed 2 falling alarms. One has a range of between 20 and 30 meters, the other has a range up to 900 meters. The short range unit delay can be set to any length but a 20 second delay is recommended. The built in delay allows the person wearing the alarm to bend over for short periods of time without initiating the alarm. This is ideal in situations where the person works in the garden of does house work. While the delay timer is operating, a buzzer sounds indicating to the wearer that the alarm has been initiated and they have only 20 seconds before the alarm radio signal is sent out summoning help. The delay timer is immediately cancelled if the person wearing the unit stands upright. The long range unit has a fixed time delay of 24 seconds. The alarm can be worn around the waist in a pouch.

7.2.3.6.6 Reconfigurable Embedded Systems for Medical Applications

Website: http://er.cs.ucla.edu/index.html

Embedded and Reconfigurable Systems Lab (ER Lab) at the Computer Science Department of the University of California at Los Angeles (UCLA). The SmartCane System is an assistive device for Geriatrics. The SmartCane system combines advances in signal processing embedded computing, and wireless networking technology to provide capabilities for remote monitoring, local signal processing, and real-time feedback on the cane usage. This system aims to reduce risks of injuries and falls by enabling training and guidance of patients in proper usage of assistive devices.

7.2.3.6.7   iLife Fall Detection Sensor

Wesite:http://www.abledata.com/abledata.cfm?pageid=19327&top=10761&productid=15981
1&trail=0&discontinued=0

The iLife Fall Detection Sensor is an emergency alert system designed for use by seniors and individuals with balance and mobility disabilities. The system includes a fall sensor with a wireless radio transmitter, which are housed in a single wearable unit worn on the body of the protected person. The sensor can detect falls, abnormal body movements, or extended periods of inactivity and automatically summon assistance without user intervention. The device also has a manually activated button for summoning help. The fall detection sensor employs accelerometers and a microcomputer that is programmed to distinguish between falls and normal movement, even if that movement involves shocks such as dropping into a chair, walking with a heavy gait, or descending stairs. The device can be worn in bed.

7.2.3.6.8 J.T. Posey Co.

Website: http://www.posey.com

Posey developed a range of fall monitoring and fall prevention products ranging from anti-slippery socks, chair and bed occupation sensors and alarm systems based on radio transmitters.

7.2.3.6.9 MARC gait monitor

Website: http://marc.med.virginia.edu/projects_gaitmonitoring.html

The MARC gait monitor comprises a highly sensitive and selective sensor technology that is capable of measuring footfalls on the floor. The sensor's output signal will create a unique signature based in part on the individual's weight, gait, stride and average pace. The signal is then stored in a computer database for establishing a baseline for the individual. Using this established baseline, analysis and comparison of gait patterns can be made over time. Consequently, gradual deviation from the baseline pattern can be detected, implying a change in an individual's health status, either for better or worse. A gait change that might predict a fall (such as the appearance of a pronounced limp) can prompt an automatic alert from the monitoring system to notify the individual, their informal caregiver and the formal health care provider, using a communications interface, such that a preventive intervention may be taken. Additionally, a detected fall followed by no gait signal indicates a situation where the user is potentially unconscious or unable to initiate an emergency call. In such a case the monitoring system can be pre-programmed to alert the caregivers, via e-mail, instant messaging or phone to check up on their el-

ders. Thus, the Gait Monitor operates in concert with "pendant" type alert systems but does not replace such emergency response devices. Preliminary tests on this Gait Monitor have demonstrated extremely encouraging results. The device has thus far proven capable of differentiating normal gait from, shuffling, limping, tiptoeing, as well as detecting change in pace, reduced stability (balance) and falling.

7.2.3.6.10 RF Technologies Code Alert

Website:http://www.rft.com/Wireless_Fall__Incontinence_Solution-c1379-wp8202.htm

The Code Alert® Wireless Fall & Incontinence Management Solution offers a time-proven method of reducing fall rates. The system's large sensor pad continuously monitors whether a person is properly positioned in their bed or chair. If pressure is removed from the pad, the system automatically generates an alert to warn healthcare staff of potential fall situations.

7.2.3.6.11   RF Technologies Sensatec

Website:http://www.rft.com/Sensatec_Fall_Management-c1379-wp8208.htm

Sensatec® Fall Management Solution is for senior living communities, hospitals and rehab facilities. Sensatec® notifies in advance of potential fall situations. A pad and alarm unit is connected to alert staff if a patient attempts to leave a chair or bed.

7.2.3.6.12 Tunstall

Website: http://www.tunstall.com/solutions/fall-detectors

Tunstall offers a choice of two fall detectors to suit individual circumstances. The waist worn fall detector can be worn on a belt or in a discreet pouch, and uses a sophisticated two-stage detection process to identify a fall. The detector will emit a buzzing noise to alert the wearer that it is about to raise an alarm call, which the user can cancel at this point. If they fail to do so the detector will raise an alert via the Lifeline home unit, Communicall Connect or CareAssist pager. Tunstall's wrist worn fall detector, VitalBaseFALL by Telecom Design, automatically senses if the user has fallen and remains immobile and will automatically raise an alert via the Lifeline home unit, Communicall Connect or CareAssist pager. Like the waist worn fall detector it also has an ergonomic button which the wearer can press to call for help at any time.

7.2.3.6.13 Visonic Pendant MCT-241

Website: http://www.visonic.com/

MCT-241 is a stylish waterproof pendent PowerCode™ wireless transmitter designed for emergency alert applications in wireless security alarm and emergency response systems. The transmitter is supplied with two wearing options, a neck cord featuring a built-in safety release mechanism and a belt-clip.

When the alarm button is pressed, the MCT-241 initiates a PowerCode transmission sequence of a 24-bit ID alarm code, which is selected from 16 million possible combinations and is therefore unique and virtually impossible to accidentally reproduce. A smart anti-collision algorithm prevents signal jamming by simultaneous transmission from multiple devices.

7.2.3.6.14 Zenio

Website: http://www.vitaltronics.be/products/zenio.html

The Zenio products were developed by VERHAERT in cooperation with leading research centres. The Zenio is an intelligent device with 2-phased fall detection and recognition over 10 fall types. The user can deactivate the alarm and also can generate alarm manually. The devices are equipped with Bluetooth technology, so they connect easily to gateways and mobile phones.

7.2.3.7 Medication monitoring product profile

7.2.3.7.1 AmeliaPlex OnTimeRx®

Website: http://www.ontimerx.com/

OnTimeRx® is Mobile Reminder Apps for iPhone and Android devices. Scheduled reminders are sent by SMS, email, or phone. There are also versions available for BlackBerry, Palm, Windows Mobile smart phones and Windows desktop program.

7.2.3.7.2 Tunstall MedSmart

Website: http://www.amac.com/medsmart.cfm?healthcare_providers

MedSmart System is an automated solution that organizes, reminds and dispenses medications so they are taken properly and on-time, available in both standalone and event reporting versions. Under the event reporting and notification version, device and compliance information is transmitted to a secure data centre which allows caregivers and healthcare providers an ability to track compliance, proactively address dosing errors, ensure equipment functionality and predict refill requirements.

7.2.3.7.3 E-Pill Cadex

Website: http://www.cadexwatch.com/

Cadex offer a range of medication monitoring devices: pill boxes, medicine timers & pill dispensers.

7.2.3.7.4 Automatic Pill Dispenser

Med-Time XL is a device for dispensing medicine, reminding the user when medicine shall be taken, and making the correct dose available. At pre-set medication time, an alarm will sound & pills rotate into position. User is required to lift up device, turn the dispenser upside down to allow the pills to fall into their hand. All other medicine is inaccessible. The alarm stops by turning device upside down (or after 60 minutes).

7.2.3.7.5 CompuMed

Website: http://www.compumed.com/index.htm

CompuMed Medication Dispenser automatically dispenses the proper medication at the right time. All other medicine is locked in a tamperproof medication dispenser cassette. At present times medication is automatically dispensed into an easily accessed drawer. When medicine is dispensed, an LED light flashes, an audio alarm sounds and instructions appear on a screen (i.e. "Take with food"). CompuMed is designed primarily for solid medicine (pills, tablets, etc.), but can be used as a reminder for non-pill form medication.

7.2.3.7.6 Database Systems Corp.

Website: http://www.databasesystemscorp.com/dsc-signup.htm

Database Systems Corp. (DSC) is a provider of call centre technology which includes automated phone systems as well as call centre outsourcing phone services. As part of the service DSC offers medication reminders - Call reassurance service for seniors that automatically sends voice reminders to take their medication.

7.2.3.7.7 Global Assistive Devices, Inc. VibraLite

Website: https://www.globalassistive.com/

Global Assistive Devices offer a range of styled watches with medication reminder function.

7.2.3.7.8 Innovative Product Source LLC My Tiny Reminder

Website: http://www.mytinyreminder.com.

MY tiny REMINDER is a vibrating prompter and medication reminder designed for use by individuals with Alzheimer's disease or cognitive disabilities. The prompter vibrates at a present time for two seconds and then stops for three seconds; this pattern continues un-

til the user presses any key on the unit. The unit can be carried in a pocket or in the included wristband/wrist wallet, which also has room for other items such as cash, credit cards, keys, or MP3 players.

7.2.3.7.9 *MedMinder*

Website: http://www.medminder.com

MedMinder's pill dispenser looks like a basic seven-day pillbox. Designed with ease of use in mind, its simple and friendly interface has no digital readouts or buttons. The MedMinder pill dispenser is equipped with wireless technology (internal cellular modem) that updates MedMinder's central computer about the patient's dosage activity. This information is available online for caregivers who can also receive immediate email or text messages notifications and weekly reports. When it's time to take a medication, the appropriate compartment flashes. If the cup is not removed within the assigned time frame, the patient can get auditory prompts as well as optional automatic phone calls, text messages and emails. MedMinder keeps records of patient activities. The caregiver can access this information via the Internet or receive real-time email or text message notifications. Weekly email reports are also available.

7.2.3.7.10 *Philips Medication Dispensing Service*

Website: http://www.managemypills.com/content/home

The Philips Medication Dispensing Service can help seniors to take medication on schedule, from convenient pre-filled dosage cups. It holds up tp 60 cups. It accommodates 1 to 40 days of medicine. It holds up to 6 doses per day. It also includes reminder alerts for non-pill medications, reminder alerts for instructions on taking meds, and optional early-dose feature. Caregivers receive alerts for: number of missed doses, reminder when medication doses need refilling, dispenser errors, and loss of electricity.

7.2.3.7.11 *SIMpill*

Website: http://www.simpill.com

The SIMpill® Medication Adherence System will monitor the patient's medication schedule and intake of medication and remind patients and caregivers as necessary by sending a text message to the patient and/or caregivers' mobile phone if the patient does not take their medication as prescribed. All monitoring and reminders happen in real-time.

7.2.3.7.12 *Vacia SimpleMed*

Website: http://www.vaicamedical.com/en/simplemed

SimpleMed is medication monitoring system with 28 Compartments - semi-transparent pill compartments with light indicators, for 7 day use, up to 4 dosages per day. It has audible and visual reminders – adjustable audible and visual alarms, LCD - large screen with optional display languages. Reminders alters include pre-programmed text messages such as "Take meds with food". For safety purposes it has error alerts -visual and audible alerts when opening a wrong compartment and patients compliance log and easy to understand graphical reports.

Also there is an option to take medicine doses ahead of time. It is available in English, French, Portuguese, Spanish and Hebrew.

7.2.3.7.13 Vitality GlowCaps

Website: http://www.vitality.net/glowcaps.html

GlowCaps fit popular prescription bottles available at Walgreens and other retail pharmacies. Inside the GlowCap is a wireless chip that enables four services. GlowCaps use light and sound to signal when it is time to take a pill. GlowCaps sense when the bottle is opened and wirelessly relay their status to Vitality's secure network. If the bottle is not opened two hours after a scheduled dose, the user is automatically reminded with a telephone call that states: "It's time to take the pill in your green GlowCap." Each week, a report summarizing progress is e-mailed to the GlowCap user. If the user chooses, a family member, friend or care-giver may also receive the report. GlowCaps can even call with refill reminders and connect the patient to their pharmacy as pills deplete. Each month GlowCaps mail a printed report. The report may also be sent to the doctor.

7.2.3.8 Smart Mobility Devices

7.2.3.8.1 ARGO Medical Technologies Rewalk

Website: http://rewalk.com/products/rewalk-personal/

The ReWalk™ Personal System was designed for everyday use in a range of environments. It can be used at home, work, or other locations. It functions outdoors and on different surfaces or terrains. The Rewalk mimics a natural walking motion and requires users to control their body movements. The ReWalk can sit, stand, allows turning and has the ability to climb and descend stairs. The batteries that supply power are intended for all day use and are recharged overnight. It is customized and sized for each individual user. Launched in 2012, the ReWalk Personal is currently available throughout Europe. In the United States, the ReWalk Personal is awaiting FDA clearance.

7.2.3.8.2 Cyberdyne HAL Hybrid Control System

Website: http://www.cyberdyne.jp/english/robotsuithal/move.html

"HAL" has two control systems which work closely together. One, Cybernic Voluntary Control (Bio-Cybernic Control System). When a person attempts to walk, for instance, the brain sends electrical impulses to muscles. When they arrive at muscles, faint bio-electrical signals appear on skin surfaces. "HAL"'s system observes faint bio-electric signals on the surface of the skin. The power units generate torque and put limbs into action. Thus, HAL assists the wearer with an intended movement. The second is a Robotic Autonomous Control System. A human motion (for example standing up from a chair) can be recognized as an aggregate of several elemental movements. For a given motion, "HAL" assembles small movements from the database, just as words from a dictionary are concatenated to form a sentence. Using the database (which is also automatically augmented by the information that sensors collect from the body) "HAL" autonomously coordinates each motion to be assisted smoothly by power units.

Furthermore, in the case that no good bio-electrical signals are detectable due to some problems in the central nervous system or in the muscles, "HAL" can be of use through the Robotic Autonomous Control.

7.2.3.8.3 Utah University iWalker

Website: http://www.usu.edu/greats/research/index.cfm?article=26970

Utah State University, Vladimir Kulyukin, computer scientist developed a specialized walker that could improve the quality of life for individuals affected by Alzheimer's disease and other dementia-causing illnesses. The iWalker is a wheeled walker – or rollator – and operates within a smart world perspective. That is, its on-board computer provides visual and audible cues activated by sensors embedded in the user's environment. As the iWalker rolls over a sensor under the carpet, it announces its location – such as 'water cooler' or 'restroom. In addition, the walker's screen flashes a picture, words or an arrow with information about the location. The iWalker is not a robot. Rather, it reads information from radio frequency identification (RFID) tags placed throughout the environment where it is used. The iWalker was designed in this manner to keep its cost low.

7.2.3.8.4 CyberNorth CyberChair

Website: http://www.cybernorth.com.tr/index.html

The CyberChair is designed to be used in every wheelchair with an electric motor in order to serve the handicapped people who are unable to use a joystick. This system allows every single step of a wheelchair to be controlled by human voice. It also has a transferable voice defined electric motor which speaks to its users about any obstacle, inclination, or other information about the environment. Additionally, it informs the user about any defect. (Patent TR 2008/07063)

7.2.3.8.5 Fraunhofer Institute for Manufacturing Engineering and Automation IPA Household Assistance

Website: http://www.ipa.fraunhofer.de/Household_Assistance.21.0.html?&L=2

Care-O-bot® is a mobile service robot used to assist people in the household. The first Care-O-bot® prototype was developed back in 1998 and is capable of moving safely and reliably in environments frequented by people. Care-O-bot® II, built in 2002, is capable of handling typical household objects, or to fetch a certain object on its own. Compared with its predecessor, it is also fitted with a manipulator arm, adjustable walking supporters, a tilting sensor head containing two cameras and a laser scanner for environment recognition as well as a tablet PC to control the robot. Care-O-bot® 3 is the latest generation of this successful development series. As a future vision of an everyday household product it combines a host of innovations from the fields of control systems, sensor technology and kinematics.

7.2.3.8.6 Gecko Systems CareBot

Website: http://www.geckosystems.com

A CareBot™ MSR is built on a BaseBot™ using GeckoNav™, GeckoChat™, and GeckoTrak™ to perform timely and cost effective duties for care givers to better care for their care receivers. GeckoZap™ is used by the support personnel to perform maintenance on the CareBot™. GeckoNav™, GeckoChat™ and GeckoTrak™ are primary GeckoSavants. GeckoNav™ is responsible for all fully autonomous manoeuvring, such as avoiding dynamic and/or static obstacles, running errands and patrolling. GeckoChat™ is responsible for interaction with the care-receiver such as answering questions, assisting with daily routines and reminders, and responding to other verbal commands. GeckoTrak™, which is mostly transparent to the user, enables the CareBot™ to maintain proximity to the care receiver using sensor fusion. The CareBot™ is an Internet appliance that is accessible for remote video/audio monitoring and telepresence.

7.2.3.8.7 Gecko System SafePath

Website: http://www.geckosystems.com

GeckoSystems has created the SafePath™ wheelchair by using navigation technology developed for the CareBot ™ and artificial intelligence to interpret joystick signals, filtering out erratic movements that often make it difficult for the disabled to use a power wheelchair. This technology goes beyond mere obstacle avoidance and actually enhances the response of the controls to the intention of the user, providing greater safety and enhanced mobility to disabled persons worldwide. GeckoSystems is negotiating a Joint

Venture in the People's Republic of China for the production of this product. The company hopes that the SafePath™ wheelchair will be on the market by the end of 2012.

7.2.3.8.8 ShoeSense

Website: http://www.gillesbailly.fr/shoeSense.html

ShoeSense is a wearable system consisting in part of a shoe-mounted depth sensor pointing upward at the wearer. ShoeSense recognizes relaxed and discreet as well as large and demonstrative hand gestures. In particular, we designed three gesture sets (Triangle, Radial, and Finger-Count) for this setup, which can be performed without visual attention. The advantages of ShoeSense are illustrated in five scenarios: (1) quickly performing frequent operations without reaching for the phone, (2) discreetly performing operations without disturbing others, (3) enhancing operations on mobile devices, (4) supporting accessibility, and (5) artistic performances.

7.2.3.8.9 EXACT DYNAMICS B.V. - iARM.

Website: http://www.exactdynamics.nl/site/?page=iarm

The iARM, also known as the intelligent Assistive Robotic Manipulator, is a robotic arm that assists disabled people with a severe handicap in their upper limbs. A significant number of daily activities, which were previously unable to achieve, can be achieved by using the iARM. Due to its broad functionality, it is capable of almost fully compensating the lost arm or hand function of the user. The iARM is a mobile robot and is able to be attached to a wheelchair or detached. The iARM weighs only 9 kilos and runs on the same battery as a wheelchair. It can be stowed away when it is not being used, with minimal space requirements.

7.2.3.8.10 MARC

Website: http://marc.med.virginia.edu/projects_eldercarerob.html

MARC develops a mobility aid, based on a wheeled walker, to augment the capabilities of its user. The key to the design of MARC mobility aid is that it gives control to the user, acting as any other walker, while the user is not in a difficult or dangerous situation. When the situation changes the walker's control system can begin to take some of the burden of steering off the user. The fundamental goal of this work is to develop a system of shared control for personal mobility aids that helps the user without making them feel as if they are not in control or being "lead about". The current Walker prototype, which is built using off the shelf components and a three-wheel Rollator walker frame, employs sensor technology to detect obstacles, as well as a passive shared- control navigation system that takes control of the steering wheel only when necessary to avoid collision

with obstacles. This, in addition to the fact that there is no drive capability, makes the walker's users feel that they are in control rather than being led by, or having to chase after, the walker.

7.2.3.8.11 RoboSoft Kompaii

Website: http://www.doc-center.robosoft.com/@api/deki/files/6197/=robotic_ADL.pdf

Kompaii is a robotic companion that acts as a gateway to the rest of the world. It is able to go anywhere in the house, to speak to access the internet, and many other services. Fully programmable, it is aimed to becoming more and more interactive and intelligent.

7.2.3.8.12 TopChair

Website: http://www.topchair.fr/en/index_en.php

TopChair-S ® comes with an innovative dual-propulsion system: normal wheelchair mode for inside your house or outdoors, and caterpillar tracks to go up and down stairs or steps. These caterpillar tracks are made from special rubber incorporating strong steel reinforcements. TopChair-S is able to climb all sorts of straight stairs up to a slope of 65%.

7.2.3.8.13 Toyota

Toyota four robots is designed to help paralyzed patients walk or balance and help their caretakers gently transport them between locations. The company hopes to commercialize the products sometime after 2013. One of Toyota's new robots guides patients' strides when sensors detect the intention to walk. The Walk Training Assist robot, shown at right, mounts onto a paralyzed leg and detects movement of the hips through sensors at the thigh and foot. It helps the knee swing forward and the leg move forward to facilitate walking.

7.2.3.9 Vision and Hearing aids for indoor use

7.2.3.9.1 Cobolt Systems

Website: http://www.cobolt.co.uk/Default.aspx?pageId=1

Shop for a wide range of products including talking clocks, talking multi function radios, talking combination ovens, talking watches, microwave cookware, talking smoke detectors, a range of glasses, mouse magnifier and cordless mouse magnifier and more.

7.2.3.9.2 FREEDOM SCIENTIFIC, INC

Website: http://www.freedomscientific.com/

Freedom Scientific offers a range of PC appliances for low vision and blind such as desk-top video magnifiers, screen magnification software, large print keyboard, open book scanning and reading software, brille display, and screen reading software.

7.2.3.9.3 *Humanware MaxEvent*

Website: http://www.humanware.com

MaxEvent glasses are perfect for seeing indoor and outdoor events with more crisp and clear vision and will make user feel positively close to the action! Head-mounted glasses provide 2.1 x magnification and can be adjusted so that each eye lens can be focused separately (+- 3 dioptres), making the system very adaptable.

7.2.3.10   Physical and Cognitive Gaming

7.2.3.10.1 *Dakim*

Website: http://www.dakim.com

Dakim BrainFitness is the only clinically tested brain fitness software designed specifical-ly for active adults over 60. In developing, Dakim BrainFitness R&D team collaborated ith a team of brain researchers to incorporate findings from the latest scientific research. They also continued to observe and interview many of the thousands of individuals who use the program in senior living communities in USA. Dakim's brain fitness approach is designed to stimulate six essential cognitive domains: Long-Term Memory, Short-Term Memory, Critical Thinking, Visuospatial Orientation, Computation, and Language. To ex-ercise each domain, Dakim created dozens of exercise formats and thousands of individ-ual challenges. Dakim produce content across five levels of challenge for each of the six cognitive domains. Using proprietary technology to gauge users'' performance, the differ-ent challenge levels ensure that users are always stimulated, but never stumped, no mat-ter what their cognitive level. And since cognitive abilities vary among the domains, Da-kim BrainFitness tracks performance in each separate domain, creating a personalized workout profile for each user.

7.2.3.10.2 *Nintendo Wii*

Website: http://www.nintendo.com

Nintendo Wii games are offering both physical and brain fitness programs to promote healthy aging. Nintendo Wii games are now being used by hospitals and rehabilitation fa-cilities because many of the games actually use the same movements that would be used in traditional physical therapy. Nintendo Wii has developed 68 games for physical and cognitive fitness. Our review found physical exercise games including: aerobics workout, Pilates, Yoga, weight loss programs, fitness programs, UFC program, dancing,

and Zumba. In addition, Nintendo Wii has developed 2 cognitive games for adults, Brain Age programs with the collaboration of Neuroscientists. The programs include varies exercises such as quickly solving simple math problems, counting people going in and out of a house simultaneously, drawing pictures on the Touch Screen, reading classic literature out loud, recite piano songs, playing a challenging version of rock, paper, scissors, playing Concentration, and Sudoku puzzle.

7.2.3.10.3 PlayStation

Website: http://us.playstation.com/

PlayStation developed two complimentary platforms which enable to move beyond traditional gaming. PlayStation®Move. Step, jump, dance into the game experience that's possible only on the PlayStation®3 system. PlayStation®Move offers an engaging and emotional game adventure. Player moves give control over the game. The EyeToy® USB camera translates for EyeToy compatible games your body movements into the controller input, to map your face onto in- game characters and more! The EyeToy USB camera also has a built-in microphone to record short video messages right onto your Memory Card (8MB) for PlayStation®2. There are 19 exercise games of which 8 are compatible with PlayStation® Move or EyeToy: ProStroke Golf, Aerobics, UFC workout, dancing, fitness programs, Adidas micoach, and Zumba. Our research found one mind exercise game named Mind Quiz. Mind Quiz is a set of 49 exercises from 4 genres of calculation, reflex, judgement, and memory. It includes a featuring Brain Age Checking Mode.

Another platform of PlayStation is Move.me, a new software application that runs on the PS3 system and gives researchers, students, and programmer's access to PlayStation Move's technology for developing apps beyond traditional gaming, such as for physical therapy, sports rehabilitation, or education. Using a PS3 system, PlayStation®Move motion controller, PlayStation®Eye camera, and PC, you take the PlayStation Move beyond traditional gaming.

PlayStation also developed

7.2.3.10.4 XBOX Kinect

Website: http://www.xbox.com

XBOX Kinect has a greatest variety of physical fitness games. Our research traced 104 fitness games available including fitness programs, Zumba, UFC workout, self-defence training, shape, dancing, Adidas micoach, Nike training, Cardio Boxing, and aerobics. In addition Xbox developed few cognitive fitness programs. We review here two which are intended mostly for adults.

Dr. Kawashima's is a physical and mental integrated workout plan on Xbox Kinect. They based the game on recent studies which show that body movement increases brain function more than mental exercise alone. Using the Kinect's motion-tracking capabilities, the player solve fill-in-the-blank math problems by kicking numbered soccer balls or represent a digital time on an analogy clock by positioning the arms appropriately. According to a game reviewer Dr. Kawashima is burdened by a few shortcomings. Some mini games are hampered by tracking issues, resulting in inadvertent answers, and swapping profiles mid-session can also be problematic. In general, Kinect technology is still an early stage technology with some limitation and will several years to mature.

Another Xbox brain fitness program exercises multiple brain categories: logic, memory, mathematics, and other grey-matter-demanding areas. The game includes 20 min-games for Single Player, Xbox LIVE Multiplayer 2-4, Local Multiplayer 2-4, HD (High Definition) and monitor player progress.

7.2.3.10.5 UniSoft Brain Spa

Website: http://www.ubi.com/US/Games/Info.aspx?pId=5911

A PC brain fitness program is to relax the mind and work on grey areas. It includes 8 mini-games in 4 brain categories: Memory, Vocabulary/expression, perception and logic/Math.

7.2.3.10.6 PositScience BrainHQ

Website: http://www.positscience.com

BrainHQ is an online brain fitness program built by a team of neuroscientists. BrainHQ exercises multiple brain categories: memory, brain speed, intelligence, people Skills, and navigation. Some of the exercises directly exercise those skills. But other exercises may not seem like they exercise those skills at all. Instead, they challenge the player to improve in basic sensory skills—such as telling sounds apart or spotting objects quickly on screen.

7.2.3.10.7 Minware Consulting MindGames

Website:

https://play.google.com/store/apps/details?id=mindware.mindgames&feature=search_result#?t=W251bGwsMSwxLDEsIm1pbmR3YXJlLm1pbmRnYW1lcyJd

Mind Games application is a collection of games based on principles of cognitive psychology to help practice different mental skills. This app includes all 13 of Mindware's brain exercising games. All games include personal score history, a global top scores list, and graph of personal progress. The main app shows a summary of personal best

games and today's scores on all games. Using some principles of standardized testing, personal scores are also converted to a standardized scale so that a player can see where they need work and excel. The games include: attention training, face memory, math star, memory racer, memory span, categorization skills, mental flexibility, serial memory, spatial memory, speed trivia, vocabulary star, visual memory, and word memory.

7.2.3.10.8 Brain Trainer

Website:

https://play.google.com/store/apps/details?id=brain.trainer&feature=search_result#?t=W251b GwsMSwxLDEsImJyYWluLnRyYWluZXIiXQ..

Brain Trainer is the largest collection of brain games on the market. Available game modes: math ninja, save ninja, letter sequences, number sequences, memory trainer (pictures), math workout 1 and math workout 2 game modes, math madness, speedy shapes, memory letters, memory numbers, tricky colours, memorize 123, 3D CUBES, target mode, phone numbers, question mode, 18 session modes...Sudoku of course and other modes like puzzle.

7.2.3.10.9 Brain Age

Website:

https://play.google.com/store/apps/details?id=lop.mos.dev&feature=related_apps#?t=W251b GwsMSwxLDEwOSwibG9wLm1vcy5kZXYiXQ

A Free brain teaser game test brain age and memory performance using those several brain training game tests. Those tests will analyse reflexes and concentration, brain age and memory age and arithmetic abilities. At the end of the test player can post personal score to the global score board and challenge other players. In addition, player can track performance using progress graph. One can also compare scores with friends and share results on Facebook.

7.2.3.10.10   GestureTek IREX

Website: http://www.gesturetekhealth.com/products-rehab-irex.php

GestureTek's Interactive Rehabilitation and Exercise System (IREX®) uses immersive video gesture control technology to place patients into virtual sport or gaming environments where they are guided through clinician prescribed therapeutic exercise regimes. Clinicians can design a fun, interactive exercise program that tests single joints, combined joint movements or full body function.

Patients are immersed in a full-body virtual world where they can interact with on-screen images and objects, designed to enhance the sense of "presence" for the patient. Real-time auditory and visual feedback further stimulates the patient, resulting in improved motivation and effort in rehabilitation exercises. The full IREX system is designed for permanent installations and comes with a green-screen background. A selection of immersive applications from IREX can also be delivered on a portable immersive therapy cart.

The IREX virtual reality environments are specifically designed to rehabilitate the patient in the precise manner recommended by the clinician. The motion of the patient can be monitored and reported to describe functional improvement in the patient's range of motion, control of motion and balance over the course of their treatment.

7.2.3.10.11   *Kinect for Windows*

Website: http://www.microsoft.com/en-us/kinectforwindows/

Kinect for Windows offers sensor and software development kit for developers who wish to develop interactive applications in multiple industries, including education, healthcare, retail, transportation, and more. Until now no commercials products are available for Microsoft technology.

7.2.4 Discussion

The purpose of the study was to review commercial and in-development technologies aimed to enhance elders' independency. Our systematic review shows surprisingly over 150 companies and research institutions active in the field of elder-care technologies not including over 500 Smartphone applications.

As worldwide population is aged and wants to remain independent in their own residence, there are a growing number of technologies and services developed. These products range by company size, technology complexity, and price. In each product category there is a slight variation in product offerings but it cannot be neglected that each category is saturated.

Several product categories: Smart home, fall detection, telehealth and medical alert system, require multidisciplinary development of medical, nursing, computer science, psychology, robotics, mechanical and electrical engineering.

However, there is no one turnkey solution which addresses elders' entire need spectrum to remain independent and active in their home setting.

In addition to the elder-care technologies, there is a new growing market for healthcare gaming and more specifically for brain training. Aging population suffers from brain function deterioration, Alzheimer, and Dementia. Recent research shows that daily brain training can delay the development of such conditions. Thus, new gaming products emerge addressing the growing aged-population. Our research found 399 brain fitness apps on Google Play store,

and a growing number of PC, Online games. This review also covers Nintendo Wii games and XBox games available for adult brain training. This review could not cover all the available software however it provides a good understanding of the type of games available.

Moreover, video gaming platform manufacturers provide physical exercise and fitness programs for all age spectrums. Many of the games are offered by multiple platform manufacturers, for example Nintendo Wii, XBOX Kinect, and PlayStation all sale UFC Personal Trainer, In-Shape, and many others.

Some products offering are based on scientific research and collaboration with Neuroscientists. Others include various well-known brain teasers. As can be expected games based on scientific background are much more expensive.

Kinect technology is definitely future trend in entertainment and recreation. However, the technology is yet to mature. Dr. Kawashima game reviewers point few drawbacks of the game inherited in Kinect technology which still need to mature before it can be error-free.

Interestingly, Nintendo Wii states that their products are recommended by physicians for physical therapy and rehabilitation. Wii games are used by physical therapists and homecare facilities in rehabilitation following stroke, accidents, and cardiovascular diseases. Nintendo Wii also commercializes 2 game packages for brain training based on neuroscientist research. Together, they provide elders a turnkey exercise platform both physically and mentally.

The growing number of free Smartphone apps has captured our attention. Today Smartphone apps provide basic inexpensive (many times free) solutions for many of elders needs including safety, fall monitoring, medication monitoring, telehealth technologies, fitness tracking both physically and cognitively as well as navigation.

7.2.5 Conclusions

As elderly population is growing substantially worldwide, many innovative solutions are developed around the world. There is a verity of mobility applications and solutions addressing the elderly need for independency and security. Our review of commercial and in-development technologies aimed to enhance elders' independency, identified over 150 companies and research institutions active in the field of elder-care technologies not including over 500 Smartphone applications. Several product categories: Smart home, fall detection, telehealth and medical alert system, require multidisciplinary development of medical, nursing, computer science, psychology, robotics, mechanical and electrical engineering. However, currently there is no one turnkey solution which addresses elders' entire need spectrum to remain independent and active in their home setting.

The research shows that there is a growing market trend of Smartphone applications enhancing elderly safety: tracking and locating applications and fall detection alerts. In addition,

as navigation technology advances, many solutions are also developed for the visually impaired and the blind population. Since majority of elderly and disabled are of low-medium socioeconomic percentiles, low-cost technology solutions should be developed.

Interestingly, there are numerous products available for enhancing elders' safety and security, brain function while remaining independent at their residence. However, none of the companies offer a turnkey solution. An elder who desire to remain independent require a solution which will allow them to send vital signs to their caregivers, a medication reminder and dispenser to increase regimen adherence and reduce medical complications and hospitalizations. In addition, one will need a fall detector and medical alert system with wandering management and locating capabilities. Moreover, home security and security detectors are important to reduce accidents and injuries. On top of all gaming and social interaction can improve both physical and mental condition of elders who may live alone. Thus, we suggest that new innovations will integrate different technologies and services offered into one turnkey solution which will assist elders to remain in their own residence while maintaining their safety and security and at the same time providing them the confidence to remain active.

New innovations should also take into consideration two important factors. One is cost. New innovation need to provide cost-effective solutions. Cost-effectiveness can be achieved easily by reducing home injuries, hospitalization and long-term/ nursing home admissions, reducing health systems expenditure. The second which is just as important, Smartphone penetration rate are growing fast and do not pass on elders - 20% of Smartphone users are over 65. Smartphone create a perfect inexpensive platform to most of the needs described above.

The last issue which is crucial to address is matters of legislation, insurance and creating new sustainable financial models, as these emerging markets entail a wide range of challenges that can only be answered with a systematic and comprehensive responses on the supra-national, national and local levels.

7.3 Web 2.0 & Social Media for elderly people

7.3.1 Introduction
Elderly persons don't want just to stay independent as long as possible but also they are looking for social inclusion. Not all elderly have families who are looking after them. Social media is a possibility to close this gap.

7.3.2 **Methodology**
We conducted a search on senior internet and social media usage habits. To identify relevant information, we searched Google using combinations of the following keywords: Social media, internet, smartphone penetration, elders, social networks over 50s, social media for

elderly, social media for seniors, internet demographics, social network ranking, social media sites ranking.

Since social media penetration rates quickly evolve we looked for the most recent data available.

We focused the research on social media sites that focus on elderly population and neglected sites for the general population that may attract elders as well.

7.3.3 Results

Our search shows that usages of internet and Smartphone among elderly have increased in the last few years. According to Pew Internet, as of April 2012, 53% of American adults age 65 and older use the internet or email. Though these adults are still less likely than all other age groups to use the internet, the latest data represent the first time that half of seniors are going online. After several years of very little growth among this group, these gains are significant.

According to ComScore MobiLens survey, Smartphone penetration grew in the US and EU5 (UK, Spain, Germany, Italy, France) by at least 8%, with the EU5 averaging 44% and the US at 41.8% in 2011. More specifically Smartphone penetration EU5 increased by 17.7% in the UK, from 34.2% (Q4 2010) to 51.9% (Q4 2011), 13.4% in Spain, from 37.6% (Q4 2010) to 51% (Q4 2011), 8.7% in Italy, from 35.2% (Q4 2010) to 43.9% (Q4 2011), 14.2% in France, from 25.8% (Q4 2010) to 40% (Q4 2011), 12% in Germany, from 25% (Q4 2011) to 37% (Q4 2011). Moreover, senior Smartphone reach in EU5 is 18.9%, higher than USA.


Percent Composition of Smartphone Users by Age
Source: comScore MobiLens, 3 mon. avg. Dec-2011, U.S. and EU5
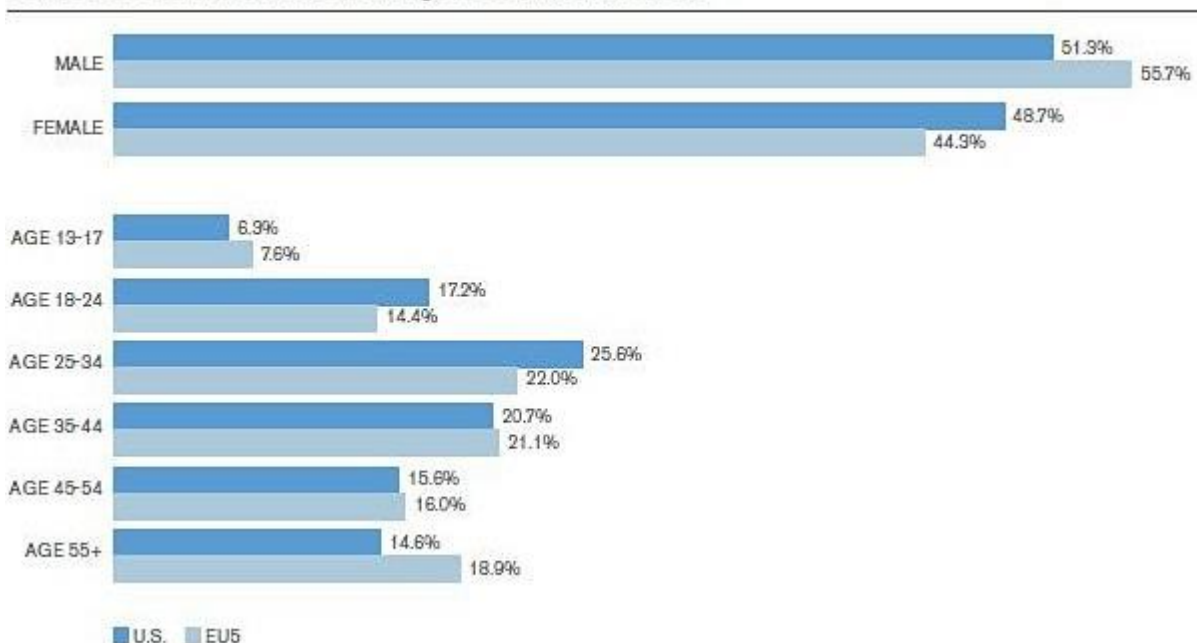
As of February 2012, one third (34%) of internet users age 65 and older use social network-ing sites such as Facebook, and 18% do so on a typical day. A survey conducted by silver surfer in 2011 reviles that in Atlantic Canada and northeastern USA, the average age of a Facebook user is 53. In England we see a similar trend, though it is somewhat lower at 46.

Hence, the belief that elders are technology disconnected is wrong rather senior are highly active in social networks. The graph below shows the use of social media by age groups. It can be deduced from the survey results that elders prefer to forums and photo sharing. They may watch video but are unlikely to create and share videos through channels like YouTube or Vimeo. For social networks in Western nations they prefer Facebook for its ease of use (all things considered) and because it is more likely that's where family and friends are. (This research was conducted prior to Google+ launch.)
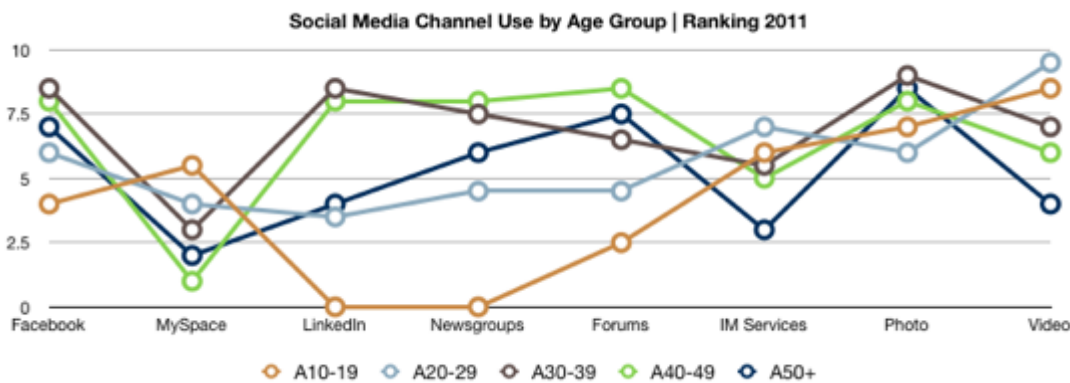
According to Yahoo the most popular sites for seniors in 2010 were:

7.3.3.1.1 Genkvetch Social Networking

Slogan: Social networking for those who recall rotary phones and 45-rpm records
Website: www.genkvetch.com
Registration: Free, required registration.

Applications: User-friendly apps for seniors use to post, share.

Description: Genkvetch is about the over-50 set and gets high marks for readability, big fonts, simple color scheme, a personals section and news of interest to seniors, includ-ing health, current events and volunteer opportunities. Genkvetch is open to people of all faiths, accepts no advertisements, and seems to really understand seniors' interests. Genkvetch is not a flashy or sophisticated site, but great fun for all. If you're not tech savvy, this is a good place to start connecting with other seniors.

7.3.3.1.2 ThirdAge

Slogan: Baby Boomer health, aging and retirement

Website: www.thirdage.com

Registration: Free, and required to access interactive features, including home, profile, chat, special offers.

Applications: Senior newsletters, groups, discussion boards, videos, articles, classes, polls, horoscopes, games, etc.

Description: Pretty sophisticated site for seniors and Baby Boomers. Leading online lifestage media, marketing and consumer insight company focused on serving Baby Boomers. Through strategic partnerships and integrated advertising campaigns, ThirdAge helps companies build lastingrelationships with site audience. ThirdAge has more than 1,000,000 unique visitors each month and nearly 1,000,000 subscribers to its customized newsletters each week. SeniorPeopleMeet function is geared to Baby Boomers and older adults who may not be tech savvy.

7.3.3.1.3 Seniorocity

Slogan: Premier Online Social Networking Community for Adults over 40

Website: www.seniorocity.com

Registration: Member log in provided for access to interactive features. Postings, pictures, group posts, etc.

Applications: Profiles, photo share, posting. Profile photos, share functions enabled.

Description: Geared to Baby Boomers and older adults who is not necessarily tech savvy. Seniorocity is an online community for adults developed to provide a social network for "Mature Adults and Seniors." Billed as an alternative to Facebook. Takes a while to get around the site, become comfortable. Great links for Seniors.

7.3.3.1.4 AARP Online Community

Slogan: Where friends and family network, share photos

Website: www.aarp.org/onlinecommunity

Registration: For free, to build profile, join groups and connect with others

Applications: Senior e-news, games, photos, videos, discounts.

Description: User friendly for Seniors, but limited, online community site. Seems to be an extention of AARP site and a place where AARP drives content, products and services. Registration enables access to AARP's weekly Webletter with the latest news and information from AARP.org for seniors everywhere.

7.3.3.1.5 Eons

Slogan: Online community for spirited Boomers

Website: www.eons.com

Registration, Free, to access interactive features for seniors and boomers.

Applications: Profiles, groups, pictures, Brain games, puzzles.

Description: Pretty sophisticated site for seniors and Boomers. Eons.com is the online community for spirited Boomers who want to explore their passions, keep in touch with friends, connect with interesting people. Groups on Body & Health, Money & Careers, Travel, Love, Fun, Learning, and so much more. Awesome brain games.

7.3.3.1.6 Rezoom

Slogan: Redefining life for an ageless generation

Website: www.rezoom.com

Registration: Free, to access ReZoom community, share photos, blog, etc.

Applications: Online groups for seniors, boomers, photo share, blog, email, etc.

Description: Sophisticated website and online community. For Baby Boomers and younger. Self-described as an "alternative to AARP." Focused on health and wellness, travel, entertainment, going green, and investing. Committed to "building a better world" through charitable donations. Interesting social network and website for Seniors and Boomers.

7.3.3.1.7 Multiply

Slogan: One place for doing more with your media

Website: http://multiply.com

Registration: Free, to access interactive features.

Applications: Website, blog, email, photos, share features. Integrated tools for creative media.

Description: Sophisticated but easy site to navigate. Great for seniors who want to post and share creative content, writing and photographs. One place to do something more with media products. Multiple gives you access to your own website where you can post, blog and keep in touch. Easy uploading of photographs and videos. Integrated tools for creative media, like cards, calendars, photographs, and more.

7.3.3.2 Boomj

Slogan: A lifestyle and social network for Baby Boomers

Website: www.boomj.com

Registration: Free, to access interactive features.

Applications: Full service social networking site, under construction in Winter 2009-2010. Blogs, video, chat

Description: Portal and social networking site aimed at Baby Boomers as target audience. Heavy on the advertisements. Social, political, financial and lifestyle content for Baby Boomers. Currently, under construction, but promises highly interactive, cutting-edge applications and online tools for Seniors and Boomers.

7.3.3.2.1 Senior Chatroom

Slogan: Best place in the world for Seniors or persons 30, 40, 50, 60+

Website: senior-chatroom.com

Registration: Free registration to access interactive features

Applications: Audio-video chatrooms, webcam chat, senior's chatroom gallery

Description: Audio-video chatrooms and webcam chat for persons 30-65+, for friendship, love and more. Senior-friendly, easy to use. Large print, directions for chat, etc. Great site for Seniors.

7.3.3.2.2 My Boomer Place

Slogan: For seasoned travellers of the '50s, '60s and '70s

Website: www.myboomerplace.com

Registration: Free, to create profile, share

Applications: Gallery, forums, posts, videos, quizzes, classifieds, and more

Description: A self-described place to "meet, congregate, and develop new relationships" with persons of similar interests. Forum pages can be viewed even if you haven't registered and content looks up to date and relevant to Senior and Boomer interests and activities.

7.3.3.3 Other Social Sites worth mentioning:

7.3.3.3.1 Google+

Website: https://plus.google.com/

Google + with their new social media platform has expressed a direct interest in supporting advocacy and support applications for disabled people, and for professional use. They have already developed special screen readers for use in chat rooms and on Google hangouts for visually impaired patients. We have had some success in early development of "Blind Veterans Help Desk" as part of the Veterans Workshop. This non-profit organization will facilitate the use of Google technology so that deaf veterans and blind veterans can assist each other and also facilitate caregivers improving communica-

tions and assistance to patients requiring support and/or in home health service. Google hangouts may reduce the frequency of at home visits by visiting nurses, or post hospitalization.

7.3.3.3.2 The Cool Grandma

Slogan: Empower Senior online community and have fun doing it

Website: www.coolgrandma.com

Registration: Free registration, for posting in forum.

Applications: Articles, chat, discussion forums, tutorials, links to games, and more

No registration to read forum topics, content. Listing fees for posting links, announcements to "cool sites."

Description: Senior online community. Lots of features. Some still being built, like email. Discussion forums look interesting for seniors, but absence of dates on these and other features make me wonder if this content is "evergreen" or outdated.

7.3.3.3.3 Senior.com

Slogan: Your internet community

Website: www.senior.com

Registration:Free, for access to interactive features

Applications: forums, chat, information sharing tools.

Description: News, articles, tools, and more for seniors and caregivers. Focus on health and wellness, caregiving, recreation, activities, and healthy living. An internet community for sharing information and stories.

7.3.3.3.4 Love to Know - Seniors

Slogan: Everything you'd love to know

Website: http://seniors.lovetoknow.com

Registration: Sign up for emails, etc.

Applications: Information, galore

Description: Dedicated site for seniors and caregivers. Great information, features for everyone in the family.

7.3.3.3.5 Leading Age

Website: http://www.leadingage.org/

Slogan: Expanding the World of Possibilities for Aging

Registration: not required

Application: advocacy, education, and applied research for aged population.

Description: To expand the world of possibilities for aging, LeadingAge members and af-
filiates touch the lives of 4 million individuals, families, employees and volunteers every
day. The LeadingAge community includes 6,000 not-for-profit organizations in the United
States, 39 state partners, hundreds of businesses, research partners, consumer organi-
zations, foundations and a broad global network of aging services organizations that
reach over 30 countries.

The work of LeadingAge is focused on advocacy, education, and applied research. We
promote adult day services, home health, hospice, community-based services, PACE,
senior housing, assisted living residences, continuing care communities, nursing homes
as well as technology solutions and person-centred practices that support the overall
health and wellbeing of seniors, children, and those with special needs.

7.3.3.3.6 Patients like me

Websites: http://www.patientslikeme.com

Slogan: Social media website for patients

Registration: free registration

Application: sharing personal stories and personal health data, supplies detailed infor-
mation about conditions, symptoms and possible treatments.

Description: PatientsLikeMe is a health information sharing website for patients. The site
began as online community for ALS patients and added communities for other life-
changing   conditions,   including multiple   sclerosis (MS), Parkinson's   dis-
ease, fibromyalgia, HIV, and many more. As of January 2013, there are approximately
175,000 registered users. Patients may keep personal journals, share their health pro-
file, and learn from the experience of other patients.

7.3.3.3.7 Eldy

Website: http://www.eldy.eu/de/about-us

Eldy is a software, a social network, and a non-profit volunteer organization. Eldy is in-
volved in several research projects, and makes special adjustments for localized needs,
such as local languages, disability, or quick access to local businesses and government
services. The software is available for free download at the website.

The Eldy software turns any standard computer to an easy-to use, intuitive and immedi-
ate interface that makes it easy to write emails, browse the web, chat, conduct videocon-
ferences, write a documents, etc. It may also work with an APP for tablet and for TV. Its
graphical user interface (GUI) has been designed to help the elderly in accomplishing

the most common tasks. Fonts and buttons are bigger than usual. The software has an evident colour contrast between text and background.

The Eldy project started in the city of Vicenza (Italy) by a non-profit organization, the Eldy Association ngo, whose aim is to reduce the technological gap between young and older people. Currently (Nov, 2012) Eldy counts 400.000 users worldwide and a large variety of versions, for localizing content or particular applications. Eldy has been adapted by some Regions and Local Public Administration with relevant local content to provide easy and immediate access to local websites, local services, local hospitals, via e-government modules.

7.3.3.3.8 Finerday

Website: http://finerday.net/index.php

Slogan: Finerday.com is the free, multi-award winning, intergenerational, online social network.

Registration: Free

Application: It is safe for grandchildren and connects grandparents. Safely share messages, photos, memories, websites and more.

Description: FinerDay is a free, secure, online, closed, social network. It allows for older persons who are less technically aware, or those that have special needs, to stay connected to family, caretakers, healthcare professionals and the community, on a trusted platform. For persons without an email address, one will be created upon registration to the website. It allows sending messages (inside the website or to an external email address), share photos and watch slide shows. It has birthday and special dates reminders, gifts suggestions, and it allows users to write memories and share them with family and friends, store favourite websites and search for new ones, and connect with family. The software was found to be a useful tool in reminisce therapy for dementia patients.

7.3.3.3.9 Farseeing

Website: http://farseeingresearch.eu/

FARSEEING is a collaborative European Commission funded research project with 11 partners distributed in 7 EU countries. It aims to provide a thematic network focusing on the issue of promoting healthy, independent living for older adults. FARSEEING aims to promote better prediction, identification and prevention of falls and support of older adults with a focus on ICT devices and the unique proactive opportunities they can provide to older adults to support them in their own environment.

7.3.3.3.10 *Sega Zone*

Website: http://www.sagazone.co.uk/

Slogan: Social networking for the over fifties

Registration: Free

Application: make friends, share pictures, write blogs, create clubs, enjoy the free tea & eat naughty cakes

Description: A UK social network for over 50s. The site provides information on many issues such as insurance, health, money, lifestyle, care, legal and more. The site has 20 different forums where members can share ideas and information. Members can also manage and read personal blogs, share and upload pictures. In addition Zone Clubs provide members a place to join or create their own environment and get together with others who share similar interests. Indulge in chatting, sharing videos and posting pictures with your chosen group.

7.3.3.3.11 *Seniorkom*

Website: http://www.seniorkom.at

Seniorkom is an Austrian social network for senior citizen in German. It offers senior citizens a comprehensive selection of services and information as well as Chat possibilities for registered users.

7.3.4 Discussion

Social Media gained momentum in the last few years and now social network sites are very common. Survey shows that currently, 34% of Elders use social networks such as Facebook. These figures are growing each year. As people got accustomed to sharing personal experiences and photos online, the demand for sites intended for people with similar interests and needs immerged.

Currently there are many social media sites available for elders in all languages. These sites provide members to share information and experience and ask for advice from other members. These sites cover range of topics that interest elders such as legal, healthcare, independent living, and recreational activities such as hobbies, birthday reminders and photo sharing.

In contrast to our initial expectation elders use smart-phones – 19% of smart-phone users are over 50.

Healthcare solutions use both Smartphone and social media platforms to improve patients' compliance and treatment.

7.3.5 Conclusions

We could not point out any gap within social media sites. We believe that SafeMove can easily collaborate with Social Media site to promote its projects and ideas.