AAL Joint Programme, Call 6
ICT-based Solutions for Supporting Occupation in Life of Older Adults

healthy *work*

Description of Work (DoW)

Project areas addressed:	Improving occupational lifestyle preserving health at work supporting behavioural changes, coping strategies that can help older adults adapt physically and cognitively with their tasks
Title:	personalized adaptive workplace health promotion for older employees
Acronym:	healthy@work
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List of participants:

Participant no.*	Participant organisation name	Short name	Type	Country
1 (Coordinator)	YouPers	YP	SME	CH
2	XIM Limited	XIM	SME	UK
3	Lucerne University of Applied Sciences and Arts – Engineering & Architecture CEESAR - iHomeLab	HSLU	Research	CH
4	u-sentric	USE	SME	BE
5	romus	ROM	SME	CH
6	CURAVIVA	CUV	Enduser	CH

History:

Version	Date	Changes	From	Review
0.1	13.12.2013	Initial draft	YP	
0.2	21.1.2014	Minor changes	YP	
0.3	11.3.2014	Some minor corrections	YP	
0.4	18.3.2014	With input of HSLU	YP	
0.5	15.4.2014	Inclusion of input of XIM and re-balancing of tasks due to the leave of Bournemouth Borough Council (BBC)	YP	
1.0	28.2.2015	Adjusted lead coordinator person	YP	
1.1	2.9.2015	Various minor changes	YP	all partners

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Section 1: Relevance and Scope

1.1 A short summary of the challenge addressed and the overall project idea

Goal:

The goal of healthy@work (personalized adaptive workplace health promotion for older employees) is to improve the quality of life of older people with a new approach in occupational health promotion. The project addresses the often-experienced gap between just knowing what would be good for your body and mind and actually starting to change your daily behaviour. healthy@work focuses on older employees.

Older employees are often physically not as fit as younger employees. In combination with unhealthy movements in their daily routine this leads to sickness absence and earlier retirement. In terms of expected care shortage in the next years this will be a challenge.

Because of changing demographics we will also experience a lack of skilled, experienced professionals in administration jobs. Often people in those jobs suffer from a shortage of physical movement, mental overload and increasingly we experience cases of burn-out.

Therefore an innovative, motivational, technology-supported health promotion program for older employees will be implemented. healthy@work should inspire older employees for a healthier behaviour at work. On one side healthy@work will create healthier, well-balanced and fit older employees and on the other side employers can rely longer on the experience of their older employees. And finally also the society profits, because people can stay occupied and healthy for a longer time, preserving the invaluable experience of these people for a longer time in times of changing demographics.

Initial situation:

You'll get agreements from almost everybody that eating right, drinking enough, getting exercise, and periodical relaxing are good for your health. But how can we help people recognize and change unhealthy habits in everyday life?

It's the aim of YouPers – a Swiss based start-up in the digital health business – to support people in taking greater control of their health, which means to live healthy and to prevent health risks. The health behaviour of individuals has a significant impact, not only on their personal health status, but also on the competitiveness of companies and healthcare costs.

The older working population seems to us as an absolutely essential target group for health promotion, especially in industrialised countries. Because many adults spend most of their waking hours at work, their workplace offers an excellent opportunity to promote healthy behaviour. We created the idea to explore; how we may best encourage and support companies to start workplace health promotion programs.

The project idea is mainly based on the following starting position:
- People have a basic desire to keep healthy, but it's hard to bring that into daily life
- Companies have a strong interest in having physically and emotionally healthy employees and to reduce the sickness figures and therefore costs
- Companies follow the basic strategy to actively involve their experienced elderly and specialised workers in the working process as long as possible, and keep them motivated for their job
- Due to the demographic development, especially caregiving employers will have a lack of specialised employees and therefore they will be interested in keeping them as long as possible in the work process. And this will only be possible with fit and healthy employees.
- State-of-the-art information and communication technologies enable new ways of health promotion like social gathering, "quantified self" approaches, personalized actions and evidence-based prevention

Nowadays employers already utilize different health promotion initiatives (e.g. onsite gyms, fruit baskets, water dispenser, health newsletters, etc.). Our solution idea goes far beyond traditional programs. On the one hand, there hasn't been a workplace health promotion program especially tailored to the elderly workforce and their special needs in terms of fitness and health. On the other hand the assisted Workplace Health Promotion Programme (healthy@work) proposed in this project deeply utilizes ICT in a new, innovative way in order to increase the motivation and the effectiveness.

Further, we see employers more as catalysts to encourage employees to take responsibility for their personal health and well-being. With the healthy@work promotion programme we enhance awareness,

motivate people to change their behaviour, and develop environments that support good health practices.

The target groups – older care-giving professionals and office workers - have been chosen as the initial focus of healthy@work. Because we did not recognize a special need in those areas, we decided to design, develop and test a solution, which is suitable for all kinds of older employees. Nevertheless, in later dissemination phases we are focusing on special target groups such as caregiving organizations first.

Product idea:

The personalized adaptive workplace health promotion programme (healthy@work) is a mobile application platform and associated infrastructure that promotes healthy behaviour through small daily inputs, activities and monitoring. It's our aim to address as many elderly employees as possible; not only sports enthusiasts but also people who like to play, enjoy achieving goals in a team and even couch potatoes.

The programme uses the abilities of mobile devices. This allows providing context-aware and personally adapted health inputs and healthy activities in a fun and informative way. It also enables healthy@work to automatically measure execution of healthy activities and to give individual rewards for performed tasks and abilities in form of "Health Points". Those "Health Points" may be exchanged for other rewards or incentives. The "Health Points" also bring in aspects of a "gamification" approach in that they can be used for scoring (e.g. "healthy@work employee of the week") or to advance in healthy@work-levels to give the advanced employees more challenging tasks.

A few examples of activities, inputs and components that may be part of healthy@work:

- A "one-minute-health-quiz" consisting of 3 questions on health topics to increase the personal health literacy.

- A "one-minute-game" to check and train mental capabilities like reaction time, body balance, deftness, creativity, memory, power of concentration, mental capacity and flexibility, etc.

- A health activity like an amount of steps to walk or steps to climb, taking breaks, drinking water, make push-ups, etc.

- Activities to strengthen the muscles

- In collaboration with a company's cafeteria and by using simple technology support (e.g. QR-tags) encourage lunching the "daily healthy menu" and provide special "Health points" accordingly.

- Advanced activity recognition algorithms that uses mobile sensor data to recognize automatically if a certain activity has been accomplished – whether an employee took a reasonable lunch break, whether he went outside for a short break, etc.

- On a web platform employees can compare their individual "Health Points"-score with the average employee of the company or within the organizational unit.

The specific content and inputs will be developed with experts for occupational health that are available at the consortium's end-user organisations.

To join healthy@work, employees have to download the free health app for their smartphone (iOS, Android) and register for the programme. Prior to that, a company representative has to open a new Health Promotion Programme for the company.

The measurement and evaluation of the performed health tasks will be made automatically. This means that sensors and algorithms for automatic measurements are built in smartphones for mobile measuring of healthy activities at work. The software for collecting and evaluating sensor data on the smartphone will be part of a mobile app. The enrichment with data from sensors, further evaluation procedures as well as central processing and storage will be done on the healthy@work server.

The Business model:

YouPers will be the owner of this product and provides it as a service to large companies, SME's and health insurance companies in Europe. YouPers operates the service consisting of the secure health platform (handles user accounts and data storage) and the mobile app. YouPers is also responsible for the creation and further development of the content.

The licensee pays a license fee for the execution of every workplace health promotion programme and acts towards its employees as initiator of the programme.

1.2 Alignment with the call topic

Promoting healthy behaviour at the workplace

healthy@work will enable older adults to continue their occupation while preserving health and motivation to remain active. The project aims at the development of an ICT-based solution which encourages older adults to keep healthy. Because we spend most of our waking hours at work it is only reasonable to start the promotion of a healthy behaviour at the workplace. The personalized adaptive workplace health promotion for older adults creates a classic win-win situation between the employees, the employers, and the service provider.

An employee who starts a healthier behaviour promoted by healthy@work will increase his overall health condition and this will allow him to continue his occupation for a longer time, to stay active in the occupational process. The diverse activities, inputs and small games target physical health as well as mental fitness and a healthy work-life balance. This increases his overall well-being which by itself is a motivational factor to remain active.

For an employer it is increasingly important to be able to count on a healthy workforce. Especially in the industrialised countries of the EU, there is and will be a lack of specialised employees e.g. in the field of caregiving. Therefore employers have a strong interest in keeping their elderly staff in the working process. On the one hand this simply allows reducing the amount of sick-days, but on the other hand this also helps to keep older adults continue their occupation in the company, preserving the valuable experience and knowledge. An employer who promotes healthy behaviour in a modern and fun way will also be seen as more attractive. healthy@work allows an employer to invest his budget for occupational health measures in a very efficient way and with a measurable impact.

YouPers as service provider will be able to market the service towards large corporations and also insurance companies who are interested in healthy employees at small and medium enterprises. The healthy@work service will be integrated into the YouPers Health platform and enable YouPers to address its other health services towards the targeted end-users.

What is innovative about healthy@work

Currently there is no health promotion program on the market, which is tailored to the needs of older employees in different occupational groups like employees of caregiving organizations or desk jobs. Second, the approach to organise a health promotion programme at people's workplace and use ICT technology to monitor their activities and check on their progress is innovative in several other respects:

- The main innovation on the technological side is to gather and evaluate the heterogeneous sensing information coming from several different mobile sources combined with various other ICT supported activities such as a health quizzes and a health game in order to come up with a motivating and fun programme. New algorithms in terms of fusing the sensor information, detecting the health related activities of dozens of individual participants and applying complex event processing mechanisms will be applied to adaptively control the programme using real-time data from the sensors and external services. The results of the data analysis have to be mapped to a score which allows for a fair comparison and finally a rewarding scheme to be applied to the individuals.

- The advantage of this project is that mostly existing infrastructure (ICT infrastructure like WLAN, mobile devices like smartphones, etc.) will be utilized and combined to be able to measure activities and adapt to the participants. Depending on the existing infrastructure the quality of the data and the range of the services provided by the program may vary. Companies may improve their infrastructure to have a higher measurement quality and to extend the program but it is not necessary.

- The system will be scalable and adaptable to the available infrastructure environment. Therefore the measuring system of the healthy@work system must also be "tolerant". The mobile application has to be adaptable to new sensors as well as infrastructures.

- Another innovation is the adaptive and modular architectural concept in which the ICT supports the initiator of the promotion programme in setting it up and running it. He or she will be guided through the process step by step in order to get to a result that is specifically tailored to the companies profile in terms of staff and infrastructure.

1.3 An example scenario

Linda, HR-Manager at a care-giving company providing care-giving services to patients at home with about 800 employees and 6000 clients, is noticing in her absentee statistics that the amount of sick days per employee is slowly increasing, especially among the older administrational workers. She also has several older care-giving employees per year that have to quit and retire or seek entirely new professions because of back problems like spinal disc herniation. She has secured an annual budget for occupational health promotion and used to spend it for traditional measures like free water dispensers, instruction talks about ergonomic lifting or increasing the ergonomics of the desk workplaces. While some of these offerings are well received by the employees others are not and Linda is not satisfied with the overall success and of these initiatives. She is looking for a more efficient way to invest into health promotion of her employees.

Chris (62), accountant, is a long-term employee who has little reason in his job to move beyond his desk. He is slightly overweight and is not exactly a sports enthusiast. Lately he missed some workdays because of his back aching. He has heard many well intentioned hints how he could improve his health, but on a daily basis he does not really follow them. He feels awkward getting up during work for a few push-ups or feels like his employer would not agree if he went outside for his 10 minutes morning break. At lunch often he omits the healthy meal with a last minute choice when he sees the delicious French fries.

Alice (56), home-care nurse, is having ever-growing problems with her lower back when lifting and handling patients at home, especially because often at the patient's homes the infrastructure like beds, doors, chairs and handle bars is far from ideal, much less than in a purpose-built and –fitted hospital or aged care home. She has heard many speeches about ergonomic handling and lifting, but in her daily work, she often forgets it or cannot apply the best practices in the specific situation.

Linda decides to start a healthy@work-Programme and signs up on the healthy@work-Website. She invites all employees of her company to join the programme and announces motivating rewards for the organizational units and individuals with the most active participation – earning the most Health Points.

Chris gets an invitation email on his smartphone, installs the corresponding healthy@work app and is automatically signed up for the healthy@work programme. After he has been working for more than a hour on his desk, he is very surprised, that his smartphone is noticing that he has not moved for such a long time and healthy@work offers him 5 Health Points if he now gets up and does a 2 minutes walk. When he has a meeting later on a different floor and is approaching the elevator, he is reminded to use stairs and is again rewarded when he does so.

Alice also joins the programme. After the first day of work she is very surprised to get feedback on her smartphone about her healthy behaviour at work. She was not aware that while she is using the app, she has room for improvement for healthy activities. She gets specific tips on how she can improve.

After a few days Chris is using stairs as his normal behaviour and Alice is starting to improve her technique on transfers, so the healthy@work app magically stops to give hints and alerts. Only when after a few weeks Chris falls back into using elevators all the time the app is suddenly alerting him with a hint, that in the last few days he did not use any stairs anymore and motivates him to do it again. On the healthy@work App, Chris and Alice can compare their participation and score with the average participating employee, and also see how they improved over time.

When Linda meets Chris in the morning on the stairs up to his office, it seems to her that his mood is better than it used to be. He greets her friendly, looks fitter and seems to be less stressed. Alice's back problems are getting rarer. Linda's statistics seem to prove that not only for Chris and Alice, but also for others who have participated in the programme the number of sick days during the last calendar year have decreased by 10%.

1.4 Success parameters of the proposal

We have identified the following success parameters for this proposal:

No.	subject	success criteria	type	expected result
1	usability	review results and final release of usability concept	qualitative	Rating: good
2	usability	number of companies and employees involved in the project, number of tests performed	quantitative	co-creation workshops with at least 5 employees and/or other stakeholders, iterative field testing after each iteration
3	usability	percentage of positive test results (user acceptance tests with at least 30 testers)	quantitative	80%
4	credibility	number of partner organizations willing to cooperate in market launch	quantitative	At least 2 partners per country
5	credibility	market strength of the committed partnerships (size and market coverage)	qualitative	At least 1 national partner per country
6	feasibility	number of reviews of technical architecture	quantitative	At least 2
7	feasibility	successful prototype release in early project phase	qualitative	Goal reached

Table 1: Success Parameters

Section 2: Quality of the Proposed Solution and the Workplan

2.1 Technology methodology

The envisioned system consists of mobile and server based software components and will be complemented by different mobile sensor-systems. The mobile part of the system has to ensure that health-related activity data can be collected by using sensors which are integrated into smartphones (e.g. accelerometer, GPS, WLAN). This will increase the data basis and provide valuable information on the activities of the healthy@work participants without compromising their personal privacy.

As for the mobile data acquisition, plausibility checks and simple analysis can be done on the smartphone before the data will be transmitted to the server part of the system. On the server part of the system the sensor data of all input sources will be analysed in more detail and a complete picture of all available data will be built (sensor fusion). Activity analysis (working, walking, running, drinking, ergonomics of specific activities etc.) will be one of the most challenging parts within this project. Most projects dealing with activity analysis focus on either outdoors or indoors by using one dedicated technology. The healthy@work project aims to combine outdoor and indoor activity analysis to be able to measure health related tasks, which have been performed. The measurement and analysis should be done automatically in background so that no system interaction with the users of healthy@work is necessary.

The envisioned system architecture is a state of the art internet server application with mobile clients and additional browser interfaces. It will base upon the architecture of the YouPers Health platform. This platform is implemented in Java/Java EE technologies and uses a stateless/RESTful API over a secure HTTPS connection to communicate with smartphone apps, smart building devices and the browser-based web interfaces. The YouPers Health Platform uses a replicated mysql database to store data securely on the server side.
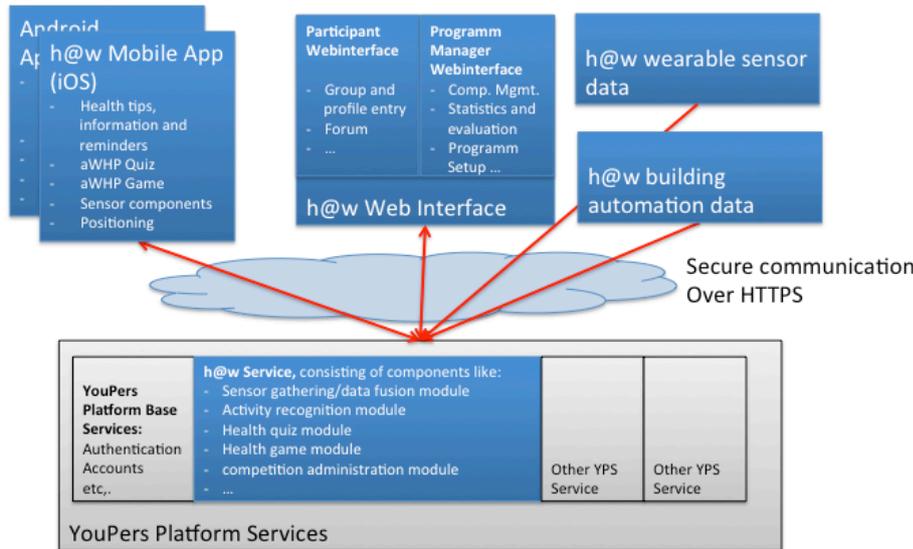
Figure 1: healthy@work Systems Overview

The healthy@work project will use a state of the art software engineering methodology based upon the results generated using the iterative, user-centred design (UCD) method. The use of an iterative methodology ensures that early feedback can be incorporated into the design and development of the healthy@work solution.

2.2 Resources (expertise, infrastructure, etc.) needed

The most important resources for the whole Consortium are the users involved in the project. They build the basis for solutions, which will be used and truly accepted in the future. The core users during the project are coming from the consortium partners CUV (Caregiving employees) and the professional network of XIM, HSLU, ROM, YP regarding office workers. Every end-user role involved in healthy@work is covered by CUV and will be involved during every phase of the project.

U-sentric, experts in UX, will be guiding the creation of a usability centred solution, while the two research and development organisations HSLU and XIM are responsible for the needed technology innovation in terms of sensor data and algorithms using data from mobile devices. The necessary expertise in requirements engineering and solution development will be covered by the 3 SME (romus, YouPers and XIM). There is a partner for every aspect in healthy@work. The following kind of expertise and resources are essential and indispensable in the consortium of healthy@work:

- End-user organisation CUV that provide access to typical employees in the requirement phase and can act as a showcase enterprise that will implement a growing healthy@work programme during the different field trial iterations. Also extremely important is experience in user involved development processes to specify real user requirements, to carry out trials and to assure a final user acceptance (YP, USE, ROM, CUV).
- SMEs/industrial partners, as well with strategic orientation towards AAL as "newcomers" in the domain, to drive development, market launch and exploitation of innovative services and intuitive user interfaces (YP, ROM, USE, XIM).
- Research centres to get an ICT-based integrated system fitting the requirements and specifications and assure that the scientific-technical goals are achieved (HSLU, XIM).
- Experience in (leading) European research projects (HSLU, XIM and USE).

The skills present in the Consortium and the infrastructure needed are depicted in Figure 7:

Figure 2: Partner skills and expertise needed for healthy@work

	End User Specialist	Business Development	Service development	System architecture & design	Usability Specialist	Security Specialist	Content, Tips, Health activities	Mobile & Web application	Mobile sensoring and sensor data fusion	Service integration skills	Evaluation design	Field Trials	Business plan & markt strategy	Dissemination	Research project management
YP		■	■	■		■	■	■		■			■	■	■
HSLU			■	■					■	■	■				■
XIM	■							■	■		■				■
USE	■	■		■	■		■			■	■				
ROM	■	■	■	■				■			■	■	■		
CUV	■						■				■			■	

Figure 2: Partner skills and expertise needed for healthy@work

2.3 The perspective of the end-users

An iterative, user-centred design (UCD) method is envisioned for healthy@work. It involves users' right from the beginning and accompanies them throughout the project in multiple, iterating cycles. Each such cycle is a development cycle on its own producing a testable prototype implementing a growing set of features. As such, it conducts its own requirements analysis together with the users, lets them taking part in the development and finally also tests the system together with them in a real-life field test environment collecting user feedbacks.

The UCD is a widely known, well-defined process for designing interactive systems. It offers many benefits to all involved project parties[1]. These benefits result from the active user involvement as well as from working together in a heterogeneous, interdisciplinary project team. The main idea is that from a closer and deeper cooperation and a vivid, mutual interaction among all involved people, one can expect better results in terms of idea generation, service development and project management. But UCD also brings long term benefits to the participating organisations and their customers in the sense that more innovative products and personal relationships result in higher satisfaction of the R&D partners as well as their customers.

In UCD, the work is split up in the four key activities:
- Understand users and specify the context of use
- Specify user requirements
- Produce design solutions
- Evaluate design against user requirements.

For healthy@work, "key-teams" at USE, XIM, HSLU and romus will accompany the project during the requirements phase, in the 3 iterative implementation and optimization cycles as well as during the final field tests running for four weeks with about 50 employees most of them older than 50 years. The end-user organisation CUV that has access to care-giving professionals and also office workers in the target group within the professional network of XIM, HSLU, ROM, YP will be involved during all phases of the project and act as pilot organisations that will carry out small and growing healthy@work programmes after every development iteration as part of the field trial work package.

2.4 Pilot application

The pilot application will be designed, developed and tested by the consortium partners. Our approach is based on several proceeding decisions that should help the project to succeed:

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[1] International Standardisation Organisation -Ergonomics of human-system interaction -- Part 210: Human-centred design for interactive systems. International Standardisation Organization, ISO 9241-210:2010.

- To meet the end-user requirements for a wide spectrum of older adults at workplace – especially regarding differences in their daily work habits – we have a large end-user organization that will be conducting healthy@work programmes in specifically chosen organisational units to cover these different types of end-users.
- To make sure that our front end applications impress by their simple functional design we have one consortium partner focusing on this subject from the very first beginning
- To get a realistic feedback in an early project stage, we plan to rollout prototype versions. These trial runs will start after the first development iteration and will grow in number of users and available functionality with every development iteration.

We plan to develop the pilot application within three development iterations (see Figure 3). At the end of every iteration, we will perform field tests at CUV (care-giving professionals) and End-Users (office workers) provided by XIM, HSLU, ROM, YP with a prototype application. This will give us early feedbacks about the usability and the functional readiness as an important input to the next iteration. The final field test will be done with about 50 employees most of them older than 50 years of CUV and End-Users (office workers, older employees) recruited by a network of XIM, HSLU, ROM, YP and will last for 4 weeks.

2.5 The exit strategy

The pilot solution as a result of the project will be supported by the provider (YouPers) for ongoing field tests until the final solution is rolled out. We plan to continue the cooperation with CUV during the phases of product development and rollout preparation.

Yet, we need to keep in mind that healthy@work is a research project, which means that there is a certain risk involved, that the idea fails. We will therefore, at the beginning of the project, inform the participants who volunteer to test and validate the service that it may be possible, that the service will be discontinued after the project ends.

Therefore, at the project exit, the participating end-users who so wish will be granted the right to keep the products they have been provided with for testing and evaluation. No end-user involved in the project will lose the opportunity of the continued use of any product that has contributed to an improved health for the single individual, as the end-users have contributed to the result of the project.

2.6 Work plan (organisation of the project)

The healthy@work work plan is organized in work packages and tasks, each task resulting in a concrete deliverable (either a report or a prototype). healthy@work splits the work into 5 work packages and the related tasks distributed over the duration of 24 months.

As can be seen in the Gantt chart and in Figure 3, the plan involves 3 major iterative development cycles that follow an integration phase. Every cycle implements new functionality and improves the components produced in earlier iterations, resulting in an incremental prototype that will be tested together with the end-users. In between integrations the agile development process applied foresees short iterations (so called sprints) within the development work package (WP3) each coming up with an executable prototype increment which can be deployed informally and tested with 2-3 friendly users. The continuous integration assures that valuable feedback is collected early and prevents surprises like in "big bang" approaches.

Initiation: The project starts with an initiation phase (WP1, WP2). During this phase, the kick off meeting will be scheduled, the administrative framework is set up, the ethical manual and the quality management plan are created as well as the risk management table, templates and guidelines etc.

Requirements: During the project's initiation, the main requirements engineering phase starts (WP2) involving end-users and the other stakeholders producing a set of end-user requirements (T2.1) which are finally turned into concrete system requirements (T2.6) for healthy@work to be implemented and tracked during the project.

Solution Design & Concepts: During this phase (WP2) the overall solution design (T2.4) is created taking into account the platform character we want to achieve, neither sacrificing the security (T2.5) nor the possibilities for the business partners to sell their services. Further the usability concept and a first usability prototype is laid out which is crucial for the further phases and the overall success of the project (T2.2).

Specification, Design & Development: The main development activities happen in WP3, which implements the base system and the mobile and browser clients for the end-users. These WPs each have their own development teams working on their tasks in short development cycles. Each of those cycles produces an increment of a service that can be tested in usability tests and presented to the end-users.
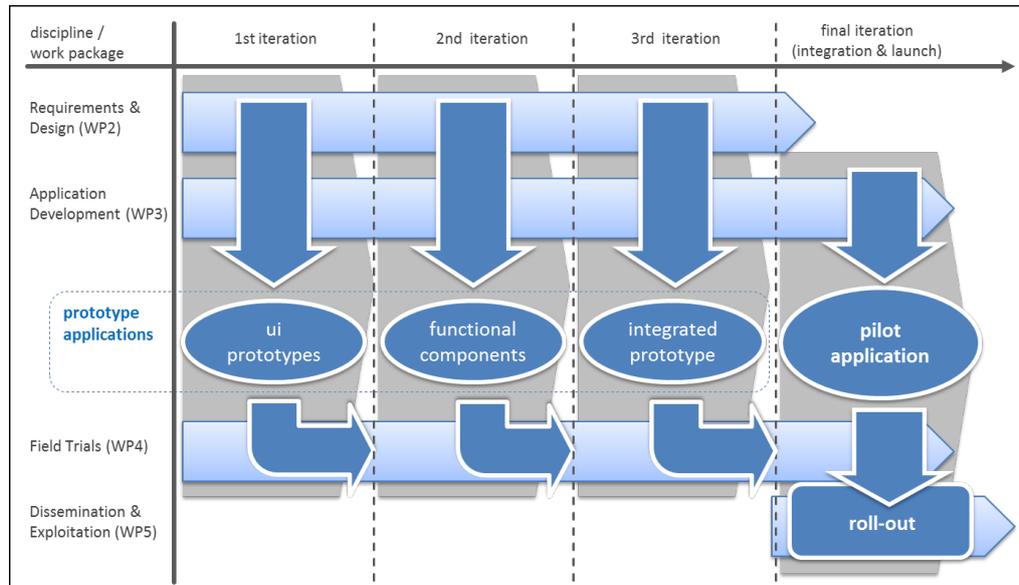

Figure 3: from iterative development to rollout of pilot application

Integration & Verification: For each integration cycle, the WP3 delivers modules for integration and simple friendly user tests. At the end of the project, a systemic prototype for an extensive pilot and the final trials is produced.

Pilot & Trials: The final trials take part in WP4 where all results from the development packages are integrated and the resulting functionality extensively tested. Before the final solution gets into the trials, the trial process is designed, the technical environment developed and finally set up and configured. After the execution of the trials, which will be conducted by the end-user organisation, the feedbacks in form of system logs and direct user feedback are closely evaluated.

Dissemination: The dissemination activities for the project (WP5) start right at the beginning and continue throughout the project. Besides the web appearance and activities for public awareness, the scientific dissemination through the scientific partners will start as first publishable results come up.

Exploitation & Business Plan: The first gathering of ideas for exploitation including a market strategy and the business plan actually has already started during the preparation of the proposal. However, the work will be continued and elaborated in two phases in the project (T5.1, T5.4) synchronised with the development and the trials to involve the users.

Project Quality Management

The healthy@work work plan considers internal and external quality measures based on reviews, continuous user feedback, regular project meetings, documentation guidelines and the consequent application of structured development processes which e.g. also involve retrospective meetings to track the lessons learned and optimise the process accordingly. At the heart of all those measures stands the project's **quality plan,** which contains all relevant information related to the quality management in the lifetime of healthy@work. The coordinator creates the plan during the initiation phase of the project and will act as quality manager (QM).

Risk Management

The coordinator will create and maintain a complete risk management table and lead the risk management in the project. But the coordinator relies on each project partner to identify and communicate risks in their daily work soon enough to be prevented. As for now please refer to the chapter 3.3 for the risk table and contingency plan in this proposal.
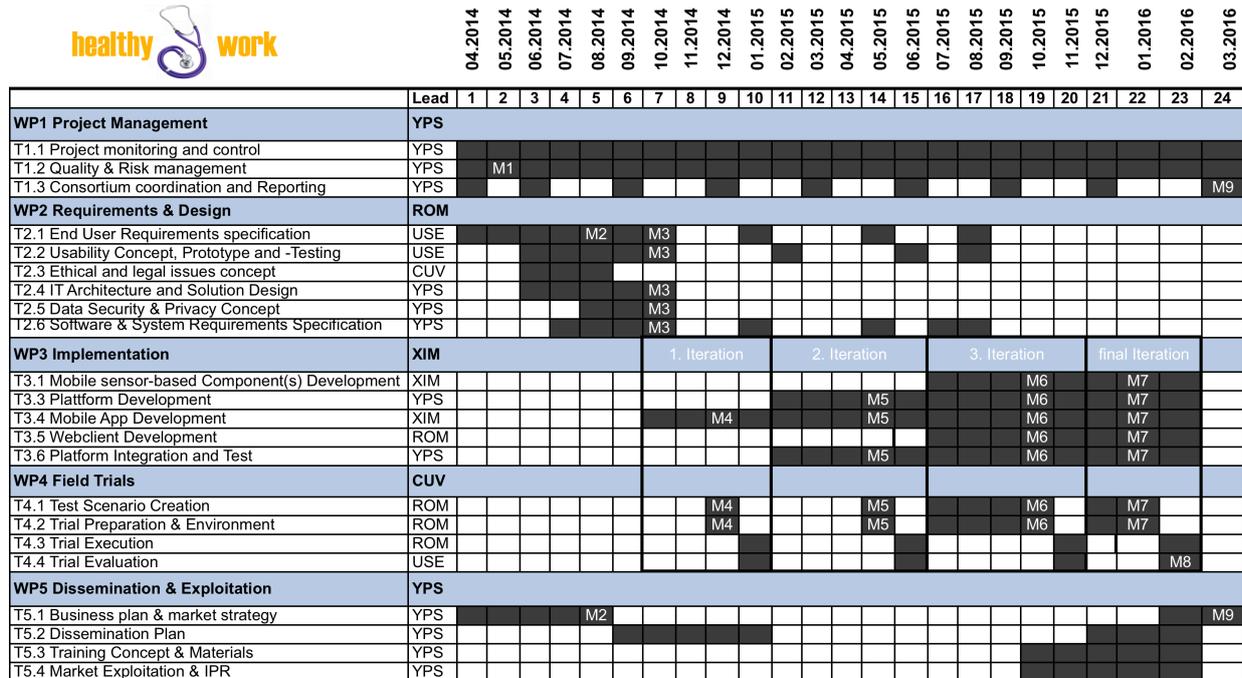
Figure 4: Gantt chart of healthy@work project plan

	Lead	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1 Project Management	YPS																								
T1.1 Project monitoring and control	YPS																								
T1.2 Quality & Risk management	YPS		M1																						
T1.3 Consortium coordination and Reporting	YPS																								M9
WP2 Requirements & Design	ROM																								
T2.1 End User Requirements specification	USE					M2		M3																	
T2.2 Usability Concept, Prototype and -Testing	USE							M3																	
T2.3 Ethical and legal issues concept	CUV																								
T2.4 IT Architecture and Solution Design	YPS							M3																	
T2.5 Data Security & Privacy Concept	YPS							M3																	
T2.6 Software & System Requirements Specification	YPS							M3																	
WP3 Implementation	XIM										1. Iteration			2. Iteration			3. Iteration			final Iteration					
T3.1 Mobile sensor-based Component(s) Development	XIM																			M6		M7			
T3.3 Plattform Development	YPS														M5					M6		M7			
T3.4 Mobile App Development	XIM								M4						M5					M6		M7			
T3.5 Webclient Development	ROM																			M6		M7			
T3.6 Platform Integration and Test	YPS														M5					M6		M7			
WP4 Field Trials	CUV																								
T4.1 Test Scenario Creation	ROM								M4						M5					M6		M7			
T4.2 Trial Preparation & Environment	ROM								M4						M5					M6		M7			
T4.3 Trial Execution	ROM																								
T4.4 Trial Evaluation	USE																							M8	
WP5 Dissemination & Exploitation	YPS																								
T5.1 Business plan & market strategy	YPS					M2																			M9
T5.2 Dissemination Plan	YPS																								
T5.3 Training Concept & Materials	YPS																								
T5.4 Market Exploitation & IPR	YPS																								

Individual workpackage (WP) description

WP number	WP1		WP duration:		M1-M24	
WP title	Project Management					
Activity type	Management					
Participant no.	1	2	3	4	5	6
Participant short name	YP (WP-lead)	XIM	HSLU	USE	ROM	CUV
Person-months per participant	7	1	1	1	1	1

Objectives of the WP

The main objective of WP1 is to ensure timely and qualitative achievement of the project results through technical and administrative coordination as well as to provide timely and efficient organisational and financial coordination meetings.

Description of work (possibly broken down into tasks) and role of partners

Task T1.1 Project monitoring and control: (Lead: YP)

In this task the overall management of the project will be done. Based on the planned time scheduling all activities will be coordinated. Each partner gets the information over the actual project state in regular intervals. The coordination and controlling of all financial aspects will be carried out in this task.

Task T1.2 Quality & risk management: (Lead: YP)

This task includes the creation of a quality management plan and the tracking of the on-going work and reviewing of the deliverables of any work packages. A detailed risk management plan is established, implemented and continuously updated.

Task T1.3 Consortium coordination and Reporting: (Lead: YP)

All activities and results will be permanently documented and periodically communicated to the different stakeholders. A homepage will be established with a protected part showing the actual state of all activities and the next steps.

In this task all the communication to the ALL association will be done. Each partner will be assisted in the account of the performed work and can be supported in the financial founding process.

Deliverables of the WP:

D1.1: Consortium Agreement (type: document; deadline: before project start) – All important aspects for working in the consortium

D1.2: Description of Work (document; milestone: M1) – All important aspects concerning project execution

D1.3 Quality Management Plan (document; milestone: M1) - Lists all tasks and deals with the quality &

risk management process
D1.4 Project Risk List (document; M1/update every 3 months) – Continual updated list of project risks and corresponding mitigation activities
D1.5: Project Progress Report (document; every 12 months) – Official AAL document to report project progress and estimations
D1.6 Public Final Project Report (document; milestone M14) - A publishable final activity report, covering all main aspects

WP number	WP2		WP duration:		M0 – M7 + iteration updates	
WP title	Requirements & Design					
Activity type	Research and Design					
Participant no.	1	2	3	4	5	6
Participant short name	YP	XIM	HSLU	USE	ROM (WP-lead)	CUV
Person-months per participant	14	6	6	9	7	3.5

Objectives of the WP
The main purpose of this work package is to define the service and its underlying product components with all its variants and characteristics. This means in particular:
- Specification of user requirements for healthy@work in cooperation with all stakeholders
- Specification of software and system requirements
- Specification of the usability concept
- Specification of the solution design
- Specification of the security and privacy concepts

Description of work (possibly broken down into tasks) and role of partners

Task T2.1 End-user Requirements specification (Lead: combined USE and ROM)
This task starts with defining the group of end-users, who will be involved in testing and validating the healthy@work service in the prototype tests and field trials. For the requirements collection, co-creation workshops and prototyping will be used as main instruments. User stories and scenarios are developed together with all stakeholders. They serve as input for the user requirements specification. In collaboration with the stakeholders, the user requirements for healthy@work are specified in an iterative way. This means that after the prototype tests the requirements of the healthy@work service are adapted according to the needs of the users.

Task T2.2 Usability Concept, Prototype and Usability Testing: (Lead: combined USE and ROM)
In this task the user interface design (UID) and the design of the interaction for the healthy@work service will be developed. As this service will be integrated onto the YouPers platform, we will basically use the existing UI standards and guidelines from YouPers. The concept is prototyped to get valuable feedback and provides the basis for the development and evaluation of Graphical UIs and interactions in mobile and web-based applications in WP4. Direct feedback from field testing with end-users coming from T4.4 will be used to optimize the UI concepts and interactions.

T2.3 Ethical and legal Issues concept (Lead: CUV)
As the healthy@work service is created and tested with real end-users, ethical issues are an important issue in the project (organisation of informed consent, contact to ethical commissions of the end-user countries, consideration of legislation etc.). Furthermore task 2.5 deals with the secure processing of personal data.

T2.4 IT Architecture and Solution Design (Lead: YP)
This task starts with defining the overall system architecture including the integration concept. Each component will be integrated into the overall system architecture. The solution design will provide several design decisions and concepts:
The consortium will decide, which types/operating systems of smartphones to support
- Layers and interfaces between the different components
- Specification of necessary mobile, fixed and server-based components of the system:
    - Component(s) for recording sensor data on a smartphone
    - Server and gateway component(s) for accessing and recording in-house sensor data
    - Component(s)/Algorithm(s) for analysing sensor data
    - Mobile healthy@work app (end-user system interaction e.g. entering information, getting information about ranking etc.)

o   Web-Client (Administration e.g. start new programme, team building etc.)

T2.5 Data Security and Privacy Concept (Lead: YP)
This task will define the standards regarding data security and privacy in the context of workplace health promotion that need to be considered in the healthy@work service. Based on the requirements and also considering privacy issues for each component, security scenarios will be worked out. The latest international standards like ISO 27001, HIPAA, GoodPriv@cy and European and National data protection laws will be taken into consideration.

Task T2.6 Software and Systems Requirements Specification (Lead: YP)
This task will specify the technical requirements. The healthy@work service requires the YouPers platform and will run primarily on mobile devices. Besides the software requirements of platform processes and web/mobile clients, there are several requirements concerning the integration of all devices including external sensors.

Deliverables of the WP: (for month of delivery see GANTT chart, below the relevant Milestone)
D 2.1 End-user Requirements Specification (document; 1st version M2, final update M6)
D 2.2 User Interface and Interaction concept and prototype (document; M3, final update in in month 18)
D 2.3 Data Security and Privacy concept (document; M2)
D 2.4 Solution Design (document; M3)
D 2.5 SW and System Requirements Specification (document; M3, final update M6)
D 2.6 Ethical Issues Concept

WP number	WP3		WP duration:		M7-M23	
WP title	**Implementation**					
Activity type	Research and Development					
Participant no.	**1**	**2**	**3**	**4**	**5**	**6**
Participant short name	**YP**	**XIM** (WP-lead)	**HSLU**	**USE**	**ROM**	**CUV**
Person-months per participant	**16**	**27**	**15**	**0**	**9**	**0**

Objectives of the WP
In this work package, the components and applications for healthy@work will be realized based on the requirement documents of WP2. With regard to the risk driven approach, we start within 1st development iteration to build the components with the highest technology risks. Within the 1st and the 2nd development iteration we build the front-end components and start to implement the server-side applications as a basis for the later integration. First prototypes of the App are developed. During the 3rd iteration, the main focus will shift to the sensor-based components.
The implementation team gets an updated version of the requirements specifications at the beginning of every iteration cycle. At the end of any iteration, the developed software parts will be deployed to the test environment. A test will be executed with a small focus group. This ensures that the functions correspond exactly to the expectations of the end-user.

Description of work (possibly broken down into tasks) and role of partners
Task T3.1 Component(s) for recording and analysing smartphone sensor data: (Lead: XIM)
For each required smartphone sensor, a separate component for recording will be implemented. Each component will support different tracking intervals in order to be able to find the best suiting interval in terms of data analysis and energy consumption. Algorithms for activity recognition, which are able to deal with sensors, will be implemented. Therefore, in a first step statistical methods and machine learning approaches will be applied to detect and eliminate outliers (e.g. GPS-errors). In a second step, the classification of different activities will be done using threshold/rule-based approaches. To improve the classification accuracy a combination of the sensor specific classifiers are combined to an ensemble model. This approach treats also the problem that not all classifiers are able to always deliver a value (e.g. no GPS signal).
Server connection
A server connection will be implemented to be able to transfer the sensor data to further analysis tasks to the server.

Task T3.3 Platform Development: (Lead: YP)
The YP team develops the server-side functionality and integrates these software components on the YouPers platform. These tasks start in parallel to the development of the sensor-based components (1st /2nd development iteration) and will produce platform deployments at the end of 2nd iteration (M6), 3rd

iteration (M8) and finally 4th iteration (M10). There will be a regular exchange of ideas, data interface requirements and progress between the platform development team and the sensor-based component development teams.

Task T3.4 Mobile App Development: (Lead: XIM)
Beginning with 1st iteration, XIM starts the development of the mobile application. In this first phase the mobile application will be a UI prototype without integrating the artefacts of Tasks 3.1-T3.3. There will be a close exchange between platform, mobile client and web client development teams. In addition, certain adjustments in the sensor-based components will be passed on task T3.1 and T3.2.
The incremental development will produce executable, integrated solutions by the end of 3rd (M8) and 4th development iteration (M10).

Task T3.5 Web Client Development: (Lead: ROM)
Beginning with 1st iteration, ROM starts the development of the web client application. In the 1st and 2nd iteration this will be a stand-alone front-end without integration that allows usability testing. There will be a close cooperation with the platform development team, but also a periodic exchange with the mobile client development team. In addition, certain adjustments in the sensor-based components will be passed on task T3.1 and T3.2. ROM will deploy an executable, integrated software version by the end of 3rd (M8) and 4th development iteration (M10).

Task T3.6 Platform Integration and Test: (Lead: YP)
By the end of the 3rd development iteration, for the first time, all software components will be integrated with the platform. The "integration team", led by YP, will therefore check and adjust if necessary all data interfaces between the clients and the platform.
This enables us to perform an integration test of the whole functionality, first at the end of the 3rd iteration (M8) and finally at the end of the 4th iteration (M11).

Deliverables of the WP ☹for month of delivery see GANTT chart, below the relevant Milestone)
D3.1 Early Prototype (M4)
D3.2 Second prototype (M6)
D3.3 Third prototype (M8)
D3.4 Final prototype (M10)

WP number	WP4		WP duration:		M7 – M23	
WP title	Field Trials					
Activity type	Testing, Evaluation					
Participant no.	1	2	3	4	5	6
Participant short name	YP	XIM	HSLU	USE	ROM	CUV (WP-lead)
Person-months per participant	6	1	1	8	11	6.5

Objectives of the WP
This work package ensures that the developed healthy@work service addresses the goal of best encouraging and supporting companies to start workplace health promotion programs to get employees to take more care on their health. This means in particular:
- Ensuring the correct implementation of the requirements
- Evaluation of the field trials based on established criteria

Description of work (possibly broken down into tasks) and role of partners
Task T4.1 Test Scenario Creation: (Lead: ROM)
In this task the test scenarios will be created for the test we perform by the end of every development iteration. All consortium partners will be involved. The tests focus on the major objectives of healthy@work so that the end-user satisfaction can be determined in relation to these. We will use a variant of Basili and Rombach's "GQM" (Goal-Question-Metric) method to obtain measures on an ordinal scale for user satisfaction.
Task T4.2 Trial Preparation & Environment: (Lead: ROM)
In every iteration cycle, we prepare the test environment and take certain adjustments to be best prepared for the trial execution. There will also be a pre-evaluation to identify possible problems regarding usability, accessibility and user experience before starting the field trial activities.
Task T4.3 Trial Execution: (Lead: CUV)
Execution of the four field trials in Switzerland/UK and compilation of the documentation for the trials. During the first two iterations we will test the sensor-based components, in 3rd iteration mainly the client application and in the final iteration the whole product.

Task T4.4 Trial Evaluation: (Lead: YP)
All the logs and documentation from the trials with the end-users will be inserted into the global evaluation. The results of the evaluation will show the suitability of healthy@work for daily use within enterprises.
Deliverables of the WP: (for month of delivery see GANTT chart, here the relevant Milestones)   D4.1 Test scenario description (document, M4, M5, M6, M7)   D4.2 Trial Evaluation Report (document; 1st version in month 9, final update M8)

WP number	WP5		WP duration:		M1-M24	
WP title	**Dissemination & Exploitation**					
Activity type	Management					
Participant no.	1	2	3	4	5	6
Participant short name	YP WP-lead	XIM	HSLU	USE	ROM	CUV
Person-months per participant	10	3	2	2	3	1

Objectives of the WP

The main goal of this work package is to be prepared for later dissemination and exploitation. This means in particular:

- Develop business plan & prepare a market strategy for systematic service roll-out into the designated markets
- Clarify IPR issues / exploitation terms to ensure that the service can be brought to the market
- Disseminate project results within the relevant communities (fairs, conferences, journals)
- Encourage liaison with relevant insurance companies as multipliers
- Develop, test and validate training concepts and materials

Lead: YP

Description of work (possibly broken down into tasks) and role of partners

T5.1 Business plan & market strategy: (Lead: YP)

We will develop a business plan that takes into consideration the perspective of workplace health promotion within the industrialized countries. Business plan development will include: service description (problem solved, customer demand, USP), market positioning (sector analysis, competitor analysis, market analysis (market needs, trends, segments, target market strategy, sale/cost forecasts), marketing and distribution strategy (including service strategy (customizing), pricing (target costing), distribution strategy and channels, promotion/communication strategy), financial planning, risk analysis, milestones for business plan implementation. The plan will be developed mainly by YP and will take into account regional/national market specifics and regulations. As part of the business plan development, we will also organize an innovation workshop with all consortium members – based on the rapid idea generation concept – to jointly develop ideas for future workplace health promotion services.

T5.2 Dissemination Plan: (Lead: YP)

Dissemination of project results and raising awareness among relevant stakeholder groups will on the one hand be done through traditional dissemination channels (conference presentations, posters, papers, articles in newsletters, forum, presentations at technology trade shows and exhibitions), but also via online channels based on viral marketing concepts. Activities include: drafting a dissemination plan (dissemination objectives, strategy, relevant target groups, the content and messages to be communicated, printed and electronic dissemination products, dissemination channels, publication schedule); identifying and contacting relevant insurance companies as multipliers/stakeholders; designing, producing, and disseminating electronic/printed dissemination materials via mailings, the project web site, in relevant digital communities, at relevant events, etc. Task leader is YP, with all other partners contributing to dissemination activities.

T5.3 Training Concept & Materials: (Lead: YP)

healthy@work addresses two different user roles: the responsible enterprise representative (e.g. a human resources leader) and the employees as end-users. For each of these groups, it will be necessary to provide training on how to promote respectively and/or use the healthy@work service. In this task, we therefore will develop, test and validate training concepts for the different user groups, and revise training concepts and materials.

T5.4 Market Exploitation & IPR : (Lead : YP)

In this task YP will negotiate the terms and conditions under which insurance companies and other possible partners can commercially exploit the service. This includes negotiating licensing fees, clarifying copyrights, etc. This will result in a legally sound agreement (checked by a lawyer) that will allow our

partners to exploit healthy@work commercially.
Also parts of this task are terms and conditions of licensing between consortium partners.

Deliverables of the WP: no., brief description and project month of delivery
D5.1 Business plan (document; 1st version M2, final update M9)
D5.2 Dissemination Plan (document; 1st version in 12, final update in month 23)
D5.3 Training Materials (document; final update in month 23)
D5.4 Consortium IPR and Market Exploitation Terms and Conditions (document; final update in month 23)

Work package (WP) overview list

WP no.	WP title	Type of activity	Lead partc. no.	Lead partner	Person months	Start month	End month
1	WP1 Project Management	MGT	1	YPS	12	1	24
2	WP2 Requirements & Design	RTD	5	ROM	45.5	1	19
3	WP3 Implementation	RTD	2	XIM	67	7	23
4	WP4 Field Trials	RTD	6	CUV	33.5	7	24
5	WP5 Dissemination & Exploitation	DEM	1	YPS	21	1	24
	TOTAL				**179.0**		

Deliverables overview list

Del. No.	Deliverable name	from WP no.	Nature/type of deliverable	Dissemination Level	Delivery date (project month / milestone)
D1.1	Consortium Agreement	-	Document	Public	Before start
D1.2	Description of Work	1	Document	Public	M1
D1.3	Quality Management Plan	1	Document	Restricted	M1
D1.4	Project Risk List	1	Document	Restricted	M1
D1.5	Project Progress Report	1	Report	Restricted	every 12 months
D1.6	Public Final Project Report	1	Report	Public	M9
D2.1	End-user Requirements Specification	2	Document	Restricted	M3, first draft in M2, final update M6
D2.2	User Interface and Interaction concept and prototype	2	Document	Restricted	M3, final update in 18
D2.3	Data Security and Privacy concept	2	Document	Restricted	M2
D2.4	Solution Design	2	Document	Restricted	M3
D2.5	SW and System Requirements Specification	2	Report	Restricted	M3, final update M6
D2.6	Ethical Issues Concept	2	Document	Restricted	M3
D3.1	Early Prototype	3	Software	Restricted	M4
D3.2	Second Prototype	3	Software	Restricted	M5
D3.3	Third Prototype	3	Software	Restricted	M6
D3.4	Final Prototype	3	Software	Restricted	M7
D3.5	Mobile App software	3	Software	Restricted	M5, M6, M7
D3.6	Web client software	3	Software	Restricted	M5, M6, M7
D3.7	Integrated software release	3	Software	Restricted	M6, M7
D4.1	Test scenario description	4	Document	Restricted	first M4, final update M7
D4.2	Trial Evaluation Report	4	Report	Restricted	First in 9, final update M8
D5.1	Business Plan	5	Document	Restricted	M2, final update M9
D5.2	Dissemination Plan	5	Document	Restricted	first in 9, final update in 23
D5.3	Training Concept & Materials	5	Document	Public	23
D5.4	Consortium IPR	5	Document	Restricted	23

Milestones overview list

No.	Milestone name	WP involved	Expected date (project month)	Means of verification
M1	Project Management Setup	1	2	D1.2, D1.3, D1.4
M2	Business Plan and Market Strategy, Draft of End-user Requirements	2, 5	5	D2.1, D2.3, D5.1
M3	End User Requirements and Usability and Solution Design	2	7	D2.2, D2.4, D2.5
M4	Completion of 1st Development Iteration	3, 4	9	D3.1, D3.2, D3.3, D3.4, D4.1, D4.2
M5	Completion of 2nd Development Iteration	3, 4	14	D3.1, D3.2, D3.3, D3.4, D4,1, D4.2
M6	Completion of 3rd Development Iteration	3, 4	19	D3.1, D3.2, D3.3, D3.4, D4.1, D4.2
M7	Completion of final Development Iteration (pilot application)	3, 4	22	D3.3, D3.4, D3.5, D3.6, D3.7, D4.1, D4.2
M8	Final trial evaluation	4, 5	23	D4.3
M9	Project close-out	1, 5	24	D1.6, D5.1

Summary overview of staff effort in person months (pm)

Part. no.	Participant short name	WP1	WP2	WP3	WP4	WP5	Total
1	YPS	7	14	16	6	10	53
2	XIM	1	6	27	1	3	38
3	HSLU	1	6	15	1	2	25
4	USE	1	9	0	8	2	20
5	ROM	1	7	9	11	3	31
6	CUV	1	3.5	0	6.5	1	12
TOTAL		**12**	**45.5**	**67**	**33.5**	**21**	**179**
		7%	**25%**	**37%**	**19%**	**12%**	**100%**

Section 3: Quality of the Consortium and Project Management

3.1 Quality of the Consortium

The goal of healthy@work is to build and test a Workplace Health Promotion system consisting of a variety of technologies fitting seamlessly to create a real user experience and get accepted. The 6 consortium partners from 3 countries bring in all the competences and infrastructure to make this happen.

A consortium that is in its competences only possible in a European context as the coordinator was not able to realise the complete systemic idea on a national level, and thus, has carefully chosen the members below to implement of what is now a common vision. For other characteristics like the balancing of SME, Industry, end-users and science and a list of the competences see chapter 2.2. The table below is a brief excerpt of the detailed descriptions below:

Partner	Competences	Role
1 - YP	Experience in building up new companies, creating new business models and managing Business and IT projects	• Coordinator • Service-provider
2 - HSLU	Applied AAL research, embedded & mobile software, automation, context-sensitive systems, end-user access (Member of EnOLL[2]), indoor localisation, integration skills	• Research-partner for wearable and fixed sensor solutions and algorithms • Verification & validation • Dissemination in iHomeLab
3 - XIM	Development of mobile and web-based systems (smartphone applications, GeoWeb) Capture and analysis of mobile sensor data – GPS, accelerometer, gyroscope Algorithm design for behavioral analysis	• Research-partner for mobile sensor analysis and algorithms • Implementation of mobile sensor-based components and mobile client app
4 –USE	Leading experts in user centred design engineering	• design and usability concepts
5 - ROM	Professional Services Company, Business and IT Solution Design and implementation. Romus delivers its services to clients in the finance, healthcare and public sector.	• Requirement engineering • Solution design • Implementation of Web Client • test engineering
6- CUV	Swiss based care organisation with a research and development division for the sector of elderly and care homes	• Requirement workshops and interviews • Field trials • Dissemination support

Table 2: Partners, Competences and Role

Youpers – YP (Coordinator)

Founded 2011 in Zug - Switzerland, YouPers AG is a start-up company with a focus on developing a digital Health platform for individuals in Europe. This new service is based on the future prospects that health management will be outsourced to individuals / patients because of technical progress, simplicity to use and increasingly unaffordable costs of traditional treatment models.

Stefan Müller, co-founder of YouPers, holds a B.A. degree in Business Administration from the University of Applied Sciences from Zurich. After several leading positions in the health insurance industry Stefan Müller was acting for 3 years as a manager in an international professional service company. In 2004, he founded romus AG. His key competencies lie on business process modelling and project management.

Reto Blunschi, CTO at YouPers, holds a master of science from the Swiss federal Institute of

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[2] European Network of Living Labs

Technology Zürich (ETH). He joined YouPers in its initial stages after several years of managing a team in a consulting company. He was responsible for various software projects in the healthcare business. His key competences lie in software engineering, particularly in software architecture and design.

XIM Limited – XIM

A UK-based creative technology development SME specialising in advanced user experience and eHealth R&D, with over 10 years' experience in the healthcare sector. Expertise includes: sentiment analysis (multimedia analytics and social media analytics), behaviour analysis through video feature extraction and sensor analytics, emotion recognition, non-contact multimodal user interfaces and human-enhanced image and video search, as well as large-scale cloud deployment of mobile services. XIM has been a partner in a number of EU framework projects in the eHealth and digital media domains, most recently AAL call 3 with the GoldUI project and the FP7 CUbRIK project (video search engine technologies using crowdsourcing to improve accuracy).

In GoldUI (www.goldui.eu) XIM developed a cloud-based service for seniors that provides user friendly access to critical digital services including self-care health, emergency calls to carers, shopping and social media. Adapts to user's accessibility capabilities and works across digital radio, ipTV, smartphone and tablets. Can be remotely managed by informal or formal carer. XIM's role: lead technical architects, developed core software framework, designed the adaptive user interface (mobile app-based) and user profile.

In the FP6 CALLAS project, XIM developed a non-contact "MusicKiosk" showcase for young museum visitors that estimates a user's emotional state via multimodal interface using vision and sound capture, and dynamically creates music based on user's perceived mood via a behavioural analysis algorithm.

Laurence Pearce is founder and CEO of XIM. He graduated in Computer Science from Hertfordshire University in 1987 and received his MBA from Warwick Business School in 1990. Laurence has over 15 years' experience in EC R&D, having project managed two research projects, acted as an evaluator for the EC and as peer reviewer for other projects. He founded XIM in 1999, and is actively involved in technical, creativity, and management capacities in many of XIM's commercial and R&D projects. Laurence's specialist areas are user experience design for eHealth and assisted living, and exploitation planning. He is also an advisor to the UK NHS on IT cloud outsourcing, information governance and telehealth.

Adam Awan is Lead Developer at XIM. He has a BSc in Computer Science from King's College London University, and specializes in artificial intelligence, behavioral analysis, cloud-based mobile application development and security. Adam led XIM's development work in the AAL project GoldUI. Before joining XIM, Adam worked as CTO for two startup companies and previously as a developer for Google Inc.

Lucerne University of Applied Sciences and Arts – Engineering & Architecture CEESAR – iHomeLab (HSLU)

iHomeLab (www.iHomeLab.ch) of the Lucerne University of Applied Sciences and Arts – Engineering & Architecture (HSLU) is the leading research centre for building intelligence in Switzerland. Together with the support of its over 70 industrial partners, the iHomeLab team conducts funded applied research in the areas of ambient assisted living (AAL), human building interaction (HBI) and energy efficiency (EE). We actively take part in shaping new standards and technologies being a member of standards organisations (e.g. ZigBee Alliance, KNX Scientific) as well as focusing on user driven solutions being part of the European Network of Living Labs (ENoLL). Further, the team has experience in test of user centric services & trial organisation.

The main goal of the iHomeLab is to promote and implement the idea of assistive technology in a networked world bringing true value to all stakeholders, especially the end-users themselves. As an applied research institute we are very near to the industry and the end-users. The iHomeLab software engineers of the iHomeLab team are engaged in the development and the integration of the mobile platform into the community and services server portal. Additionally, the iHomeLab facility provides an integrated, sophisticated, state-of-the-art environment to test and demonstrate the results together with the end-users – the iHomeLab facility.

Alexander Klapproth is a professor in the Faculties of Electrical Engineering and Information Technologies and head of the iHomeLab. He is head and initiator of the iHomeLab – The Swiss Think Tank and Research Laboratory for Intelligent Living (www.iHomeLab.ch).

Rolf Kistler is a research group leader and senior researcher where he also received his degree in Electrical Engineering (Industrial Informatics). After graduation, he spent 6 years as an embedded software engineer and technical project leader. Currently, he is performing research and coaching projects in the field of networked systems with focus on AAL at iHomeLab.

Clemens Nieke is senior researcher at the iHomeLab (www.iHomeLab.ch). He has received degrees in Electrical Engineering (Automation Technologies) and adult education (Andragogy). He has more than 10 year's experiences in project management. His main tasks will be the coordination of the end-user involvement and the project management.

U-SENTRIC - USE

U-SENTRIC is a young, dynamic company, founded end 2007 and born out of the Centre of User Experience (CUO) of the K;U;Leuven – Belgium. Its core competence is Human Centered Design. U-SENTRIC has already built a solid reputation within the market and serves many clients within various sectors going from finance, energy, governments, pharma, health and this for several projects/development processes from digital devices, product devices and services.

Tara Schrimpton-Smith, project manager and senior experience manager. Tara has been part of u-sentric from the beginning. After graduating in Communication Sciences, and specializing in E-communication and Usability Design she started her career straight away at the CUO. Her main task is to develop projects centred around the evaluation of user-friendliness. She has the full range of user centered design at her fingertips.

Hanne Sidarow, project manager and senior experience manager. Hanne graduated in Product Design with Distinction. As Tara she has the full range of user centered design tools at her fingertips. She constantly redesigns the interaction between man and machine to the favor of the user. She's also responsible for different projects within different fields.

Annita Beysen, managing partner of u-sentric. After a career within marketing, management and entrepreneurial projects she joint u-sentric end 2007. She holds a university degree of Social and Economic sciences, next to several master degrees at Insead and Vlerick. Next to the day to day operations, she's also involved in some UCD projects.

ROMUS - ROM

Romus AG, is a Swiss based Professional Service Company. Founded in 2004, an experienced consulting team consisting of economists and engineers delivers its services to clients in the finance, healthcare and public sector. Our key competences lie in Business and IT Solution Architecture, Design and Implementation.

Martin Sigrist, Partner at romus, holds a B.A. degree in Business Administration from the University of Applied Sciences from Lucerne. After several leading positions in the insurance industry, Martin Sigrist joined romus in 2005. His key competencies lie in requirement engineering and test management.

Matthias Reck, Partner at romus, holds a B.A. degree in engineering and a Master of Arts in Business Administration. He joined romus in 2011 after several IT project leads in the health insurance industry. His key competences lie in the implementation of comprehensive business applications.

CURAVIVA

CURAVIVA Schweiz is made up of three departments (elderly and care homes, homes for adults with a disability, children's and young people's homes) and three business groups (services, education and finance/administration). CURAVIVA Schweiz has a total staff of around eighty people. In relation to the above three departments, we have 2500 institutions throughout Switzerland who are members of our organisation. Our association's headquarters are in the city of Berne. Further information about our organisation as a whole can be found in German and French at www.curaviva.ch.

The Old Age Department, which is the research and development division for the sector of elderly and care homes, is significant in respect of the AAL programmes. In our team of six people, we are responsible for developing new and innovative services and projects for the benefit of our member homes. This happens mainly in the following spheres:

- Business management
- Gerontology
- Marketing
- Politics
- Projects & development

To give you a better idea, here are a few facts and figures about the overall sector of elderly and care homes in Switzerland:

- approximately 1500 elderly and care homes throughout Switzerland, nearly 100% of which are CURAVIVA members
- approximately 110,000 employees work in these elderly and care homes
- approximately 90,000 residents live in these institutions

Dr. Markus Leser, Head of the department for the Ageing and member of the management board, has a degree in gerontology and association management and has experience in project management.

3.2 Project management

Key factors to any successful project are a well-structured project organisation, a clear and concise definition of the roles and responsibilities and a skilled project management.
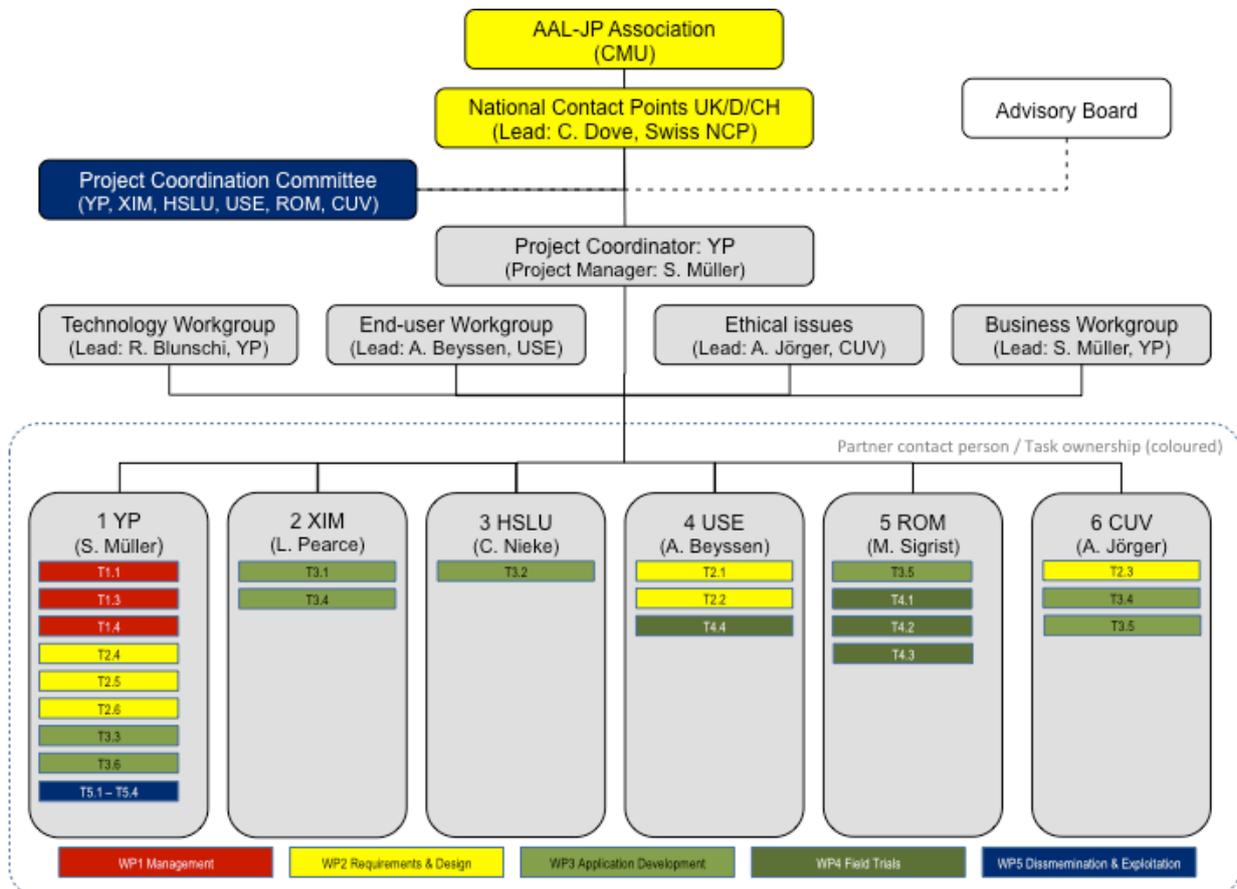
Figure 5: Organisational project management structure

As can be seen from the figure below, presenting the organisational structure of healthy@work, the project is based on 3 layers:

1. Project Coordination Committee, Project Coordinator and the Advisory Board form the upper layer being responsible for all major decisions and the project management tasks.
2. The 4 working groups and their leaders focus on the content of the project managing the most important domains such as science & technology, end-user involvement, ethics & privacy and dissemination and business aspects.
3. The work package leaders are responsible for the management & coordination, the quality of the work and for meeting the goals within the assigned work packages.

Project Coordination Committee - The committee is the executive institution of the consortium and has the overall management responsibility of the project. It is formed by representatives of the consortium consisting of one representative per party. They have the responsibility for decisions on financial and strategic issues. The coordinator as organizer and chair of the committee will prepare and preside meetings according to the governance structures defined in section 6 of the CA. The steering committee is responsible for: (1) decision making (2) Reviewing, Evaluating, Assessing, Tracking (3) Coordinator support (4) Conflict resolution

Project Coordinator - The project coordinator has the responsibility of the overall project management and coordination tasks under the supervision of the steering committee. The coordinator is the central contact point and information hub for all project stakeholders: the European Commission, the steering committee, the workgroup leaders and the work package leaders. He fosters a culture of quality and efficiency, in terms of time and resources promoting transparency and accountability amongst the partners regarding all aspects of the program. He actively cultivates the teambuilding process and also mediates in conflict situations. The tasks of the project coordinator include: (1) planning, scheduling (2) coordinating, communicating (3) monitoring, tracking (4) assisting, guiding.

Advisory Board (optional) – In agreement with the project coordination committee, the project coordinator involves an Advisory Board, consisting of representatives of the AAL National Contact Points and, conceivably, the AAL Board. Together they will discuss the progress, look at the processes, check the financial situation and identify improvements or handle potential project execution issues. The Advisory Board activities enforce the cooperation with related initiatives such as international, national or EU and AAL funded projects. Project reports and occasionally organised meetings will allow taking advantage of synergetic effects between initiatives with complementary activities and helps avoiding duplication of efforts.

Science & Technology Board - The science & technology workgroup consists of 4 members, the scientific partner HSLU and the technology providers (YP, ROM, XIM). The aim of this group is to assuring the scientific and technological objectives of the project are met and is involved in all major decisions concerning science and technology. Among other activities, they are responsible for the technical and non-functional requirements, the progress beyond the state of the art and the scientific quality as well as the technical reliability of the project deliverables. The group is also heavily involved in designing and setting up the overall system architecture of the healthy@work solution. The Science & Technology Board is led by a representative of HSLU and manages of all board activities.

End-user Workgroup - The group members consist of representatives of the end-user organisation (CUV) and 2 SME's (USE, ROM). The workgroup will meet on a bi-monthly basis and is in charge of all end-user related activities of the Project. They are in charge of bringing the end-users into the requirements process, ensure the code of ethics, and are involved in the preparation, procedures and organization of the end-user trials, the selection and interviews of trial participants and the continuous evaluation of the end-user perception and valuation. The workgroup is led by USE who is responsible for the management and coordination of all activities of the work group.

Marketing, Dissemination and Business Development Workgroup - This group discusses researches and develops the marketing and business plan for healthy@work. It executes the cost analysis and identifies and evaluates possible funding schemes. Further, it coordinates and executes the dissemination of the project results and is in charge of all marketing activities. The workgroup consists of the two workgroup leaders (science and technology board, end-user workgroup) and the 2 SME (ROM, YP). The group will meet throughout the project on a bi-monthly scheduled voice meeting. The group is led by a representative of YP.

Ethical and Privacy Management - The ethics and privacy manager of CUV will keep an eye on all related aspects in the project and is represented in the steering committee reporting any special findings and advising it. He will be active throughout the whole project assuring the fully informed consent and free will of the volunteer participants, special precautions for particularly vulnerable persons with

cognitive or physical impairments, specific care-taking measures for each individual taking part in the project and the general compliance with the ethical and data privacy guidelines.

Work Package Leaders - Every work package (WP) is assigned a WP leader. He has the responsibility to ensure the technical objectives of his WP and that all planned tasks in his work package are completed on time and the outputs are delivered with the expected quality. The leader reports the WP progress, sends the deliverables and follows the milestones closely working together with project coordinator. In general WP leaders are in charge of taking decisions concerning their work package. However, the WP leader closely cooperates and communicates with the other project stakeholders such as group leaders. The leader cares for the dissemination & exploitation of his WP.

3.3 Contingency plan

The following table lists in fair detail the project risks, their consequences as well as mitigation for the risks.

No.	Description	Probab.	Impact	Mitigation
1	Usability does not fit to end-user needs	Medium	High	Reliable requirements analysis Evaluation of a consortium partner only on the Usability focuses itself; Conduction of UI-prototyping, user-acceptance-tests and optimization-cycles
2	Development of the Application out of plan (effort, time, quality)	Medium	High	Create technical Architecture and detailed Specifications of the application; Conduct feasibility Reviews of the technical Architecture and Specifications; Iterative Development of the application
3	Participation withdrawal of an End-user-Organization in the project	Medium	Medium	Substitute consortium partner by a equal End-user-Organization
4	Participation withdrawal of an Business / research partner in the project	Medium	High	Allocate tasks to the remaining consortium partners
5	YouPers platform will not be ready in time	Medium	Medium	To deploy the prototype version for field tests, a minimum user accounting has to be provided. Based on the open design, integration on other platforms can be taken into account
6	Activity recognition technology is not good enough to monitor all health activities	High	Low	Two leading research partners focusing on this area from the beginning. As an alternative a hybrid approach with additional manual data entry may have to be employed.

Figure 6: Risk table

A high risk is certainly the state-of-the-art activity recognition and evaluation, especially in the case of the automatic measurement of ergonomics of specific professional tasks, e.g. the ergonomics of lifting and transferring patients by caregivers. The consortium's research partners are well aware of the involved challenges and intend to focus research in this area.

If the quality of measurement that can be achieved in the project does not allow qualitative evaluation of activities – e.g. how ergonomic was the patient transferring – activity recognition will still allow a quantitative approach – e.g. how many patient transfers were done – and help to adapt and target specific health tips for the individual older employee.

3.4 Ethical and legal issues

The members of the Consortium declare that the proposal conforms to current legislation and regulations in the countries where the research will be carried out. Moreover, the proposal conforms to relevant EU legislation such as

- The Charter of Fundamental Rights of the EU
- Declaration of Helsinki (World Medical Association - Declaration of Helsinki), latest version
- Directive 95/46/EC on the **protection of individuals** with regard to the **processing of personal data** and on the free **movement of such data**
- Directive 2002/58/EC **processing of personal data** and the **protection** of **privacy** in the **electronic communications** sector
- Nothing in the proposal stands in conflict with the opinions of the European Group of Advisers on the Ethical Implications of Biotechnology (1991-1997) and the opinions of the European Group on Ethics in Science and New technologies (as from 1998).

healthy@work will involve users throughout the project, due to this ethical issues play an important role. Following the "Ethical Aspects of the Development and Use of Assistive Technologies with Regard to Older People"[3] the next aspects will be taken into account:

Responsibility: On the one hand tasks have to be carried out correctly; on the other hand there is a responsibility in the legal sense for any errors. Responsibility is especially important regarding the element of health monitoring in the project. The project members will look into different questions, for example how the solution will influence or change the life of users or which tasks can be entrusted in the solution. Aspects of responsibility will be considered thoroughly.

Autonomy: It is the aim of healthy@work to promote healthy behaviour of employees at the workplace with the support of technologies. Transparency of the technology is a major prerequisite for independence: Participants need to understand how the equipment works in order for them to operate and respond appropriately. Users should be aware of the process or interventions the technology carries out.

Socio-ethical Issues: Another ethical issue concerns the distribution and the participatory equality. healthy@work is aiming at developing a low-cost and easy to use solution in order to ensure a broad access. It is not the aim of healthy@work to substitute personal contact, but to facilitate communication concerning different aspects. Regarding research ethics the code of Ethics for medical research (World Medical Association Declaration of Helsinki[4]) will be taken into account. Informed consent will also be an important characteristic of the user involvement.

Data Protection: Data protection will be taken into consideration, especially in the case of sensitive data such as medical data. Data protection offices will be involved. All personal data will only be used for project purposes. Only relevant data will be collected and the users will be asked to verify the compiled information. The data collected will be made anonymous. Personal data will not be made available to third parties. The privacy of the participants will be respected.

Only the individual end-user himself (the employee) has access to his personal health data, collected health points and his personal statistics. Employers will only have access to aggregated data over the whole company and organizational units with a size large enough to preserve the data protection rights of each individual. The protection of dignity, autonomy and values of end-users will always be an issue throughout the project.

Informed Consent: All participating users will be asked to sign an informed consent. They will be informed about the project. Their specific task in the testing and piloting will be explained as well as the risks and benefits. They will be informed about their exit rights and they will have a contact person in the project to ensure close communication if necessary.

Further information can be found in the ethical rights table in the annex of this proposal.

3.5 Available resources

The total costs of the healthy@work project is estimated at ~2.13 M€ over 24 months with a requested funding of ~1.10 M€. A detailed cost overview is given in table 3 below.

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[3] Assistive Technologies: Ethical Aspects of the Development and Use of Assistive Technologies. Opinion of the Austrian Bioethics Commission 13 July 2009 (http://www.bka.gv.at/DocView.axd?CobId=39411)
[4] World Medical Association. World Medical Association Declaration of Helsinki. Ethical Principles for Medical Research Involving Human Subjects. 1964, 2000)

Partner Nr.	1	2	3	4	5	6	Total
Short	YPS	XIM	HSLU	USE	ROM	CUV	
Country	**CH**	**UK**	**CH**	**BE**	**CH**	**CH**	
Total Person Months	53	38	25	20	31	12.0	179.0
Total Personnel in €	699'600	220'400	330'000	130'000	409'200	126'000	1'915'200
Travel & subsistance in €	5'000	7'000	10'000	0	5'000	5'000	32'000
Material, consumables, equipment, depreciation in €	17'000	3'000	16'000	0	4'000	2'000	42'000
Direct Costs in € (Belgium 20%)				26'000			26'000
Total Other costs in €	22'000	10'000	26'000	26'000	9'000	7'000	93'000
Subcontracting costs non R&D in €	0	0	0	0	0	0	0
Subcontracting costs R&D in €	0	0	0	0	0	0	0
Total Direct costs in €	721'600	230'400	356'000	156'000	418'200	133'000	1'882'200
Total Indirect costs in €	0	74'936	0	39'000	0	0	113'936
Total Project Costs [€]	721'600	305'336	356'000	195'000	418'200	133'000	2'129'136
Total Funding [€]	360'800	183'202	178'000	107'250	209'100	66'500	1'104'852

Table 3: Partners & cost effort of healthy@work

Personnel Cost: The main chunks are personnel costs for researching solutions in innovative activity recognition/evaluation and specifying, designing, developing and finally building and testing the healthy@work service which result from the human specialists working on the project listed. As practically every aspect of the system is covered by a partner of the consortium, no subcontracting is needed.

Travelling Costs: The travelling costs were calculated form a first rough meeting plan which lists the occasions (such as kick off, integration phases, trials) were physical presence of specific partners is critical to successfully reach the next milestone. A special budget was reserved for partners who publish scientific papers to attend conferences and exhibition sites.

Infrastructure: The infrastructure costs represented the effort for using existing platforms and IT-systems. In these costs the costs for software licenses will be included.

3.6 The Intellectual Property Rights management (IPR) and other legal issues

We foresee the following IPR issues related to ownership of, access to, and protection of, knowledge:

(1) Background knowledge: IPR for pre-existing technologies / technology components brought into the project by individual technology partners, as well as rights to use and access these technologies. In general, all partners remain sole owners of the intellectual property rights of pre-existing knowledge and material that is made available to the project. The partners will set up a Consortium Agreement (CA), with a comprehensive list of relevant pre-existing knowledge and materials that are explicitly included or excluded from access/use in the project.

(2) Foreground knowledge: for technologies and technology components that will be developed jointly and therefore constitute a joint invention of the project the contributing consortium members will have joint ownership. For such joint inventions, the consortium members are collectively responsible to seek and maintain protection of such knowledge. The CA will regulate the terms of ownership, allocation to partners, and protection of knowledge.

(3) IPR for third party knowledge and content (if applicable): the consortium will not be responsible for any copyright infringement caused by partners who fail to obtain copyright clearance. For content created jointly within the healthy@work project, we will use appropriate Creative Common licenses. If third party content will be used, or links to third party content will be established or integrated within the healthy@work community platform, then we will seek clearance of copyrights and/or acquire appropriate licenses before including such third party content.

(4) IPRs on established brand names / trademarks: Owner of existing trademarks and brand names retain all rights, titles and interests in the brand name, service name or trademark (including the use of logos, symbols, slogans related to this trademark or brand name). This will also be part of the Consortium Agreement.

Several members of the consortium have already been involved in EU-framework and AAL JP projects before. Thus, we can draw from various templates for the healthy@work-CA.

Section 4: Potential Impact of the Proposed Solution on Quality of Life

4.1 Improving Quality of Life for end-users

It is common knowledge that a good health state is the one main contributor to a high quality of life of older adults; therefore a healthier behaviour encouraged by project like healthy@work will lead very directly to a higher quality of life. But the approach taken by healthy@work goes far beyond this direct influence by promoting healthier behaviour in an occupational environment at the workplace. A healthier employee allows the employee to stay occupied, if this is the preference of the employee – and again, occupation and the feeling to be needed and valued is for many older adults an important factor in quality of life.

A company that is starting a healthy@work programme for its older employees shows that it is caring about the physical and mental health and fitness of its employees, and this appreciation will be a motivating factor for many of the employees in the target group.

A very important aspect of healthy@work is the long-term vision of the programme. While it is already challenging, but very valuable to initiate a behavioural change, often it is even more challenging to help an individual not to fall back into old behaviour after the initial promotion programme. Therefore healthy@work is designed to become a long-term programme that get less and less intrusive for an individual after the initial promotion, but will monitor the behaviour in the background and whenever a user starts to fall back into his old behaviour can remind him und start becoming more active again. It is only because of this long-term focus that we can count on durable health improvements.

healthy@work will adapt itself in several ways towards the differing social and organizational needs across Europe. It is obvious that healthy@work programs have to provide different hints, activities to users with different job profiles. Somebody working in home-care who will not need an incentive to more movement, but might be open for suggestions about ergonomics, nutrition or taking breaks at the right times. While this is true for individual employee profiles in one enterprise this is even more true for companies in different sectors or within different cultural environments. While the two initial target groups are employees in care-giving jobs and desk jobs, the healthy@work project will investigate other sectors and industries and provide an adapted solution wherever it is reasonable and feasible.

As for cultural differences this is addressed by the dissemination plan to start market penetration in central Europe environment (Switzerland, UK, Germany, Austria), which is well covered by partner organisations. A widening of the geographical environment is planned later.

For the individual user – the older adult at work - there is no direct cost involved, not even a cost of invested time because the healthy@work programme happens during work hours. The benefits are laid out above – better health, a higher quality of life and an opportunity to stay occupied for a longer time.

4.2 The aimed service models

Workplace Health Promotion:
According to the European Agency for Safety and Health at Work, workplace health promotion (WHP) is the combined efforts of employers, employees and society to improve the health and well-being of people at work. This is achieved through a combination of:
- Improving the work organisation and working environment
- Promoting the participation of workers in the whole process of WHP
- Enabling and encouraging healthy choices

Within the context of the healthy@work project, we direct our attention in particular towards enough physical movement, healthy food and beverage, health education, relaxing and mental health of older adults at work. There are many studies about the social and economic benefits of healthy employees at work. A representative summary of key reasons and arguments, why employers should increase their

efforts in workplace health promotion was for instance given by the European Agency for Safety and Health at Work in 2012 (https://osha.europa.eu/en/publications/literature_reviews/motivation-for-employers-to-carry-out-workplace-health-promotion) or presented in a description of the benefits of workplace health promotion by the World Health Organisation WHO in 2013 (http://www.who.int/occupational_health/topics/workplace/en/index1.html).

Employers – main target group:
It's our aim to motivate employers to carry out workplace health promotion initiatives within their organizations. The visible commitment of employers and senior managers to the promotion and protection of employees' health and well-being has been found as major reason for the enhanced commitment and participation of employees in workplace health initiatives.
Large and medium-sized companies (500+ employees) usually have a separate organization unit concerning occupational health promotion. Our project will directly address these companies as our main target group.

Insurance companies – second target group:
Smaller companies with less than 500 employees are often less organized and have fewer budgets for workplace health promotion processes. For companies without an established 'corporate health management', we see the insurance companies – which also are interested in healthy employees at the client workplaces – as promoter and sponsor of workplace health initiatives for their customers.

The proposed healthy@work solution is vastly different from traditional Workplace Health Promotion initiatives because of its innovative use of technology. Only the combined usage of advanced mobile device sensor technology and modern automated building technology allows an automated, non-intrusive measurement of health activities. This combination of multiple sensor technologies and the thereupon-based activity recognition algorithms are the main research areas of this proposal. The two partners HSLU and XIM are both leading in their respective areas and are looking forward to combining fixed and mobile senor technology as part of this project to innovate the field of activity recognition.

Automated measurement and recognition of individual health activities and behaviour is the basis of the adaptive features of the healthy@work application. Healthy@work will react to the individual behaviour of an employee and adapt to the specific needs and behaviour levels of each participant. For an individual participant the healthy@work application will also adapt over time. After a behavioural change has been initiated successfully the app will transform itself from being the initiator of the behavioural change to being the background monitor of the behaviour. It will help the participant to not fall back into old behaviour by starting to give hints and alerts again only when it detects that the behavioural change is disappearing again.

4.3 Social and ethical impact

Healthy@work will enable older adults to keep healthy for a longer time and encourages more older adults to care about healthy behaviour and nutrition at the workplace. We foresee that a larger focus on health at work will influence people's overall behaviour also outside work times and increase their well-being. This will enable older adults to stay active and lead to more social interaction.

A main focus of healthy@work is data protection – especially the very delicate relation between employers and employees in regards to health data. The employer only acts as a catalyst between healthy@work and the employee – promoting the service but in no way "providing" the service, this is made very clear in all communication from the beginning of a programme
All healthy@work data is stored securely on the YouPers platform outside the employer's area of influence (and its premises), protected by encryption and data protection laws. All data traffic between user's devices and the YouPers platform is securely encrypted and cannot be listened to by the employer. The employer has no access at all to any individual's healthy@work data. An employer may only see aggregated user data – how many employees are participating, how is the average increase of health activities or, in large enough enterprises, what is the participation in which organisational units. A user only sees his own data and may compare his success to aggregated data of the enterprise.

4.4 Other user segments

The digital health initiative of YouPers will provide a personal health platform for all citizens with various target group-specific services. Starting in Switzerland we plan to establish the platform step by step across Europe.

For the user segment at the workplace it's additionally planned to launch eWorkLife – a digital solution to enhance the work-life balance and prevent burn-out situations of employees. This service will not primarily target older employees but measure work-life balance over all employees and provide means to improve the situation for every employee who may benefit.

Also the healthy@work initiative may be able to broaden its focus away from older adults (50+) at work to other target groups. We think about younger employees or also students at university or schools, where especially nutrition and exercise is a very popular topic.

Section 5: Potential impact of the Proposed Solution on Market Development

5.1 The business case

As described in Chapter 4.2 healthy@work will enable us to target two primary target groups – large companies with their own budget for occupational health and insurance companies with an interest in their small and medium clients. In the healthy@work project we mainly cover two stereotypes of employees – the care-givers and the office workers. This enables us to target the service to a large percentage of the total possible market. YouPers plans to cover a wider area of professionals in the later phases of the deployment of healthy@work outside of the scope AAL-project. Next area to cover may include industry/production professionals and construction workers.

Estimated Market Size
Basically, workplace health promotion is worth adapting in every region of the world. Our main focus lies on the industrialized countries (Europe, North America and Asia).

Existing market for WHP solutions in larger companies (> 500 employees):
We estimate the following market size for organizations with 500 and more employees:
- 100'000 companies with average 1'000 employees / € 100 Mio. Staff costs (this corresponds to approximately 20% of middle-sized and large companies in the industrialized countries and 100 Mio. employees involved). The estimated number of enterprises seems to be reasonable compared to number of total enterprises in Europe (EU-27, 2008) and about 42'000 large enterprises (source: Eurostat, key figures on European business, 20 July 2011)
- We estimate the total spending for workplace health promotion as € 1 Mio. average per company per year (1 % of employee costs).
- As we assume that 80% of this spending is fixed (e.g. Workplace safety/ergonomic), € 200'000 remain available per year for individual workplace health promotion initiatives. The potential market size for variable WHP solutions shall amount to € 20 Mia. per year. This seems to be a big number, but in comparison with the avoidable costs for absences due to illness and accidents, this estimation appears to be reasonable.

Existing market for WHP solutions in smaller companies (< 500 employees):
We estimate the following market size for insurance companies to cover smaller companies less than 500 employees / without WHP budget:
- 1'000 national/regional insurance companies with average WHP spending of € 5 Mio. This leads us to € 5 Mia. WHP spending per year within our target group of insurance companies (in particular: health insurance, accident insurance, life insurance). These spendings are variable and mostly not subject to national regulations.

Estimated expenses for the execution of one healthy@work Programme (total costs of ownership)
- For providing the healthy@work-service, we plan to cover each execution with € 10'000 for larger enterprises and € 5'000 for insurance companies sponsoring the initiative to a larger enterprise. These prizes include personal assistance. In addition, the companies will have to spend about € 15'000 for the internal management and supporting activities. We assume that 60% of the contracts will be sponsored by insurance companies.
- For insurance companies, we offer the execution of cross-company (regional, sectoral, etc.) programmes for smaller companies (< 500 employees). We cover € 50'000 per year for the unlimited use of the healthy@work-service including support. In addition, the insurance company will face own promotion and project expenses of about € 100'000.

We estimate the sales as follows:
- 1st year after market launch: € 850'000
- 2nd year: € 3'250'000
- 3rd year: € 8'040'000
- 4th year: € 15'000'000
- 5th year: € 19'700'000

Status of competition in the market

There is an established WHP-market of competitor's providing conventional products and services like ergonomic workplaces, coaching and consulting (e.g. workplace health promotion concepts), employee surveys, education, etc. but there are only a few software solutions for checkups (e.g. stress measuring) and education. There are several successful smartphone health apps for private fitness like runtastic, runkeeper, daily fitness. healthy@work will be different because it focuses on health at workplace and the target market is different – we do not focus exclusively on sports enthusiasts.

Direct competition in the market doesn't exist so far.

There is a lack of mature software solutions that on the one hand combine workplace health promotion with individual health behaviour and on the other hand provide a strictly separate data management between employer and employee (privacy).

Marketing Approach

The uniqueness of the healthy@work promotion programme lays in the fact that the purchasing process is fully handled over the Internet (web-based) and the core application runs on mobile devices which can be easily downloaded from the Internet.

The insurance companies as our partners will be a powerful lever to promote our service to their corporate clients.

Additionally, we will – together with our consortium partners – attract some well-known enterprises and public organizations in Switzerland, UK, Germany and Austria to use the service and let us produce suitable success stories.

5.2 Dissemination

Outside this project, the service provider YouPers will establish the YouPers Health platform for individuals. The dissemination of the healthy@work application will take the availability of the underlying platform into consideration. The healthy@work service for older employees will be placed as one of several services on the digital health platform of YouPers (work in progress). The end-user partner organisations may integrate the service on their web-portal.
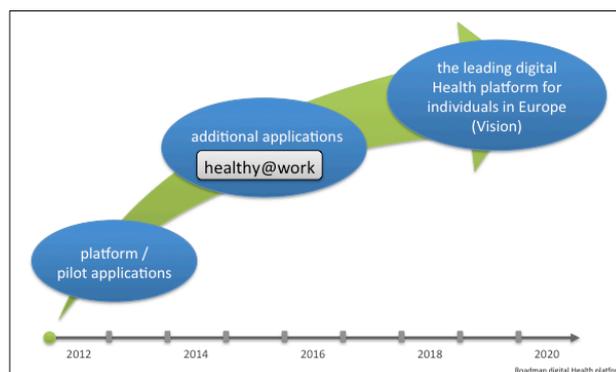
Regarding time to market the *YouPers platform* will be in place 2013/2014 with pilot applications such as eFitness and eWorkLife. The healthy@work application specific for older adults in professional occupation will be launched onto this platform in 2015/2016. The following figure shows the overall dissemination plan of platform and applications (source: YouPers AG).

dissemination plan
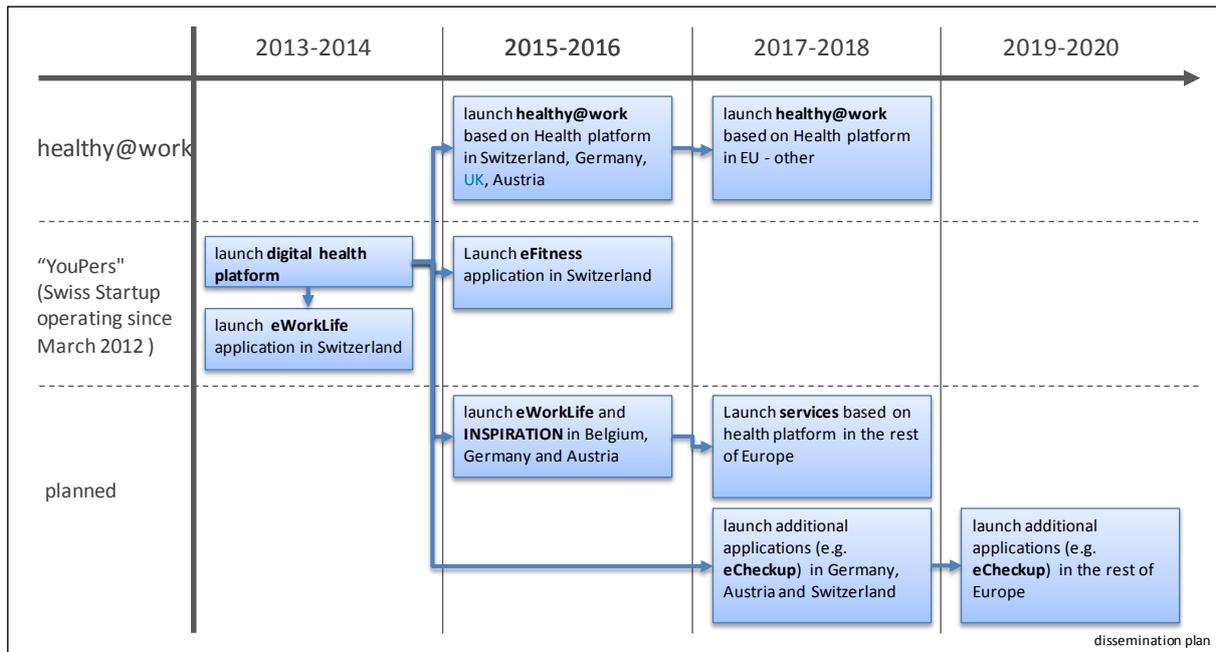
In accordance with our product development strategy, we plan a step-by-step market launch for healthy@work:
- Switzerland, UK, Germany, Austria; German and English version
- Rest of Europe and USA; German, Italian, French and English version
- Rest of World; additional languages

5.3 Standards

Legislation and regulations:
Health promotion and workplace health promotion in particular do not fall within the restrictions of national health regulations. Regarding the promotion of healthy activities, there are no limitations known to us. Further investigation of regulations that may apply will be done in the project. Any such regulation will be fulfilled.
Besides, there are several national initiatives to promote employer health programs like "The Affordable Care Act and Wellness Programs" of the US departments of Health and Human Services (HHS), which is planned to start on January 1, 2014.

Standards and certification:
The World Health Organization (WHO) has published several guidelines regarding healthy behaviour (e.g. "Global Recommendations on Physical Activity for Health", WHO-2010).
Above all, we see privacy as a universal human right. We take care on the latest data security and privacy standards and will get certified by public bodies (e.g. Pretty Good Privacy certification).
EU and National data protection laws are applicable for the healthy@work solution.
As far as possible, healthy@work admits to open standards such as open interface specifications or open source software, which will be used and extended in healthy@work. Mobile software development will be based on open platforms and standards like the Android platform or HTML5 to ensure portability of the applications to upcoming platforms. In the context of security and privacy standards like ISO 27799 (http://www.iso27001security.com/html/27799.html) will be considered. For user authentication it is planned to use an existing open source authentication and access-control framework like Spring Security or Seam Security to implement user and permission management. Currently the ISO IEEE 11073 is not relevant for healthy@work. However, beyond healthy@work it is planned to allow an exchange of vital parameter. This aspect will be considered during system design. Therefore the use of and contribution to existing open source frameworks in this field will be evaluated (e.g. OpenHealth - http://openhealth.libresoft.es – ISO/IEEE 11073-20601 standard implementation for Android).

Annex: Ethical "declaration" table

The ethical declaration table below has the purpose to provide an overview of the relevant information and suit the special needs of the Ambient Assisted Living paradigm (see also chapter 10 in the Guide for Applicants).

Ethics declaration of proposals in the AAL-Joint-Programme	Described on page or "not relevant"
• How is the issue of informed consent handled?	Chapter 3.4 Page 24
• What procedures does the proposal have to preserve the dignity, autonomy and values (human and professional) of the end-users?	Chapter 3.4 Page 24
• If the proposal includes informal carers (e.g. relatives, friends or volunteers) in the project or in the planned service-model - what procedures exist for dealing with ethical issues in this relationship?	Not relevant
• If the proposal includes technology-enabled concepts for confidential communication between the older person and informal and formal carers, service providers and authorities – what procedures are planned for safeguarding the right to privacy, self-determination and other ethical issues in this communication?	There will be different access strategies in order to ensure differentiated access to the different data. The users will be kept informed about all the data and about how the data will be processed. All data is stored on the trusted YouPers Platform geographically in Switzerland and all communication is using state-of-the-art encryption. An employer has no access to any personal health data of its employees.
• What "exit" strategy for the end-users involved in the project does the proposal have (in terms of end-users leaving the project during its implementation and after the project's end)?	Users will be able to stop their participation in the project at any given time. If wanted, the data collected will be deleted. See also Chapter 2.5 Page 10
• How are the ethical dimensions of the solution targeted in the proposal taken into account? (Brief description of distributive ethics, sustainability et.al.)	The users will have the support and the training during the testing. Especially regarding topics such as usability, confidence and dependency. Ethic committees will be involved from all countries involving users.