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D3.8 Report on Call 3 projects¹

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D3.8 Report on Call 3 projects

	<p>Tom Jones, Uzair Adam, Hayleigh Beck, Carol Weir, Paul Gately, Roman Fedorov, Piero Fraternali, Chiara Pasini, Simon Köhl, Ronnit Wilmersdörffer, Zulf Choudhary, Richard Harvey, Folkert Ringnalda</p> <p>Afra Quintanas, Harini Manivannan, Remo Ricchetti, Maria Gabriella Brodi, Robert Greve, Julian Fürstenau, Johannes Rothe, Francien Eppens, Michelle Green, Maeve Bowen, Eimear Cusack, Elmar Krack, Joeri Achterberg, Josef Kreitmayer, Mike Hartley, Pieter-Jan Pauwels</p> <p>Guus Meijer, Pasquale Donadio</p>	<p>Bemint srl, MoreLife Ltd., Jourvie gUG, ecobytes eV, Tender-It BV, SchulePLUS GmbH, Ibruar SES, Bossers & Cnossen BV, P. Donadio, BMSHome Ltd. Bee3ee srl, GffB e.V., OKNF, Sparta Ltd., POLIMI</p>	
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1 Introduction

The purpose of this report is to provide an overview of the main activities and results of the 23 projects selected through the CHEST Call 3 "Call for prototypes". Whereas their social impact is presented in D2.3 "Projects monitoring and impact report", this document focuses on the implementation of the solution approach to the given social problem for each project. Based on the typology of fields of societal challenges defined in D5.1 (Social Innovation and Ethical Guidelines) the 23 projects tackle a wide range of relevant issues, with a slight emphasis in the areas of "Civic Empowerment and Community Engagement" and "Knowledge Society and Education", as Figure 1 shows.



Figure 1: Fields of societal challenges addressed by Call 3 beneficiaries (multiple mentions possible)

More specifically, the overview given in Table 1 lists the specific challenge addressed by each of the beneficiaries together with a brief outline of their respective solution approach.

Table 1: Overview of CHEST Call 3 beneficiaries

Project name	Societal challenge	Short description of solution	Page
3D-Immersion Platform with Low-literacy course	Education in a broad range of topics	A platform for educational courses with social focus tackling a broad range of social needs from health & lifestyle to language to bullying. Innovatively combining 3D immersion with gamified learning.	17
Active Citizen	Civic participation	Empowering citizens with their own artificial intelligence algorithms thus increasing participation by merging electronic democracy with machine learning algorithms and opening the potential of open big data to citizens.	31
AdviSex	Sexual education	AdviSex develops a mobile application that aims to improve adults' individual and couple sexual health. Taking into account age, gender and sexual orientation of the user, the application provides personalized recommendations.	55
Hybrid Letter Box	Digital divide	Develops novel forms of interaction, that bridge the gap between the digital and the analogue, through the Hybrid Letterbox, an augmented, connected mail box where anyone can throw a physical postcard, and it is automatically digitized, and is uploaded to an internet platform to be spread and discussed.	78
Jourvie	Eating disorders	An app, created to support people suffering from eating disorders like anorexia or bulimia and make their therapy easier and more efficient. The solution provides them with the tools they need for a successful recovery, such as a food journal, coping tactics, motivation and support from peers and	101

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		facilitate communication with therapists.	
Kidslox	Childcare and education	Kidslox is about giving carers a platform to help children learn to use tablets and phones constructively giving carers automated and remote control over the time children spend with devices and the activities they engage in.	122
Medhance	Medical education	Medhance develops an online knowledge sharing and education platform and app aimed at patients and their care-givers about specific clinical skills, preventing hospital admissions, reducing the number of emergency department attendances caused by incorrect use of medical equipment and lowering overall costs.	142
MoreLife Online	Obesity	Engage the population of overweight and obese individuals, providing support whilst encouraging effective behaviour change, through a web-based members' site providing a safe support system and unique behaviour change tools and peer to peer support.	164
MountainWatch	Environmental monitoring	To boost social engagement for environmental monitoring by engaging the user in a societal challenge of producing high quality images, by identifying peaks in real time and overlaying their name onto the user generated photo. Acting as crowd-sourcing interface for massive environmental data collection.	179
Open language platform on Serlo	Language education	Development of a free openly licensed language learning platform, that combines modern e-learning tools and interfaces and the Wikipedia-principles of openness. The platform will offer grammar explanations, diverse exercises, a vocabulary training tool and a matching tool for international study groups.	195
PAYEZE	Financial / economic inclusion	An innovative mobile payment solution, which will offer digitally and financially marginalised across Europe a risk free way to engage in digital e-commerce. For businesses, the solution offers an improved engagement mechanism and payments collection system outside the banking networks at low costs.	214
Personal Health Record for self-management of elderly	Demographic change / healthcare	Developing a prototype of a personal health record (PHR) which gives the elderly the ownership of the content of the record. PHR will not replace the current records of the different care professionals. PHR will only store those files of the different care professionals which the elderly needs in supporting his/her self-management.	231
Provenance Coin	Consumer empowerment	This project explores the use of the Blockchain in product supply-chains to foster transparency building on existing design work to prototype and test this application to demonstrate the open tracking of materials, components and products to enable informed purchases.	250
ReadRunner	Dyslexics	This project aims at creating a revolutionary mobile platform aimed to assist people with Dyslexia in improving their reading and comprehension aptitudes through a unique intelligent play experience.	268
SchulePLUS	Education / partnerships between schools and societal stakeholders	An innovative matching platform for schools and their external partners allowing stakeholders like foundations, universities, companies, individual experts, NGOs or cultural institutions to post their cooperation offers for schools while teachers are able to find offers for their needs easily due to a tagging and matching algorithm.	304
SHOP&DROP	Waste reduction / sustainable consumption	Personal service for citizens that makes waste separation simple and effective providing personal advice on where to separate waste and offers insight in the value of reusable products and waste.	316
SourceIT	Waste reduction / sustainable consumption	A GIS mapping tool to support existing and new enterprises, which have a specific focus on the reuse and recycling of materials, in locating unwanted resources/waste materials which are essential to the existence of such enterprises.	339
TenderIT	Transparency and accessibility of public procurement	Development of a digital market place (that processes and unifies existing European tender sources, making the market transparent for all organizations and especially small SMEs and self-employed professionals.	357

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Transformap – mapping social innovation	Collaboration support for social innovation	Bringing together a wealth of scattered resources to advance transformative social innovation by proposing a well informed solution integrating current existing open source mapping technologies into an innovative collaborative effort for social innovation initiatives.	378
User Centric Energy Management for Social Housing	Energy efficiency / saving	Allowing social housing residents to express their energy management preferences through the use of digital devices in the home calculating the optimum energy use time plan (heating) and the comfort level (temperature) preferences and the optimum energy consumption load balancing for the building as a whole.	403
W4P - Crowdsourcing local social innovation	Collaboration support for social innovation	W4P wants to tackle the problem of giving citizens with great ideas the resources, knowledge or network to develop and extend these ideas, by providing a platform to support the leveraging of funding, coaching, materials, volunteers and other resources for their projects.	422
YouSense	Environmental monitoring	Self-monitoring of air pollution in direct environment, and to share this data, through the development of affordable devices with a linked portal and smart phone app.	444
Yubu	Education / career orientation	Serious game platform providing support to high school students in Study and Career Orientation (SCO) guiding students through SCO from the start of the first year up to the final exams in the last year of secondary school.	462

D2.3 did not emphasize the organizations and individuals behind these impacts and their enormous efforts carried out under the CHEST funding scheme, which is the goal of this report. The final reports developed by the 23 beneficiaries aimed to give in depth insights into each project and form the base of this document. In the following 23 chapters, detailed insights into the societal challenge addressed, the organizational structure, the solution approach (including efforts and activities performed in each of their individual workpackages) as well as their approaches to user involvement and a brief summary of their main results are given for each beneficiary project of CHEST Call 3.

2 3D Immersion Platform²

The project develops a prototype for a platform where educational courses with social focus can be followed. These courses can potentially tackle a broad range social needs: from health & lifestyle to language to bullying. What is distinctive about these courses is the use of a completely new approach to learning: 3D immersion combined with gamified learning. By having the learner interact within a 3D-world solving simulated real-life problems. Motivated through gamification, these courses will be significantly more effective than current classroom methods.

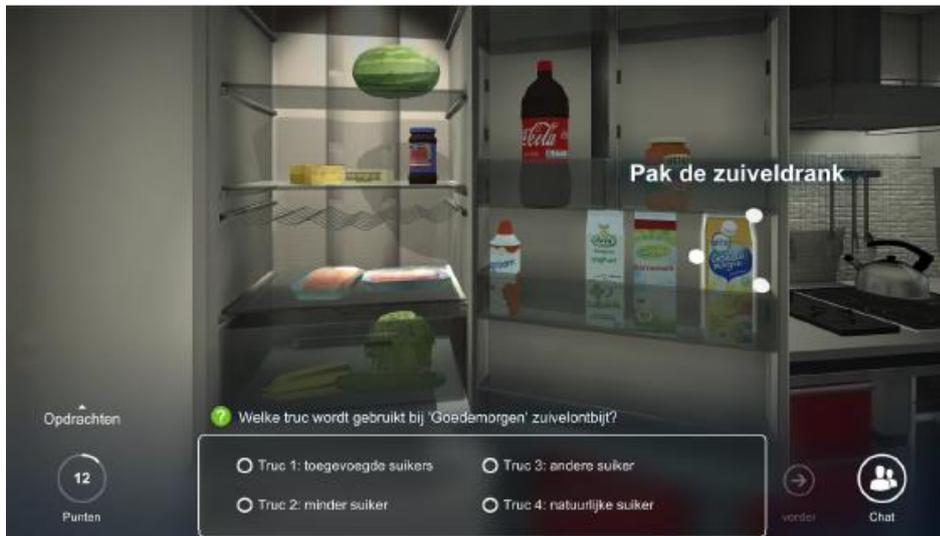


Figure 2: Screenshot of the 3D-Immersion platform prototype

2.1 The societal problem

2.1.1 Description of the problem

Low-literacy has been named as the social problem of this project. Both on an individual and a societal level.

The impact low-literacy has on the individual is substantial. Many of those with low-literacy find hindrance in societal participation (Social Inclusion), as they for instance have trouble finding a job, cannot read medicine prescriptions or perform administrative tasks like taxes. Adding to this is the embarrassment that often resides within low-literacy sufferers.

On societal level the impact is even more severe as a growing part of the workforce is not able to fully participate towards the society and economy. This has a crippling impact on the current and future workforce.

This crippling effect becomes worse over time as society asks for more and more reading skills by going more digital with each year, especially in the past 5 years. Our partners have indicated this to be a risk for almost all public instances such as municipalities, pharmacies, schools and hospitals.

Underlying all of this are several issues. In earlier decades education wasn't as valued as it is now, resulting in a large group of the baby-boomer generation to have a deficit in language skills. But even nowadays 20% of children in primary schools tend to have a reading deficit, which often stays with them their entire lives. This means that the current 13% of low-literacy is only bound to grow in the coming decades.

In terms of taking action, there is a willingness to learn. Shame and complexity of 'where to begin', however, still form a large hurdle for the target group to actually be heard and/or approached.

² Chapter contributors: Mathias Becker, Andries van Vugt, Fons Verhoef

2.1.2 Scale of the problem

The target group of this prototype 3DIE low-literacy course are people with low literacy between 30 and 60 first in the Netherlands and ultimately in Europe.

In the Netherlands the target group is estimated to comprise of 1,3 mln Dutch aged 16 to 65 and in Europe 75 mln adults** are affected. In the coming decades, this group is only more likely to grow.***

Currently 20% of children in primary school have a language-based learning deficit.

Figures show that societal costs of low-literacy amount to €550 million per year in the Netherlands. With an increasing digitalisation of services (including governmental), requiring substantial reading skills, these costs will only increase.

Taking a low-literacy language course shows to have a great impact on both individuals and society. Per learner, societal benefits amount up to €3000 (e.g. increased productivity, reduced health costs)****.

* <http://www.lezenenschrijven.nl/feiten>

**<http://www.unric.org/en/literacy/27799-eu-75-million-adults-lack-basic-reading-skills>

***20% of primary school children have a language deficit. This deficit has grown over the last few years, which is bound have a negative influence in 5 – 10 years' time.

****http://www.seo.nl/uploads/media/2013-51_Rendement_van_cursussen_voor_laaggeletterden.pdf

2.1.3 Previous approaches to solving the problem

In terms of alternative approaches to dealing with low-literacy two alternatives can be found in the market place.

(Online) low literacy courses. These course have impaired effectiveness as a result of these being text based. Example: **Oefenen.nl** There is too much text and no onboarding, resulting in scaring of those who are willing to learn.

Teacher-centred instruction is the prevalent method currently employed. Teacher-centered instruction commonly refers to lessons where the teaching activities take place from the front of the classroom. Although this method offers the benefit of courses being available and offering interaction with a teacher. A number of serious drawbacks can be identified most notably; shame acts as a serious hurdle for people to sign up, the need to be physically present when people have limited time, and the costs associated with this type of learning and instruction.

3-d immersive reading offers a remedy to these drawbacks; it offers immersive contextual learning, the target audience can take the course in the privacy of their home (cancelling out the shame factor), allows participants to take the course at their own leisure, removing the need to be physically present, allows for a customized approach and all of that a significantly reduced price-tag.

2.2 Implementation of organizational structure

2.2.1 Maturity of the project

Idea/seed phase [completed]

Organiq has tested several ideas* in the scope of this project in the area of low-literacy but hasn't developed a full course yet. This next step will be initiated and developed the pilot phase.

*EVA a course aimed at improving employment and employability for low literate unemployed.

Pilot phase [Nearly Completed]:

First prototype of a full course for improving overall practical literacy skills has been developed and assessed.

2.2.2 Organizational structure

Content and concepting

This task concerns educational needs and overall framework of the course and first creative concept.

Unit: Analyst /creative (1.5 employee)

(Concept) visual

This task entails the development of the creative concept into a full course including all (2D and 3D) visual components and assets.

Unit: Creation/ creative (1.5 employee)

Tech development:

This task realizes the technological development of the creative concepts and visual components. Utilizing relevant applications and realizing interaction.

Unit: Technology (1 employee)

2.2.3 Key personnel

Cor Tjepkema

Job title : Senior 3D artist

Description : Over a decade of experience with a range of 3D projects in both educational and non-educational settings.

Experience : LOI Kidzz Language courses English/ Spanish, URBAN 2020, Rotterdam Straat van de Toekomst, KNMP Low-literacy interactive training.

Hans-gert Knoop

Job title : Senior Unity developer

Description : Experienced developer proficient in several programming languages with a focus on Unity 3D.

Experience : Several low literacy pilots in seed phase (Organiq), Game development [customer: classified], Unity based educational [client: classified].

Fons Verhoef

Job title : Interactive analyst

Description : Trained information analyst specialized in complex intricate projects combining technology and creative requirements.

Experience : Unity based educational [client: classified], LOI Kidzz language course English/Spanish, LOI CITO prep course, KNMP Low literacy interactive training, EVA course for low literate unemployed.

Andries van Vugt

Job title : Creative Director

Description : Founder of Organiq. Experienced in innovative and out-of-the-box interactive solution concerning both social and operational fields.

Experience : Unity based educational [client: classified], LOI Kidzz language course English/Spanish, LOI CITO prep course, KNMP Low literacy interactive training, EVA course for low literate unemployed.

2.2.4 Partnerships, cooperations, and networks

Cooperation: Dutch Reading & Writing Foundation and Zwijsen

Organiq in association with the Dutch Reading & Writing Foundation and Zwijsen, a publisher, aims to develop a 3D Immersion Education (3DIE) platform (Co-creation).

The cooperation aims to access expertise concerning the effectiveness and distribution of literacy courses. For that reason partnerships with the Dutch Reading & Writing Foundation and Zwijsen have been sought as potential didactical expertise providers and launching customers.

The contractual basis of the partnership is part of an ongoing discussion. Currently, both partners are incorporated in the development of the concept and proof-of-concept.

Strategic significance of partnership: medium-high.

2.3 Implementation of the solution approach

2.3.1 Solution approach

The impact low-literacy has on the individual is substantial. Low-literacy is very much associated with embarrassment. This embarrassment is the main cause why low-literacy is a rather hidden problem within society.

Most current courses follow an outdated didactic and are text-intensive, which obviously constitutes a problem. A person with low-literacy learns best contextually (Audiovisual), in a stress-free location (Web/Internet), studying at his or her own pace (Social Software). Organiq strongly believes that a 3DIE course would provide just that.

Solution:

To ultimately realize this prototype 3DIE platform featuring a low-literacy course, a working prototype, including the underlying conceptual model, needs to be build that can be tested with a relevant target audience and be used as a demonstration for potential investors and customers.

Organiq aims to develop a platform where educational courses with a social focus can be followed. These courses could potentially tackle a broad range social needs from health & lifestyle to language to bullying. What is distinctive about these courses is the use of a completely new approach to learning: 3D immersion combined with gamified learning. By having the learner interact within a 3D-world solving simulated real-life problems. Motivated through gamification, these courses will be significantly more effective than current classroom methods.

As such, the targeted project objectives are:

- The development of a prototype social 3DIE platform offering a basic low-literacy course* that is ready for testing and demonstration.

***Basic low-literacy course**

The basic low-literacy course gives the learner the option to understand language better through an interactive experience. This experience combines language instruction and exercises with a compelling story-telling element that motivates learners to keep learning.

In this course, the player uses an avatar to walk through a world where he is prompted to use language skills to solve problems at hand. By solving these problems the engaging story continues. As the story progresses, the needed language skills are higher, which could be achieved through instruction.

From this basic course the learner could eventually (when the platform is fully functional) hop to other courses that use the same principles (instruction + exercise with a compelling and motivating story) for different settings (for instance a train station) and themes (such as Healthcare)

2.3.2 Target groups

Here you describe who you intended to reach with your activity. Your direct target group comprises

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The target group of this prototype 3DIE low-literacy course are people with low literacy between 30 and 60 first in the Netherlands and ultimately in Europe.

In the Netherlands the target group is estimated to comprise of 1,3 mln Dutch aged 16 to 65* and in Europe 75 mln adults** are affected.

This large group could be divided into subgroups based on age, sex, work sector and other demographics. However, IEP is being developed to address the needs of the group as a whole. This approach is in line with existing approaches and favoured by partners such as the Reading and Writing Association.

Many of those with low-literacy find hindrance in societal participation (Social Inclusion), as they for instance have trouble finding a job, cannot read medicine prescriptions or perform administrative tasks like taxes. Adding to this is the embarrassment that often resides within low-literacy sufferers. Low literates are adept at creating and employing coping strategies but inherently they are constantly at risk of not being able to participate fully***.

* <http://www.lezenenschrijven.nl/feiten>

**<http://www.unric.org/en/literacy/27799-eu-75-million-adults-lack-basic-reading-skills>

http://www.marketing.pamplin.vt.edu/facultyFolder/julieOzanne/01socialwebsite/professional/researchpapers/2005_JCR_Low_Literate.pdf

2.3.3 Activities and work performed

Work Package Number : 1 [Analysis and Concepting]
Actual Starting month : October Predicted / Actual End month : November
Work Package Objectives: <ul style="list-style-type: none"> - Getting and overview of the market - Mapping the wishes of the target group in more detail - Combining analysis into a list of requirements for the creative concept
Description of work this period: Main achievements: Arrived at a list of requirements for the creative concept Detailed description of work performed to reach the achievements listed above: <ul style="list-style-type: none"> - Analysis of the market’s current and future supply and demand of low-literacy courses - In-depth analysis of current low-literacy courses and wishes of the target groups
Summarise any problems you have encountered, and how they have been overcome <ul style="list-style-type: none"> - Due to a communication barrier it was rather tough to extract the wishes from low-literates. Our partners were helpful herein by providing access and tactics concerning communication.
Description of planned activity for next reporting period <ul style="list-style-type: none"> - N/A

Work Package Number : 2 [Visual Concepting]
Actual Starting month : November Predicted / Actual End month : December
Work Package Objectives: <ul style="list-style-type: none"> - Arriving at a final creative concept

Description of work this period:

Main achievements:

- Initial brainstorms about the creative concept of the course.
- Using the list of requirements from WP1 to arrive at a first draft creative concept.
- Testing this concept with the target group
- Finalised the creative concept based on the style guides as provided by Reading and Writing Association and the first showing to the target group. As such the design clearly follows the design in which Organiq created a first 2D low literacy course for women with ambition (www.evaenik.nl).

Detailed description of work performed to reach the achievements listed above:

Processed feedback into final creative concept



Summarise any problems you have encountered, and how they have been overcome

Scheduling a session with the target group turned out to be more difficult than expected in the last and first weeks of the year, ultimately resulting some delay on the overall planning.

Description of planned activity for next reporting period

-

Work Package Number : 3 [Functional Design] + 3.5 [Functional test and rework]

Actual Starting month : December

Predicted / Actual End month : February

<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Using the creative concept (WP2) to arrive at a finalized functional design for the course and an overview of needed digital assets.
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Finished the functional design <p>Detailed description of work performed to reach the achievements listed above:</p> <p>Finishing the functional design by incorporating the results from the target group functional test.</p> <p>This advisory report was done rather extensively, whereby a focus was put on determining the gamification strategy of IEP. To do so academic theories were tested alongside the prototype in order to determine the practical effectivity of the design.</p> <p>Next to this focus, attention was geared towards user experience design as this is of vital importance for the group. No reports were typed up on this aspect as notes were taken by the designers themselves and processed directly. The main elements that needed improvement were:</p> <p>Intuitiveness of the design. The design in parts proved to be less user friendly than expected. Subsequent changes were made to accommodate the specific wishes of the target group. This mainly concerned the placement of buttons and colour schemes to show the focus of the interaction (e.g. blinking buttons).</p> <p>Readability and pace. Readability and the ability to follow the course at a certain pace or level was an important topic during testing. Audio cues or the use of specific words in the interface were changed based on target group's advice.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>N/A</p>
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none"> - N/A

<p>Work Package Number : 4 [Technical Design]</p>
<p>Actual Starting month : February Predicted / Actual End month : February</p>

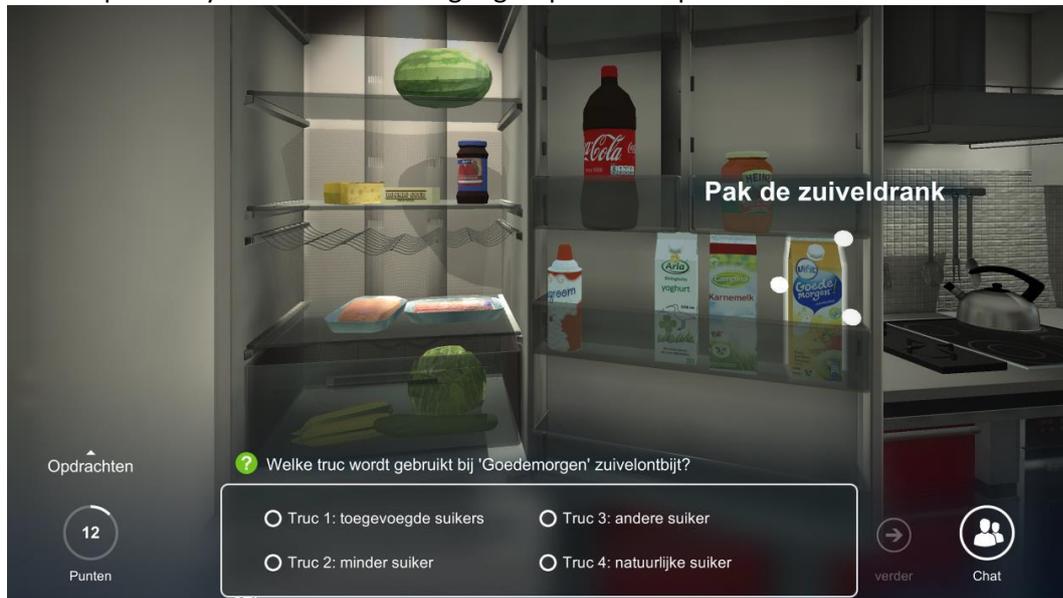
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Technical Design of the course
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Finalized Technical Design <p>Detailed description of work performed to reach the achievements listed above:</p> <p>The functional design was analysed and translated into a technical design of the course based on Unity and incorporation into current systems. This design entails a series of brainstorm and analyses which lead to a system drawing and dataflow diagram.</p> <p>Adding to this is the overall technical design philosophy that guides choices made during development. For IEP this philosophy was formulated to make choices in such a way that the resulting programme allows for maximum modularity and generic building. In this way, it has become possible to generate 3D environments and interface aspects based on cues in the back-end, which eventually makes the creation of new levels and assignments more efficient.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>N/A</p>
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none"> - N/A

<p>Work Package Number : 5 [Creative Development (Prototype)]</p>
<p>Actual Starting month : March Predicted / Actual End month : April</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Realising all digital assets for the course, based on the creative design and functional design.
<p>Description of work this period: Main achievements:</p> <p>Complete library of Digital Assets</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - Based on functional and technical design, digital assets were developed. These digital assets form the visual component of the course and are incorporated into the technical

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framework in following steps.

- This step also entailed a complete redesign whereby the original design was forgone to make place for a more modern and forward thinking design. This new design was positively tested with the target group and is depicted below.



Summarise any problems you have encountered, and how they have been overcome

N/A

Description of planned activity for next reporting period

- N/A

Work Package Number : 5 [Technical Realisation (Prototype)]

Actual Starting month : March

Predicted / Actual End month : April

Work Package Objectives:

- Realising the needed technologic aspects, based on the technical design and functional design.

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<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none">- Finished technical framework- Preliminary technical tests <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none">- Based on the technical design, the technical framework was realised. This framework houses all the components needed
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none">- A slight change needed to be made to the original technical design due to a change in the programme used for development (Unity). The rework for this took 3 additional days and is of no importance to the delivery.
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none">- N/A

<p>Work Package Number : 6 [Integration and testing (Prototype)]</p>
<p>Actual Starting month : May Predicted / Actual End month : June</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none">- Integrating technical and creative aspects- Testing the prototype
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none">- Finished prototype- Tested the prototype with target group <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none">- The prototype was finished by integrating the technical en creative assets. The prototype was then tested both internally as with the target group. Some feedback was refactored into the prototype to arrive at the final prototype

<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>N/A</p>
<p>Description of planned activity for next reporting period</p> <p>N/A</p>

2.3.4 Sustainability of the solution

Currently there are several negotiations with business partners in place that would finally result in enough funding to carry this project into maturity after the CHEST funding period.

In terms of sustainability and revenue projections. Organiq is aiming to sell the finished product (at maturity) to the Dutch Market. Preferably this will be through large parties such as (local) governments and foundations. At a price of €400 per course, this would be €1000-€1500 cheaper than current alternatives.

The total Dutch low-literate market consist of 1.3 million people. At a conservative estimation of a 1% market share in 3 years, where the realisation follows a 20%-50%-100% curve, would lead to the following calculations and projections:

Formula: Market(#people) * Market share (%) * Realisation(%) * Revenues/course(€) = Total year revenues

Year 1: $1.3m * 0.01 * 0.20 * 400 = € 1.040.000$

Year 2: $1.3m * 0.01 * 0.50 * 400 = € 2.600.000$

Year 3: $1.3m * 0.01 * 1.00 * 400 = €5.200.000$

2.3.5 Risks

- Contact with target group: In terms of risks there is the low risk of not getting into contact with the target group, however the ties with the Dutch Reading and Writing Foundation mitigate this.
- External technological risks. There is always a risk that a project cannot be build or that a technology does not work, however by using a game development ecosystem such as Unity 3D, this risk are close to zero.
- Low-literacy loses societal focus & interest: a change in policy and awareness could impact the receptiveness to the solution. However, with increased relevance of media skills, as part of a trend to online services, for governmental and non-governmental services alike, this risk seems relatively small.

2.3.6 User-based evaluation of the concept

After finishing the prototype, it was scenario based tested by a panel of 7 low-literates from Amsterdam and 5 from the Eindhoven area, equal to the tests before. The panel was asked to use the prototype as they would a final product.

Most insights are geared towards UXD and functional design to further improve the usability of the course by those who have little digital skill. The original design had already been adapted once based

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on target group feedback but could now be tested with full interaction. This gave insight in how to create a pleasant onboarding, which would result in a better adoption of the programme by the target group.

In general participants stated that they saw the prototype as fun, useful and relatively easy to use. Participants felt the security of the environment and felt free to explore without fear or anxiety. Yet, several participants stated that they rather have a volunteer help them when they would use the platform as they still had insecurities about their digital skills. As this belongs to the intended use of course, this finding did not come as a surprise.

In terms of motivation and gamification the course seems to be rather motivating. Participants felt stimulated to continue exploring and learning within the environment. Multiple participants asked if there were more locations to explore, which shows promise for the possible success of the full course when developed based on this prototype.

As a next step in de development from prototype to full product it is important to plan the rest of the course and the locations needed. This will be done with the Reading and Writing Association as soon as the project gets the go ahead (financing) for production.

2.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 2.

Table 2: Snapshot of project "3D-Immersion platform with low-literacy course"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
The development of a prototype for a social 3DIE platform offering a basic low-literacy course that is ready for testing and demonstration	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Final creative concept ○ Functional & technical design ○ Realized all digital assets for the course ○ Finished technical framework ○ Preliminary technical tests ○ Finished prototype ○ Successfully tested the prototype with target group <p>The project successfully delivered 5 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved</p>	<ul style="list-style-type: none"> ○ Dedicated blog on organisation website: http://organiq.nl/blog/laaggeletterdheid/ ○ 55 interactions in the project's section on the CHEST Community Forum. <p>*Due to the stage of development and a desire not to release sensitive material too early, the full dissemination strategy will be implemented with Organiq's partners upon launch of the 3DIE platform.</p>

Table 3 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (education and human capital) and secondary (information) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 3: Mandatory KPIs for 3D-Immersion Platform

Dimensions	Indicators	Variables	Baseline	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype	Number of target groups involved in co-design process	1	3	3

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	evaluation / test usage	Number of users involved in co-design process	5	10	21
		Ratio between men and women involved	40/60	50/50	50/50
		Ratio between young, adult and old people involved	Adult	Adult	Adult
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.) ³	1	5	5
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	1	1
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	1	1
		Number of comments / replies on project blog entries on CHEST forum	0	4	4
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	100 new followers within current communities of the Dutch Reading and Writing Association	130 new followers
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	200 retweets within current communities of the Dutch Reading and Writing Association	20

³ To what extent do you agree with the following sentence: "Our project reduces information asymmetries experienced by the users". Please attribute a value from 1 to 6 where 1 is "totally disagree" and 6 is "totally agree"

3 ActiveCitizen⁴

Active Citizen takes civic participation to the next level: empowering citizens with their own artificial intelligence algorithms. The project aims at increasing participation by merging electronic democracy with machine learning algorithms. Artificial intelligence algorithms will find and present the data needed to participate in democracy at all levels. Active Citizen connects citizens to open big data through advanced machine learning algorithms.

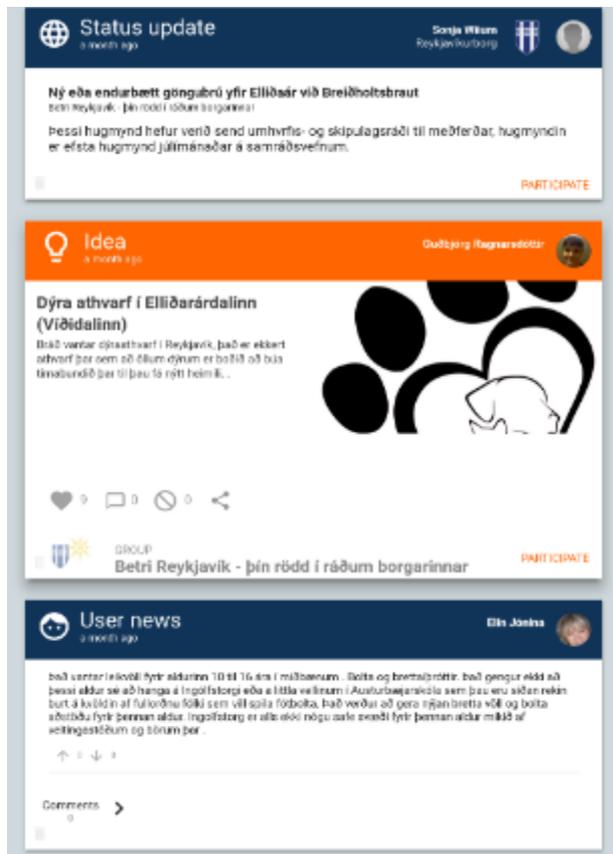


Figure 3: Screenshot of an example Active Citizen newsfeed

3.1 The societal problem

3.1.1 Description of the problem

Active Citizen aims at confronting the trend observed in Europe of a decrease in political participation. We are convinced that this trend is largely the result of our political system failing to take stock of citizens' expectations and needs and that this trend is reversible, with the correct measures.

Representative democracy puts a strong emphasis on voting, often reducing participation to voting for your representatives every 3 to 6 years. We need to include participative democracy as a core component of our political systems to renew democracy substantially.

Many citizens doubt the impact of their vote on society, as seen in the issue of lobbying at the European level in the frame of the recent European Parliament elections. Other means to get involved in society are gaining more interest: Protesting, working with NGOs, on-line activism and volunteering. The importance – and even more the potential – of these means lead us to think that

⁴ Chapter contributors: Mathias Becker, Róbert Bjarnason

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the distinction between “conventional political participation” and “unconventional political participation” has become less relevant in analysing political participation in the 21st century.

Decreasing political participation, disinterest from young people, lack of inclusiveness in decision-making are reversible trends. We believe that only by bringing together representative and participative democracy we can bring back citizens’ trust in the political system and build up sustainable democracies. And technology has a big part to play in that process.

Democracy can be - and will be - upgraded to the digital age. Active Citizen addresses the challenges identified here by relying on the potential of digital tools and creating those needed for that purpose.

3.1.2 Scale of the problem

There is a well known Crisis of Democratic Legitimacy and trust in both the EU and democracy in Europe - it is outside the scope of this report to define the scale but we refer you to a discussion paper called: “The Eurozone’s Crisis of Democratic Legitimacy: Can the EU Rebuild Public Trust and Support for European Economic Integration?” from the European Commission published September 2015.

http://ec.europa.eu/economy_finance/publications/eedp/pdf/dp015_en.pdf

In addition we reference an interesting debate on the Debating Europe website, called “Why are people losing trust in politics?”

<http://www.debatingeurope.eu/2015/10/27/people-losing-trust-politics/#.V8wjEFSLTJ8>

Reaching out to all citizens, including those who feel far from politics and excluded from decision-making, is a long-term objective which requires us to rely on a wide range of different types of multipliers.

This is why, although Active Citizen is primarily targeted at citizens, we will continue promoting it towards multipliers such as local governments, service providers, non governmental organisations and other social innovators throughout Europe.

Targeting these multipliers will offer us the opportunity not only to promote the platform but to easily deploy it in different countries.

Active Citizen API and open source code is also targeted at other open source civic applications. We are moving into a world of APIs where services like Active Citizen can be consumed by many different types of applications.

3.1.3 Previous approaches to solving the problem

Using Artificial Intelligence to help with citizen participation has to our knowledge never been attempted before but many trials of using online participation have been done around Europe and the world using different types of software and solutions.

There are literally 1000’s of solutions that have been tested for citizen participation in the past decades and there has been a constant evolution - here are some thoughts on our experience citizen participation the past 7 years and how we think Active Citizen will help.

The Your Priorities open source application was created in 2009. It has been used in many countries including Iceland, Estonia, UK, USA, Greece and Bulgaria. We’re building Active Citizen on over 5 years of open source civic software development.

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Amongst successful projects using our software are the Better Reykjavik participatory democracy and budgeting in the capital of Iceland and the Rahvakogu (Peoples Assembly) project in Estonia which has successfully made the national legal environment better and more democratic.

In Better Reykjavik, over 70,000 people have participated since 2010, out of a population of 120,000. Over 12,000 registered users submitted over 5,000 ideas with 8,000 debate points. The city of Reykjavik has approved over 500 ideas from citizens and most of them implemented.

According to Google Analytics over 500,000 people have used Your Priorities websites around the world since 2009, over 250,000 in 2013.

Active Citizen builds upon the experience of Your Priorities, taking its core elements further to better involve all citizens in the decision-making processes.

Active Citizen will run pilot experiments in co-operation with established citizen communities and civil society in Estonia, Iceland and the UK. The project brings together top social science research teams and leading AI and VR development teams with user communities around Europe to build upon work carried out from the seed-funded CHEST project and volunteer prototype work since 2013. This project will be a fluid combination of many procedures, functions and technologies that we will combine to make civic life much simpler and yet more productive.

The Citizens Foundation is part of the D-Cent FP7 project as a community partner and soon a full partner. D-Cent is complementary to the Active Citizen project and Active Citizen will be deployable as a D-Cent application. <http://dcentproject.eu/>

Your Priorities was our first step in upgrading democracy, Active Citizen is the next. It offers civic empowerment and a new way for people to engage with their communities with increased participation by younger people.

We build on high quality open source software and a new generation of machine learning APIs to bring those features to market quickly.

3.2 Implementation of organizational structure

3.2.1 Maturity of the project

Active Citizen 1.0 was released in May 2016 and included in the a new release of our Your Priorities citizen participation software. According to Google Analytics over 45.000 citizens have used Active Citizen since release in May. The Active Citizen project is based on over 8 years of experience in open source civic software development and electronic democracy processes. The Citizens Foundations "Your Priorities" e-democracy software has been used by over half a million people since 2009 and has helped improve many communities. Now we are taking civic participation to the next level by using state of the art technology to make participation easier and more interesting, especially to young people.

3.2.2 Organizational structure

We work within a Lean philosophy which means that we build the software in functional increments, starting small, deploying and testing. Nathalie Stembert has been instrumental in the research phase, Robert Bjarnason is the lead programmer and Gunnar Grimsson is managing the project as well as QA but the whole project is a collaboration with weekly meetings discussing all aspects of it and making

consensual decisions. We continue to develop Active Citizen in this lean manner even if the CHEST project has come to an end.

3.2.3 Key personnel

Róbert Bjarnason, Iceland, President, Software design and programming

Robert is a successful entrepreneur that introduced the web to Iceland in 1993 and Denmark in 1995. Before co-founding the Citizens Foundation he worked in the online gaming industry. His team received many industry awards including two BAFTA awards for games. Robert has extensive experience with AI algorithms and 3D software spanning over 20 years.

Gunnar Grimsson, Iceland, UX design and programming

Co-founder and CEO of the Citizens Foundation, Gunnar is on the Internet since 1992. Freelance web and interface designer and teacher for universities, companies and institutions since 1994 (clients include: Icelandic Parliament, University of Iceland, Supreme Court of Iceland, Icelandair...).

Nathalie Stembert, The Netherlands, User interface design

Graduated in September 2011 from the Delft University of Technology, Nathalie holds a MSc in Design for Interaction. Currently a researcher and teacher at The Rotterdam University of Applied Sciences. Recently she started collaborating with the Citizen Foundation in Iceland to develop Active Citizen.

3.2.4 Partnerships, cooperations, and networks

BETTER REYKJAVÍK - ICELAND - betrireykjavik.is

Born out of the 2008 economic and political crisis in Iceland, Better Reykjavik is a non-partisan citizens initiative. Opened one week before the local elections in Reykjavik, the platform was successfully used by citizens (40% of the voters participated in the online discussions) which led to a formal cooperation with the city of Reykjavik (from October 2011 until the end of the mandate). 15 top ideas processed by the city council every month and 300 million ISK budget for 180 smaller projects were debated online in 2012-13. 70.000 citizens (out of 120.000 inhabitants!) have used Better Reykjavík which is an official and active collaboration with the City of Reykjavik. In May 2016 we launched a new version of Better Reykjavik using Active Citizen for news feeds and notifications.

Better Neighborhoods - Participatory budgeting in Reykjavík, capital of Iceland from 2012 to 2016 - <https://hverfid-mitt-2016.betrireykjavik.is/>

300 million ISK (1.9+ million EUR) are allocated each year for ideas from citizens on how to improve the different neighbourhoods of Reykjavik. Citizens submit ideas for projects they think will improve their neighborhoods. Over 500 ideas were sent in by citizens in 2014 and 78 ideas were voted in by citizens in 2014. Over 200 ideas have already been executed since 2012 and improvements from Better Neighborhoods are easily found in all areas of the city of Reykjavik. In July 2016 we collected ideas for Better Neighborhoods 2016 and used Active Citizen for news feeds and notifications.

Our Kopavogur - Participatory budgeting in Kópavogur, Iceland 2016 - okkar-kopavogur.betraisland.is

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The purpose of the project is to improve relations between the town authorities and its residents, to give residents more responsibility and to engage them in the decision making process in relation to the town's development. The purpose is also to improve residents' sense of well-being and their experience of their local community, to make their neighbourhoods more pleasant and enjoyable. Our Kopavogur used Active Citizen as a part of Your Priorities for generating ideas for the 2016 PB. By using Active Citizen citizens get notifications and a customized news feed based on AI recommendation.

Oor Bit Places and Spaces, Fife, Scotland - <https://oorbit-fife.yrpri.org>

Oor Bit is an community budgeting initiative where citizens are given the chance to present their ideas on improving the environment within the Cowdenbeath Area of Fife. Project in cooperation with the Fife Council in Scotland. This project uses our yrpri.org website that is powered by Active Citizen.

3.3 Implementation of the solution approach

3.3.1 Solution approach

The key objective for Active Citizen is to confront the trend of decreasing formal political participation. Also to increase the quality and quantity of political and civic participation by making it easy, effective and fun with young people being the most important target group.

With all the online opportunities and data on myriads of websites and digital online tools, it's crucial to provide citizens with simple means to get the information they need as easily and quickly as possible, in an easily understood and digested form. With the combined and intertwined help of AI and VR we will help citizens make better decisions with less effort.

We will make digital democracy and civic group work appealing to citizens in the social context of online presence. In over two decades of internet usage a lot of our actions online have become intuitive. Digital democracy must learn from popular social sites and online games in order to meet citizens where and how we want to be. Combining AI and VR opens up revolutionary possibilities for achieving those objectives in an autonomous way and to make participation simpler for everyone.

Representative democracy puts a strong emphasis on voting, often reducing participation to voting for your representatives every 3 to 6 years. We need to include participative democracy as a core component of our political systems to renew democracy substantially.

Decreasing political participation, disinterest from young people, lack of inclusiveness in decision-making are reversible trends. We believe that only by bringing together representative and participative democracy we can bring back citizens' trust in the political system and build up sustainable democracies. And technology has a big part to play in that process.

We aim at increasing participation by merging electronic democracy with machine learning algorithms. Artificial intelligence algorithms will find and present the data needed to participate in democracy at all levels.

Active Citizen meets the needs of the modern lifestyle whilst replying to the current democratic challenges: to reduce the time spent but increase the efficiency by giving citizens the information they need to change their world in a meaningful and democratic way.

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Active Citizen connects citizens to open big data through advanced machine learning algorithms similar to those used by companies like Facebook and Google. Citizens are in full control of their Active Citizen algorithms and their purpose is solely to help the citizens make informed decisions.

Active Citizen is integrated with Your Priorities as a proof of concept and piloting platform. It's open source and API based and can easily be used by other social innovation web applications.

Active Citizen AI gives citizens access to powerful artificial intelligence algorithms that look after their democratic interests online, notifies about opportunities to participate and researches the issues at stake. Active Citizen AI will reduce participation friction by giving citizens notifications and relevant information when they need it. It will also help people with similar ideas and priorities to connect with each other.

Using a simple, yet powerful notification engine to always keep you up-to-date on civic issues while totally respecting your preferences and time.

Citizens will be able to have their say on decisions affecting them as well as help define the political agenda and top priorities of their group, neighborhood, municipality or even country. This will enable a more enlightened dialogue between citizens and local and national governments which can also use Active Citizen technology for internal administration. Active Citizen will empower citizens to increase the quality of their ideas, debate and decisions to improve their communities.

Artificial intelligence algorithms can reduce participation friction by giving citizens notifications and relevant information when they need it. It can help citizens to serve their democratic interests online, notify them about opportunities to participate, help them research the issues at stake and connect people with similar ideas and priorities to with each other.

Notifications however can also be perceived as intruding or annoying. Variables i.e. the notification sender, content, tone of voice, frequency and timing are very important and have to fit the participation process of the target group.

In this first deliverable we describe the results of a large scale survey and some in depth user interviews concerning notifications and peoples' participation processes. The results are visualized in the form of personas and their customer journey. Together these findings supply us with the information to determine what notifications are needed and how they need to be designed.

3.3.2 Target groups

Our current users

We have a large group of registered users, over 27.000 on Better Reykjavík and other Your Priorities websites. Those users participation needs are our source for the requirements for Active Citizen.

Our Better Reykjavik users are mainly interested in participating on local issues and make use of Active Citizen for AI driven newsfeeds and notifications.

Better Iceland hosts a wide variety of users with different needs. Communities like Kópavogur, Hafnjarförður and Fljótshérað use it for local issues, agenda setting and participatory budgeting and political parties like the Left Green party and the Icelandic Pirate party use it for organizing their political parties.

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The main Your Priorities website also hosts a wide variety of projects including participatory budgeting in Scotland, Croatia and Slovenia and work by various citizens interests groups including a pilot project with the Consumer Authority in Norway.

European citizens interested in citizen participation

One current key target group are Erasmus students and EU policy makers and we are working on another funded project that uses Active Citizen called “DEEP-Linking Youth”. This project is co-funded by Erasmus+ and aims to “how e-participation can foster young people’s empowerment and active participation in democratic life”. For this project we plan to use Active Citizen newsfeeds and notifications along with some new funded AI development in relations to this project.

The Citizens Foundation is working with the city of Madrid, consulting on a participatory budgeting project and Madrid has expressed interest in incorporating the Active Citizen library into their participation software.

We will firstly promote and deploy the tool at the European level since we have already a consistent network of interested organisations (grassroots, local authorities, etc.) in many European countries.

Active Citizen is a tool that is meant to empower virtually every individual (provided they have internet access) in taking an active role in their community and in society. Yet, this aim is a long-term one which will only be reached through incremental implementation, use and improvement of the platform.

Focus on younger citizens

We have identified that the age group of 16-29 participates less, proportionally to their total representation, in online citizen participation software. According to Eurostat there were 89 million people in this age group. We’re already addressing this target group directly through our cooperation with Erasmus+.

Our experience shows that such tools have a strong maximising effect when it comes to participation since they can be used at all ages. However, it is important to underline that certain features of the project are specifically aimed at younger citizens and are designed to make the tool more attractive to them. Indeed, the decrease in terms of “conventional political participation” in most European countries requires us to renew both the democratic tools and practices, notably to raise awareness and involve citizens from an early stage.

Citizens must have a strong voice in our civic debate if we want to create and maintain a healthy society. Our mission is to provide the tools and means for citizens to get their voices heard and to encourage their participation in governance.

We will give citizens the power to express themselves and together find their common priorities. This will have an influence on decision making processes in their communities and make them better integrated into their communities.

Empowering citizens with Artificial Intelligence and Virtual Reality

Active Citizen brings Artificial Intelligence algorithms and Virtual Reality to citizens to empower them in civic participation. Personal AI assistants, groups, VR interfaces, citizens assemblies that combine

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online and offline presences, democracy games and other components will assist citizens, bring them together and help to increase bottom-up citizen participation by making participation simple, fast, interesting and fun. It will help citizens make more informed decisions while spending less time and effort.

3.3.3 Activities and work performed

<p>Work Package Number : 1</p> <p>WP1: Lean design (M1 - M3)</p> <p>Our design process is user centric and we will launch prototypes to test by real users as soon as possible. We already have launched initial Active Citizen prototypes to real users.</p> <p>This will include an Agile project plan where we plan to release code early and often. The prototypes will continue to evolve, with each release involving real users using the applications at each stage. We will perform real life user interviews where we will get early feedback on design ideas.</p> <p>Deliverables</p> <p>D1.1: User interviews (M1-M1)</p> <p>D1.2: Lean design document for Active Citizen (M1-M2)</p>
<p>Actual Starting month : M1</p> <p>Predicted / Actual End month : M2</p>
<p>Work Package Objectives:</p> <p>Start the user centric lean design strategy but asking actual users what they like. Research questions:</p> <ul style="list-style-type: none">● People: Which groups should be targeted specifically?● Participation: What form of participation is most important to increase?● Period of time: What time span should a participation process have?● Engaging: When do people want to be engaged in their participation processes?● Notifications: What type of notifications do people want to receive?● Meaningful: What is meaningful for people of a certain target group? <p>These research questions formed the main guidelines for the questions of the survey and user interviews. The research questions will be answered based on our findings from these email surveys and user interviews.</p>

Description of work this period:

Main achievements:

- Over 1.000 users took part in an online survey about Active Citizen features.
- Lean design document with Personas and Timeline created.
- Specific notification design document created.

Detailed description of work performed to reach the achievements listed above:

In this deliverable we focused mainly on Notifications. Although we used the opportunity to ask our participants questions in terms of the second objective as well, in this deliverable we limited ourselves to the results on the Active Citizen notifications.

Before conducting any user research, we researched the current notifications that are sent out through the Your Priorities platform. Through email surveys and user interviews we gathered information on peoples' current notifications experiences and preferences concerning their future notification experience on Active Citizen.

Method

Based on the research questions and our goals we designed two email surveys and several user interview questions to gather more information about the preferences of current and potential Your Priorities users concerning their notification experiences.

Email survey

The email surveys were made by means of Google forms and were sent, accompanied by a newsletter, from the email address of the Citizens Foundation. In order to guarantee a maximum amount of responses the survey questions were kept concise and the survey was designed in the corporate identity of the Citizens Foundation. Both the email surveys for (medium) active as passive respondents consisted of four closed questions in English (one multiple-choice and three multiple- answer questions) and two optional open questions (to comment and to register as a future research participant). Two days after the survey was sent out to the mailing list of the Citizen Foundation

User interviews

The user interviews consisted of a set of general questions, aiming to determine the current level of participation of each participant. The remainder of interview was framed in the form of three scenarios. Each participant was walked through the scenarios, after each scenario the participant was asked for their reaction on the scenario. A set of optional questions was prepared with each scenario to anticipate and expand on the reaction of the participant.

Participants

The email response group of the email survey was based on registered users from the products of the Citizens Foundation. The response group were categorized in two subgroups, (1) a group of 2.204 people who regularly participate and (2) one group of 8.761 people who never or less frequently participate. From the first group 289 people submitted the survey, from the second

group 732 people submitted the survey, leading to a total response rate of 1021 people

Email survey

The email survey resulted in a total of 1021 responses. The responses were captured in four different Google Spreadsheets. The two spreadsheets with English and Icelandic responses from the (medium) active group of people and the two spreadsheets with English and Icelandic responses from the passive group of people were merged. Resulting in a spreadsheet with 289 responses and a spreadsheet with 732 responses. A quick overview was created with the embedded Summary of Responses tool, providing an immediate overview of the distribution of percentages over the answers. The results of each of the graphs were analysed, styled and integrated in the persona. The optional comment box was used in both the English surveys (27 and 23 comments) as the Icelandic surveys (41 and 32 comments). Irrelevant comments were filtered out and the comments with meaningful qualitative content were added to the transcripts of the user interviews. Especially the qualitative survey results from the (medium) active Icelandic survey contained relevant information to add to the persona.

User interviews

The user interviews resulted in 26 pages of transcribed data, that was analysed for patterns and insights. The main initial topics that were found were: '(1) emotions, (2) process, (3) security, (4) notifications, (5) content, (6) settings and (7) success'. The information from the two passive participants and the information of the three (medium) active participants was merged. Corresponding information was highlighted and clustered. The clusters of information forms the base for the two personas and the customer journey. The clusters of information were shortened and rewritten, maintaining as much of the original answers from the interviews and surveys as possible. The main initial topics diverged into new secondary topics: '(1) level of involvement, (2) registration and settings, (3) dashboard, profile and follow, (4) content (tone of voice), sender and action, (5) medium and Notification types, (6) process, timing and frequency, (7) time of day and (8) success'. The text that belongs to topic one and eight is integrated in the personas. Topics two to seven form the touchpoints of the customer journey and the corresponding text is integrated in the customer journey accordingly.

Personas

Based on the results of the email survey and the user interviews two personas were created.

The primary persona is a person who belongs to the older end of the Active Citizens target group and is more settled down. The persona has a family, owns a house and consequently feels responsible and finds it important to participate. It is in the personas' interest to add ideas on a neighborhood level (e.g. redevelopment of the street) as well as on a city level (e.g. safety). Participation however should feel inviting and the invitation to participate should be sent out in the beginning of a participation process, when their voice can still make a difference. Communication is preferred via email and notifications that are considered most important come from the city government. The content of the notifications is considered important and should be informative, yet concise. The frequency of the notifications should be in balance and in line with their participation processes. The notifications are used to get informed, to add points for or against an idea or to debate. Types of future notifications are: Success stories, preview

notifications, periodic news letter, key process moments, invitation to participate, elected ideas, accomplishments and real-life meetings.

The secondary persona is a person who belongs to the younger end of the Active Citizens target group and is not settled down yet. Consequently the responsibility for and bond with the neighborhood is less prominent. The persona will first observe the processes on the participation platform, it can take a couple of days before a decision is made to start participating. There is less temptation to spend a lot of time on the platform to add ideas. Adding points for or against ideas from others or to participate in debate feels more natural. Notifications are less important for this persona, there will be checked for updates if a topic is of real interest. When notifications are sent, communication is preferred via email. Notifications that are considered most important come from neighborhood initiatives, social network and neighborhood initiatives. The content of the notifications is considered important and should be based on their interests. The frequency of the notifications should be low and should envision progress of participation processes through the key moments. The notifications are used to quickly monitor processes and to be kept up to date. Types of future notifications are: Registration confirmation, periodic newsletter via email, key process moments, Ideas participated in and end-results on topics of interest. The personas will be used throughout the design process to continuously verify if the design of the notifications fits the envisioned target group.

Customer Journeys

The participation process of each of the personas is visualised in a customer journey map. The touchpoints of their journey, consists of six steps: (1) registration and/or login, (2) settings, (3) ideas, (4) debate, (5) decision & overview and (6) result, and are based on the results from the user interviews. In the map the journeys are displayed as a simplified linear process, the touchpoints can however be walked through repeatedly and the process will be repetitive. The intensity of the participation activities from the personas is displayed through the height of the graph and the peaks indicate the moment and frequency of the notifications they want to receive. With each peak the type of notification and the medium it is sent through is indicated. The journey of the personas is explained in the text above and underneath the graph. Important statements are highlighted within the text.

The email surveys and user interviews provide insights to compose a set of personas and visualise their customer journey. Together these materials led to a number of design guidelines for the notifications of Active Citizen. The design guidelines will be used to design the proposed notifications according to visual style of Google Material design and the available interaction patterns. Possible coding limitations will be taken into account.

Currently the design guidelines of the notifications are based on an analysis of the current notifications and peoples' notification experience in general. In the user interviews participants were asked to think about possible interactions with future notifications, something that is difficult to imagine for most people. The notifications that will be based on the guidelines that originated from the email surveys and the user interviews will therefore have to be tested thoroughly, before they are implemented into a final design.

Notifications Design Document

We created a notification design document to guide us in the creation of notification emails and

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browser user interface.

Summarise any problems you have encountered, and how they have been overcome

As we are an international team and most people in Iceland speak and write good English we sent out the online survey in English. There are over 12.000 people on the Better Reykjavik mailing list and we then got quite a bit of negative feedback on not using Icelandic for the Active Citizen survey. We promptly translated the survey into Icelandic and sent it out again and got in return positive feedback and close to 10% of the users participated in the survey which gave us a really wide scope of answers.

Description of planned activity for next reporting period

This work package is completed.

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

Logistics of working together across continents, we use GDocs, Hangout for meeting and Slack for ongoing discussions.

Detail any publications, publicity or other dissemination activity.

Citizen Foundation - CHEST Project Deliverable 1.1 & 1.2 - Active Citizen Notifications - <https://drive.google.com/file/d/0B9fuyFX263nnUFpWZGhycXNmUHc/view?usp=sharing>

Work Package Number : 2

WP2: Development (M3 - M10)

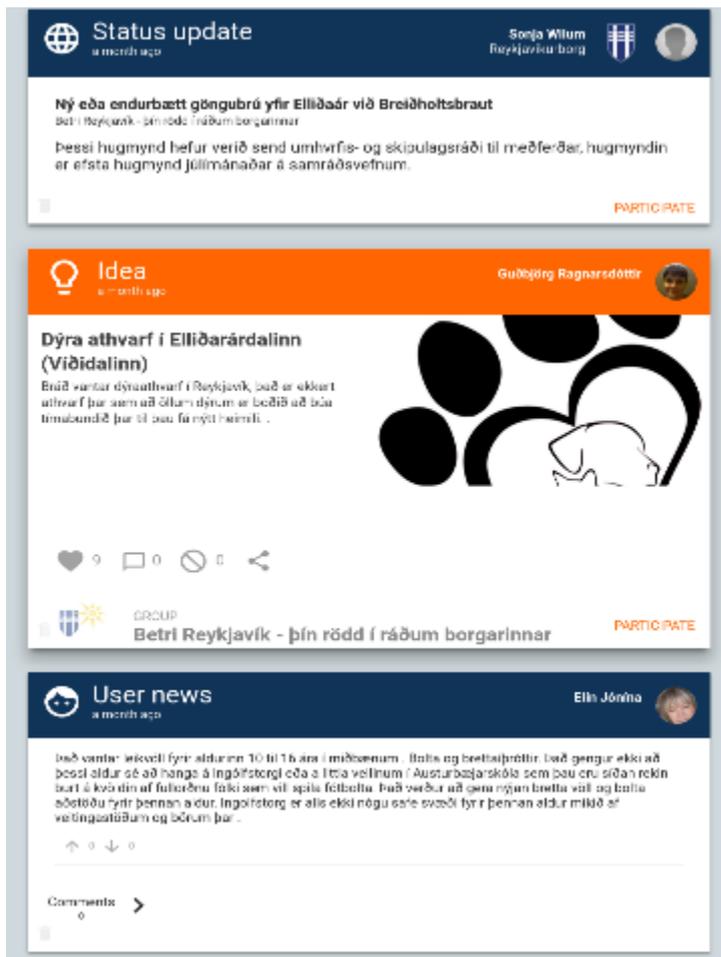
Development of the open source software.

Deliverables

D2.1: Release 1

<p>D2.2: Release 2</p> <p>D2.3: Release 3</p>
<p>Actual Starting month : M3</p> <p>Predicted / Actual End month : M10</p>
<p>Work Package Objectives:</p> <p>Develop the first working version of Active Citizen Notifications.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> ● Development completed on <ul style="list-style-type: none"> ○ Activity Stream Engine <ul style="list-style-type: none"> ▪ Newsfeed users interface component ○ Notification Engine <ul style="list-style-type: none"> ▪ For email and browsers ▪ Notification Settings user interface component ○ Recommendation Engine AI powered engine for posts and groups ○ Email notification templates ● The Active Citizen developed library released as open source software to the public <ul style="list-style-type: none"> ○ https://github.com/CitizensFoundation/active-citizen ● Over 45.000 citizens have now already used Active Citizen powered web applications according to Google Analytics for Citizens Foundation websites. <p>Detailed description of work performed to reach the achievements listed above:</p> <p><i>Activity Streams Engine</i></p> <p>We first started to develop the activity streams as those are the foundation of all interaction between the user and their algorithms. The activity streams store the all the activity of the users on the websites, those streams are then used to generate notification and train the recommendation engine. We also developed a flexible newsfeed system to display the activity streams on websites - the newsfeed were later integrated with the recommendation engine to provide the user with Facebook style newsfeed where activities are filtered partly using the</p>

recommendation algorithm.



Example Active Citizen newsfeed

Key features:

- Database storage of activity streams
- API for storing and retrieving activity items and streams
- Flexible newsfeed user interface component using the new Web Components W3C standards that is easy to incorporate into new projects.

Notification Engine

The notification engine filters the activity streams and send out notifications to the users where appropriate via email or in the browser. We developed a user interface web component for notification settings.

Example notification settings panel

Key notification engine features:

- Notifies with email or in browser
- Can group notifications of the same type
 - For example many up votes on the same post, similar as Facebook does
- Can delay and bundle notifications and send them in email hourly, daily weekly or monthly
- Integrates with external email delivery providers like SendGrid.
- Integrates with the recommendation engine to filter activity newsfeeds

Recommendation Engine

For the recommendation engine we decided to use the open source Apache PredictionIO software for the core recommendation engine. We developed functions to import the whole activity streams from Your Priorities websites, well over 700.000 activity training events for the recommendation engine.

Key features:

- Utilizes machine learning algorithms provided by the PredictionIO library
- Provides recommendation with a similar approach as Amazon and Netflix use for

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<p>their product and movie recommendations</p> <ul style="list-style-type: none">● Import of previously recorded activity streams for training● API for adding activity stream items● API for querying for recommendations <p><i>Email notification templates</i></p> <p>We create notification templates for emails based on our designs from WP1.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>There were no unexpected problems above what happens in software development.</p>
<p>Description of planned activity for next reporting period</p> <p>This work package has been completed.</p>

Project Management And Dissemination

<p>Summarise any management concerns and activities to recover the situation.</p>

<p>Detail any publications, publicity or other dissemination activity.</p>
<p>Project launches using Active Citizen technology</p> <p>As Active Citizen is a library it was first launched with a new release of Your Priorities, our other Open Source, citizen participation application. Here is a list of launches we've done this year that have included Active Citizen.</p> <ul style="list-style-type: none">● 11. May 2016 - Our Kopavogur - This project Participatory Budgeting Idea generation phase, this was the first public release of Active Citizen - over 8.500 people used the website.● 25. May 2016 - Your Neighborhood - Participatory budgeting system in Reykjavik with 35.000 people visiting the website and around 4.000 registering and taking active

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part in the process.

- 18. June 2016 - Fife Council Oor Bit Places and Spaces - A community budgeting initiative in Scotland.
- 9. September 2016 - Deep Learning Youth Dashboard in cooperation with Erasmus+.
- 19. September 2016 - Participatory Budgeting idea collection opens in Pula, Croatia
- 29. September 2016 (PLANNED) - My Vision / Elections 2016 - Debate platform in the run up to the Icelandic parliament elections October 29. 2016.

Work Package Number : 3

WP3: Project Management, Launch, Marketing & Dissemination (M1 - M10)

Manage and disseminate the project.

Deliverables

D3.1: Marketing and dissemination

D3.2: Launch event

D3.3: Project management

Actual Starting month : M1

Predicted / Actual End month : M10

Work Package Objectives:

Manage and disseminate the project.

Description of work this period:

Main achievements:

- The project has been completed and will live on beyond the work funded by the CHEST project.

- Active Citizen has been promoted at several events

Detailed description of work performed to reach the achievements listed above:

Facebook and Twitter

We've mainly used Facebook and Twitter to disseminate information about Active Citizen and we've bought boosts on Facebook and targeted people in Europe and the USA with interest in Artificial Intelligence and Democracy.



Example of a recently Facebook post about Active Citizen

Dissemination to other developers of citizen participation software

While Active Citizen has been developed to support the use case of integrating well into Your Priorities it is a separate library in its own rights and is relatively easy to integrate into other citizen participation software. We are a part of a working group at the Council of Europe called the Democratic Incubator. We met for the first time in Strasbourg November 2015 as a part of the World Forum for Democracy. There we met teams from Spain and Argentina working with local and national governments and developing their own open source citizen participation software for deliberation and participatory budgeting. We have actively sought to promote Active Citizen as an option for those to provide notifications and recommendations for their projects. This might happen in time.

Madrid Decides

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Citizens Foundation is a consultant on the Madrid Decide city participation budgeting project and they have expressed interest in Active Citizen that we are following up on.

DemocracyOS

DemocracyOS is another citizen participation tools in some ways similar to Your Priorities. It is being developed in Argentina and use there on the national level. We have monthly project meetings with their team leader and they have express interest in Active Citizen as well.

Launch Event

Launch event is planned on the 1. of October in connections to the launch of My Vision / Elections 2016 in Reykjavik Iceland. We will invite parliamentary candidates, the media and members of the public where we will launch this new website and discuss the importance of Active Citizen in providing for the first time AI recommended content in Iceland in connections to a public political debate.

Summarise any problems you have encountered, and how they have been overcome

The delay in CHEST payment was a bit challenging but we managed but our launch event was delayed but will go forward on the 1. October 2016.

Description of planned activity for next reporting period

This work package has been completed.

Deliverable Status

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

The project has completed except for final event which we will organize as soon as the CHEST interim payment is been paid so we will have a budget for it.

Detail any publications, publicity or other dissemination activity.

- October 2015 ICT 2015 EU Conference Lisbon - Presentation & Booth
- October 2015 Open Government Partnership 2015 Summit Mexico - Presentation
- November 2015 - World Forum for Democracy Strasbourg - Workshop
- November 2015 - OGP in local government Estonia - Presentation

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- Mar 2016 - Project Update Chest Website
 - <http://www.chest-project.eu/active-citizen-increasing-political-participation-artificial-intelligence-virtual-reality/>
- May 2016 - Democratic Cities Madrid - Presentations and workshop
- May 2016 - Reykjavik International Conference: Future of Democracy - Presentation
- May 2016 - Professional advertising campaign for Our Kopavogur
- June 2016 - Nordic Benchmarking Forum Helsinki - Presentation
- July 2016 - Crowdsourcing Conference, Lisbon - Presentations
- July 2016 - Professional mass market advertising campaign for Your Neighborhood in Reykjavik
- July 2016 - Deep Youth Boot camp, Budapest - Presentation
- October 2015 - September 2016 - Posts on Facebook and Twitter promoting Active Citizen directly or indirectly

3.3.4 Sustainability of the solution

We will stimulate people to participate on the Your Priorities platform over a longer period of time by engaging them through notifications that are meaningful for them.

As stipulated earlier, designing the notifications based on the needs of our target group is evident in order to meet this objective. In order to design the required notifications we composed the following research questions.

The Citizens Foundation has been developing Your Priorities since 2008 and Active Citizen since 2014 and we will continue to do so - with volunteer work, paid projects that improve the code by government and organization and by seeking further EU and other grant funding.

We are partners in a project called Deep Linking Youth that is cofunded by Erasmus+ that sponsors the development of another part of Active Citizen to do with training deep learning networks. The first application of this, to be launched in 2017 is a dashboard for EU policymakers about what young people are talking about online in regards to youth mobility.

The Citizens Foundation has recently entered into a development partners with the city of Reykjavik and the city of Kopavogur for further development of Your Priorities and Active Citizen through to the middle of 2017.

We are working on applying for a couple of H2020 grants related to Active Citizen.

The latest release of Active Citizen at the time of this report is two days ago or 17. September 2016.

.....

The development is Open Source and we are looking at ways to get more developers interested in the project.

3.3.5 Risks

Accessibility of the platform (low)

Although the main risk for Active Citizen is a breakdown of the access to internet or use in a tense political context, it shouldn't occur in the first stage of the project. These risks shouldn't be underestimated since Active Citizen aims at reinforcing democracy, notably in countries where it is emerging. Yet we will first focus on established democracies so as to have time to improve the platform and mitigate the inherent risks of such a project in authoritarian or democratizing countries (encryption, etc.).

Use of the platform (medium)

Another set of risks is that citizens do not experience ownership of the system and therefore do not use it. To mitigate this risk, we are working with real users for the pilot projects so as to get feedbacks on the potential difficulties in using the tool. Additionally, and building upon our previous experience with Your Priorities, we will offer organisations/authorities willing to implement the tool a set of services, including training of their staff, public interventions to facilitate the ownership of the platform. We will also closely work with grassroots organisations and support the project promoters in the long-term to mitigate the risks of a decrease of the use of the platform.

3.3.6 User-based evaluation of the concept

In order to design the required notifications we composed the following research questions.

Research questions

- Which groups should be targeted specifically?
- What form of participation is most important to increase?
- What time span should a participation process have?
- When do people want to be engaged in their participation processes?
- What type of notifications do people want to receive?
- What is meaningful for people of a certain target group?

These research questions formed the main guidelines for the questions of the survey and user interviews.

Before conducting any user research, we researched the current notifications that are sent out through the Your Priorities platform. Through email surveys and user interviews we gathered information on peoples' current notifications experiences and preferences concerning their future notification experience on Active Citizen.

We assume that participation can be increased by involving people more intensely on certain moments in the participation processes. Through user research we were aiming to find out if notifications can accomplish this, and if so, how these notifications have to be designed to accomplish this. Table 2 displays the distribution of our focus. From the email survey we aimed to gain insight into (1) peoples' current notification experience from Better Reykjavík, Better Iceland, Your Priorities, and (2) peoples' general notification experience (from Google and Facebook). From

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the user interviews we aimed to gain insight in, (3) peoples' preference for their future notification experiences (from Your Priorities).

Based on the research questions and the goals described above we designed two email surveys and several user interview questions to gather more information about the preferences of current and potential Your Priorities users concerning their notification experiences.

The email surveys were made by means of Google forms and were sent, accompanied by a newsletter, from the email address of the Citizens Foundation. In order to guarantee a maximum amount of responses the survey questions were kept concise and the survey was designed in the corporate identity of the Citizens Foundation. Both the email surveys for (medium) active as passive respondents consisted of four closed questions in English (one multiple-choice and three multiple-answer questions) and two optional open questions (to comment and to register as a future research participant). Two days after the survey was sent out to the mailing list of the Citizen Foundation, there was decided to translate the English questions into Icelandic, since there were too many complaints. The English and the Icelandic survey stood both open for one week time and the responses were merged after the surveys were closed.

The user interviews consisted of a set of general questions, aiming to determine the current level of participation of each participant. The remainder of interview was framed in the form of three scenarios. Each participant was walked through the scenarios, after each scenario the participant was asked for their reaction on the scenario. A set of optional questions was prepared with each scenario to anticipate and expand on the reaction of the participant. The scenarios were communicated in the language of the participants and the participants were invited to answer the questions in their own language. The interviews had a duration between fifteen and twenty minutes and were recorded with a voice recorder. After each interview was conducted it was translated and transcribed.

The email response group of the email survey was based on registered users from the products of the Citizens Foundation. The response group were categorized in two subgroups, (1) a group of 2.204 people who regularly participate and (2) one group of 8.761 people who never or less frequently participate. From the first group 289 people submitted the survey, from the second group 732 people submitted the survey, leading to a total response rate of 1021 people.

The email survey resulted in a total of 1021 responses. The responses were captured in four different Google Spreadsheets. The two spreadsheets with English and Icelandic responses from the (medium) active group of people and the two spreadsheets with English and Icelandic responses from the passive group of people were merged. Resulting in a spreadsheet with 289 responses and a spreadsheet with 732 responses. A quick overview was created with the embedded Summary of Responses tool, providing an immediate overview of the distribution of percentages over the answers. The results of each of the graphs were analysed, styled and integrated in the persona. The optional comment box was used in both the English surveys (27 and 23 comments) as the Icelandic surveys (41 and 32 comments).

3.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 4.

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Table 4: Snapshot of project "Active Citizen"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To increase participation by merging electronic democracy with machine learning algorithms and using artificial intelligence algorithms to find and present the data needed to participate in democracy at all levels.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Over 1,000 participants in online survey on user requirements ○ Lead Design and Notification Design documents created. ○ Completed development of Activity Stream Engine, Notification Engine and Recommendation Engine. ○ Active Citizen library released as open source software via Github. ○ Over 45,000 users of Active Citizen powered web applications. ○ Several other Citizen Foundation project launches using Active Citizen's technology. <p>The project successfully delivered 7 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated section on Citizens Foundation's website, including a factsheet: http://www.citizens.is/docs/Active-Citizen-Short-Description.pdf ○ Citizens Foundation social media accounts: Facebook (2,249 likes) And Twitter (974 followers) ○ Participation via exhibitions, presentations and workshops at events including ICT 2015, Open Government Partnership 2015 Summit, World Forum for Democracy, Democratic Cities Madrid, Reykjavik International Conference and Nordic Benchmarking Forum. ○ News article on the CHEST website: http://www.chest-project.eu/active-citizen-increasing-political-participation-artificial-intelligence-virtual-reality/ ○ 110 interactions in the project's section on the CHEST Community Forum.

Table 5 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 5: Mandatory KPIs for Active Citizen

Dimensions	Indicators	Variables	Baseline	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	0	2000	1100
		Ratio between men and women involved	na	na	na
		Ratio between young, adult and old people involved	na	na	na
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or	0	5	5

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	asymmetries	websites that express independent, balanced views, etc.) ⁵			
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	1	1
KNOWLEDGE SHARING COMMUNITY BUILDING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	10	1
		Number of comments / replies on project blog entries on CHEST forum	0	100	3
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	500	450
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	1000	600

⁵ To what extent do you agree with the following sentence: “Our project reduces information asymmetries experienced by the users”. Please attribute a value from 1 to 6 where 1 is “totally disagree” and 6 is “totally agree”

4 AdviSex⁶

AdviSex proposes to realize, through the Living Lab methodology, a service focused on the area of sexual sphere, which is still permeated by taboos and stereotypes, and aims to facilitate access to related knowledge. In particular, AdviSex is a mobile application that aims to support the improvement of adults' individual and couple sexual health. Taking into account age, gender and sexual orientation of the user, the application provides personalized recommendations.

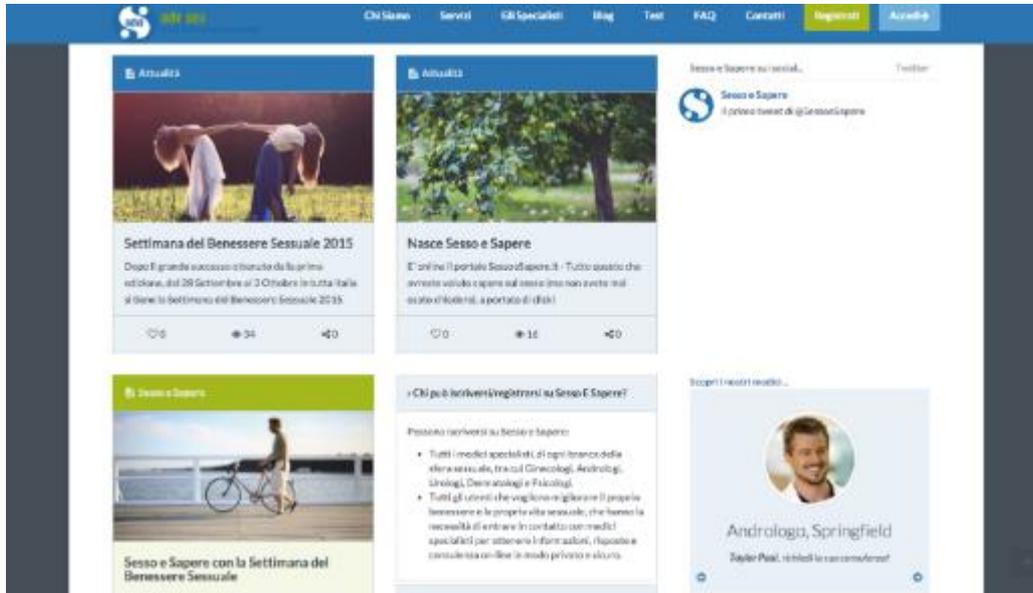


Figure 4: Screenshot of the AdviSex prototype

4.1 The societal problem

4.1.1 Description of the problem

As stated by World Health Organization, the sexual and reproductive health is essential for individuals, couples, families and for the social and economic development of communities and nations.

Even though sexual health is so important, people do not feel comfortable when talking about it. As an example, a recent study shows that people are not willing to reveal to their new partners about their sexual history, both before having a new casual sex partner or before starting a serious relationship. Communication between patients and doctors is also critical. A research published in the Journal of Sexual Medicine shows that, even when having sexual concerns, only two percent of women seek help from their physicians. The issue is confirmed at Italian level: a recent study conducted by DoxaPharma shows that 90% men having sexual health-related problems do not see a physician.

This problem leads to lack of both prevention and care support when it is necessary. In fact, if people do not talk about sex, they are more likely to lack prevention or aggravate their sex-related issues.

Poor communication about sexual health and sexual health-related issues may potentially affect all sexually active people. In particular, contrary to popular opinion, communication about sexual health and sexual prevention should not be encouraged only among young people, but also among adults. In fact, sexual habits, needs and expectations change while ageing. In addition, people with different age meet with different issues and risk levels when having a sexual intercourse.

During the interaction with Specialists, the perception of the problem changed. In addition to the difficulty to talk about sex, Specialists argued that people often are not able to assess their sexual

⁶ Chapter contributors: Mathias Becker, Mario Barile

health, therefore they may have a disturb they do not identify. That is the reason why a resource like the blog will be implemented as a support to AdviseX service. Another issue highlighted by specialists concerned the gender identity, which has a strong impact on people's sexual health but was initially overlooked by our team.

Regarding the evolution of the problem, it got worse during the last decade due to the spread of Internet pornography, which made porn readily available just at the click of a mouse. Even though pornography can be used to complement one's sexual life, it has also the power to influence perceptions and aptitudes about sexual health. Many sexual health specialists interviewed argued that the new pornography model introduced via the Web has negative effects on sexual performances with partner. In fact, it would cause Sexual Attention Deficit Disorder and other problems such as erectile dysfunctions or reduced time duration for erection. This position is confirmed by studies such as "Porn-Induced Sexual Dysfunction is a Growing Problem" published in *Psychology Today*, a respected U.S. journal. Furthermore, the period of sexual activity is progressively increasing as average age does. Therefore, if communication about sexual health-related issues is not fostered, many social issues will remain unsolved (see Section 2.2.2 for further information).

Stereotypes, taboos and poor awareness are identified as the main causes of the social problem at issue. In particular, the aforementioned study by DoxaPharma showed that people with sexual health concerns decide to not see a specialist because feel deeply embarrassed. Poor awareness appears to be the consequence of the stereotypes and taboos that still affect sexual sphere.

4.1.2 Scale of the problem

Several studies speak about important global trends: among sexually active people aged between 40 and 80 years, 28% of men and 39% of women reported at least one problem of sexual dysfunction they had had in the previous year.

It is difficult to quantify the dimension of the phenomenon at European level. The main reason for that is there is not a unified and standardized practice to measure data. Consequently, there are differences in survey methodologies, ages surveyed, cultural and socioeconomic status.

Considering the shares identified by several authoritative studies, the number of men and women affected by sexual dysfunction amounts approximately at 76mln men and 116mln women.

A recent study conducted in Italy (the first AdviseX market) argues that people affected by sexual dysfunctions amount to about 16mln. The study also specifies the number of people affected based on pathology: Erectile Dysfunction (3 mln), Premature Ejaculation (4 mln), Decreased Sexual Desire in men (1 mln), Anorgasmia in women (4,5 mln), Vaginismus (1 mln), Desire Disorder in women (2,5 mln).

There is a link between sexual health-related issues and age. In the European Male Ageing Study, focused on men aged between 40 and 79 years of age, 30% of the men reported erectile dysfunction and 6% severe orgasmic impairment, both of which were closely associated with ageing.

In addition, the ageing of the population, particularly evident in Europe, is introducing a revision of stereotypes, so the age range that covers sexual activity will expand, thanks to the support of medical advances, e.g. in treatments for erectile dysfunction.

Consequently, the sexual health of adults is a topic that will gain even more of a crucial role in the broader context of health policy.

However, people do not feel comfortable when talking about sex and sexual health-related issues. A telephone survey of 1500 individuals in the UK amongst middle aged and older people found that only 26% of men and 17% of women, among those who reported to have sexual concerns, had discussed their problem with a doctor. A survey promoted in Italy by SIU (Società Italiana di Urologia) and AGOI (Associazione Ginecologi Ospedalieri Italiani) and conducted by DoxaPharma shows that 90% of men who refer to be unsatisfied with their sexual sphere do not see a specialist to solve their problems.

The problems related to sexual health have several quality of life, social and economic consequences. Among these, increasing sexual diseases, divorces and domestic violence rates. These consequences also affect national health systems' costs. During the reporting period, the scale of the problems at issue has not been changing significantly.

The potential long-term impact of not addressing sexual health issues is generally underestimated. As an example, UK data suggests that £1.1 billion could have been saved if HIV infections diagnosed had been prevented. In addition, prevention can impact substantially on welfare costs. It is estimated that every £1 invested in contraception saves the NHS more than £12.5 in additional welfare costs⁷.

4.1.3 Previous approaches to solving the problem

Several attempts have already been made to address sexual health and prevention-related issues, but with different approaches and to different targets. The analysis of the competitors covered both Italian and international solutions.

The parameters under which the analysis has been carried out are mainly represented by content, target and technical variables.

Concerning contents, the main competitors are sexual health encyclopaedias or single topic dedicated solutions for all kinds of target:

- a. Benessere-sessuale.it, Sex Positive: general sexual health issues;
- b. Androweb.it, Men's app: sexual men's related issues;
- c. Guidaalsessosicuro.it, STD triage: STDs' encyclopaedia.

Instead, the most innovative AdviseX's feature is the provision of information tailored to user's characteristics (age, sex, sexual orientation). Moreover, most of the solutions tend to talk about sexual problematic and care-related issues; AdviseX provides positive contents to increase the user's life and relationship quality by changing lifestyle patterns.

Regarding target, competing application provide education and prevention tool almost exclusively for teenagers:

- d. Sex&co., Yourchoiceyourvoice.co.uk, Brook.org.uk: STDs, contraception and pregnancy advices for teenagers.

Instead, AdviseX has an innovative market segment: adults, with specific reference to baby boomers.

Lastly, from a technical point of view, AdviseX is the only solution providing in-app consultations with multiple health sexual specialists. The main competitors as Androweb.it, SexOs fertilità, Impotenza – istruzioni per l'uso, Eiaculazione precoce – istruzioni per l'uso, provide consultation via message exclusively with an andrologist. This AdviseX feature has a double effectiveness: first, AdviseX enables interactions with physicians of every branch of sexology, enabling a 360° understanding of an issue; secondly, it helps users to overcome the shame when asking for help through a first contact via chat, video chat or private message.

4.2 Implementation of organizational structure

4.2.1 Maturity of the project

Co-testing phase: the solution has been prototyped and the final co-testing of features and impacts is starting with the collaboration of users and specialists.

4.2.2 Organizational structure

Project Manager - permanent employee, has taken care of T1.1 and T1.2 for monitoring the whole project.

⁷ Bayer Healthcare Pharmaceuticals. Contraception atlas 2011. Bayer Healthcare Pharmaceuticals, 2011.

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Market&Marketing Manager – permanent employee, has taken care of T2.1 and T2.2 for communication and marketing aspect of the project; of T3.1 to define micro and macro environment and of T6.1 for validation methodology and metrics definition. Moreover, together with the Senior Software Developer (freelancer) he has defined technical requirements (T3.2) and with Junior Software Developer (permanent employee) is testing the product.

Creative designer – permanent employee, had in charge T3.3 for the definition of User Experience and mock-ups.

Senior Software developer – freelancer, has taken care of T4.1 and T5.2 for the product design and prototype development and together with Junior Software Developer and Creative Designer has developed software components (T5.1).

The content development (T4.2) is entirely covered by subcontracting specialists' and health legislation pool experts' consulting, both freelancers.

4.2.3 Key personnel

Valentino Moretto (Project Manager), Master Degree in Management Engineering. He has taken care of the project management thanks to his experience in participating and managing national and international competitions (e.g. Horizon 2020 SME instrument, FIWARE Accelerate, etc.). He is co-founder and member of the board of directors of beMINT, where he is also Head of the Research and Innovation unit. He is involved in the creation of innovative scenarios in the areas of smart cities and e-health and, for this reason, he is in contact with several major players in the ICT sector and collaborates with numerous national and international PAs, in particular with the city of Lecce for the enhancement and revitalization of the Urban District of Commerce, with the City of Milan for the coordination of Smart City projects, and with San Leandro (USA) on procurement and pre-procurement of innovative practices. He also works in a project as a coordinator of a network of 12 Italian pharmacies engaged in the internationalization process and in the transition towards the "Pharmacy of services" (turnover of 23 million €, increased by 10% in the last two years).

Mario Barile (Market and Marketing Manager), Master Degree in Marketing and Communication. He has taken care of market analysis and marketing campaign of AdviseX thanks to his wide experience in regional marketing and the web marketing sector at different levels. Moreover, he is taking care of relationships with customers and suppliers, interacting especially with medical and healthcare operators thanks to his experience in the Living Lab PugliaSmartLab, where he performed regional marketing activities involving and engaging relevant stakeholders to co-create innovative projects. He worked with UNHCR (United Nations High Commissioner for Refugees) as fundraiser, for whom he has supported marketing operations with specific reference to face-to-face personal contact marketing, including direct contracting, auditing, experiential marketing and event organization. He also joined ENOLL (European Network of Living Labs) events, sharing knowledge and practices with other international Living Labs. He is also co-author of international publications in the field of smart cities and was speaker at national events presenting an innovative concept focused on smart mobility. In the field of health, he is a geomarketing consultant for pharmacies. He is a co-founder of the beMINT srl startup and works in the Research and Innovation area.

Maria Grazia Rosa (Creative Designer) Master Degree in Business Management. She has taken care of the design of the solution, translating the concept into the product thanks to her cross competences both in science research and in creative design. She has worked for years on the research on social, environmental and economic sustainability in Italy and abroad, both from an academic and an entrepreneurial point of view. In the last years in Puglia@Service, a project supervised by Dhitech scarl, focusing on social and technological innovation, she has developed and designed innovative scenarios in the areas of smart cities and e-health. During this project, she has developed PSL Methodology through her two-year experience in managing the Living Lab PugliaSmartLab and performed regional marketing activities involving and engaging relevant stakeholders to co-create innovative projects. She has co-founded beMINT, an innovative start-up for

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the research and development of innovative and sustainable products and services supporting smart communities, where she works in the Research and Innovation area.

Mariagrazia Rodano (Junior Software Developer), Master Degree in Computer Science Engineering. She has taken care of the coding of the solution in collaboration with Senior Software Developer thanks to her wide experience in an IT consulting company and to her extensive knowledge of technical requirements in health sector due to a Higher Training Course "Management of Innovative Technologies for Health Organization". She has also developed expertise in the analysis, design, build and test solutions based on Oracle tools (RODOD Suite, SOA Suite, Application Integration Architecture (AIA) for Communications - Order to Cash, Agent Assisted Billing Care, Product MDM). After this experience, she has founded a web development agency, where she enhanced project management skills, so she has a broad vision of the project management and she is able to optimize the allocation of necessary resources. In the last years in Dhitech she has been focusing on design, testing and validation of Android e iOS apps and has been working in the fields of Open Data and FIWARE.

Patrizia Lecci (Administration & Relation Manager), PhD in Public Administration and researcher in public management. She has taken care of administrative and legislative health matters in collaboration with legislation pool experts' consulting, thanks to her several experiences in managing Economic-Financial aspects of tutorships and masters, collaborating with public bodies and carrying out a Fellow Research in "Health Care Companies Fund systems". She is currently collaborating with the municipalities of Lecce and Brindisi to the creation of new citizen-oriented paradigms. She has also had several experiences in the auditing field, managing financed projects and grants. She is an expert in governance processes in the Public Sector and is author of several publications about territorial planning and participation's processes. She co-founded the Living Lab PugliaSmartLab in 2013, and performed regional marketing activities involving and engaging relevant stakeholders to co-create innovative projects, such as AdviseX. She is a co-founder of the beMINT srl, innovative startup about technological services and consulting.

Giulia Antonucci (Management and Reporting activities). Master Degree in Business Management.

In particular its work in the AdviseX Project is represented by detection of events and/or meetings of the health sector strategic for AdviseX, maintaining relationships with subcontractor/partner Project AdviseX, or associations like Fiss and Dream and organizations that provide contents and value to the Project; she has taken care of the reporting activities of the Project, such as archiving and document retention Project (memoranda of understanding , contracts, professional assignments, transfers, bills, notes, etc). In 2012, she worked for an ICT company based in London, where she has dealt with verification and analysis activities aimed at projects' execution. Giulia Antonucci also had a collaboration with the IT company Alba Project LTD, on the subject of project reporting.

Furthermore, she collaborated with a research team of the Faculty of Innovation Engineering (University of Salento dealing) about digital technologies for education. She is one of beMINT co-founders.

Giovanni Inguscio (Senior Software Developer), Master Degree in Information Engineering and Software Engineer. He has taken care of the coding of the solution AdviseX in collaboration with the internal creative designer, Maria Grazia Rosa, and an external graphic design company, ADDA Studio and thanks to his experience and his knowledge of technical requirements about website, mobile, multi-channel platform, database and e-commerce.

He has also developed expertise in the analysis, design, build and test solutions based on UI and UX frontend, backend and augmented reality.

After this experience, he has founded a web development agency, Rubik Officina Digitale. He is Owner and Project Manager of the agency.

In 2010, he won the innovation prize SMAU Bari with the project Alba Service. Among his most important works there are: Santa Croce Kids (an application in augmented reality working as a tour

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guide for kids to the “Basilica di Santa Croce” in Florence); Acquario di Genova app (an application to display multimedia contents for kids visiting the Acquarium in Genoa); Napp – Enjoy and visit Nardò (an application designed to improve civic duty and social participation in citizens and tourists of the city of Nardò); e-commerce software development for Meltin’Pot’s website.

Team competences are completed by subcontractors' consulting. In fact, AdviseX team is building up a strong relationship network, including relevant actors such as Italian Federation of Scientific Sexology (FISS) and Dream laboratory. (See Section 1.4 for further information)

4.2.4 Partnerships, cooperations, and networks

AdviseX’s idea has been validated through Living Lab innovative and open approach, through which relevant stakeholders, particularly medical specialists, experts in mobile health legislation and potential users, have been involved for the definition of the product.

As a result, AdviseX team is building up a strong relationship network.

- At the time of the proposal, a strong collaboration, confirmed by a memorandum of understanding and corroborated by a subcontract under Chest funding, has been set with **DREAM** Laboratory for e-health legislation consulting. DREAM - Laboratory of Interdisciplinary Research applied to Medicine - is the result of a collaboration of the most important public Institutions in Lecce, University of Salento and ASL / LE, and aims to improve efficiency and the quality of health care services through the transfer of skills, technologies, know-how from the world of research to which of health system. In particular, this collaboration is strategic in mitigating risks concerning uncertainty in the regulatory and legislative standards and to confirm solution quality from legislative perspectives to users and stakeholders. For this reason, periodic meetings with health legislation pool will take place in order to resolve conflicts and support decision sharing.

The team has planned the activities under the partnership for the duration of the contract as follow:

1. Screening of the functional analysis of the project aims to highlight the legal and privacy aspects;
 2. Consulting on the design of the project and its specifications in relation to the Regulation standards;
 3. Tiling developer for the translation of legal compliance in specific technical components;
 4. Drafting of documents relating to the legal policies, privacy and data management.
- At the time of the proposal, a collaboration, confirmed by a letter of support, has been set with Associazione Italiana Andrologi (**ASSAI**). ASSAI was founded in 2012 to stimulate growth in scientific, cultural and social matters of Andrology. This collaboration is strategic because ASSAI has members in each specialization of sexology (andrologists, gynaecologists, urologists, dermatologists and psychologists) interested in the collaboration with AdviseX team both for the content integration and customization and for the interaction with users to increase their patients network.

To increase the visibility of AdviseX it is essential to promote the solution through the network of partnerships with trade associations; for this reason, after the proposal submission, a collaboration with Federazione Italiana Sessuologia Scientifica (**FISS**) has been developed to expand the number of specialists and specializations and to confirm solution quality from medical perspectives.

In particular, a memorandum of understanding, corroborated by a subcontract under Chest funding, has planned the activities under the partnership for the duration of the contract:

1. Using reciprocal logos for promotion and institutional events;

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2. Preparation of periodic “Post” about sexuality for the Blog, for which the author's and the association’s name will be highlighted, on request;
3. Drafting “Personalized Advices” aimed at stimulating prevention and awareness about sexual matters. According with specialists, the personalization will follow three main classes of customization:
 - Gender - Male, Female, FtM, MtF;
 - Age - initially three age groups (18-34, 35-50, 50+);
 - Sexual orientation - homosexual, heterosexual, bisexual.

At the moment, several efforts are being carried out to set collaboration with international pharmaceutical companies, aiming to increase the visibility of the solution and to have a widespread distribution of the service to final users.

Meanwhile, AdviseX has obtained the official certification as Medical Device (Class I) at National level and according to European Directive to prove its authoritative reference about health related issues.

Next steps concern the possibility to establish partnerships or collaborations with National and Local Health System, medical associations, healthcare companies and research centres in foreign countries to build up an international network and to scale the solution at EU level.

4.3 Implementation of the solution approach

4.3.1 Solution approach

In the aforementioned study conducted by DoxaPharma, it is reported that the favorite way to access information to solve doubts about sexual health is the Internet among those who are unsatisfied about their sexual life and do not see a doctor (the 90% of cases).

The most plausible reason for that is the Web allows accessing information in a private, instant and direct way. However, information available on the Web can be no reliable, poorly distinguished and not targeted to user need. AdviseX aims at joining the market of web applications as a distinguished and complete resource supporting sexual health and prevention and enabling users to overcome shame during the doctor-patient first contact. It is a web-responsive application, which will be developed on two main levels:

- Prevention and quality of life - authoritative information, customized according to gender, age and orientation, are provided in collaboration with all the major figures specialized in sexual health (andrologists, gynaecologists, dermatologists, psychologists, and urologists) to whom a specific section of the budget is dedicated. In addition, users will use tests validated scientifically to assess if it is appropriate to contact a specialist;
- Care support – the possibility to establish a direct contact between users and sexologists through chat, video chat and file exchange is provided.

Transversely at the two levels and two targets (users and doctors), AdviseX provides:

- feedback system to measure the effectiveness of the features;
- the possibility to share contents, in order to encourage the creation of collective knowledge and experiences.

AdviseX concept was created through Living Lab approach. Through LL methodology, relevant stakeholders, particularly medical specialists, experts in mobile health legislation and potential users, have been involved (in progress) since the design phase of the idea, so that the final product would be the most possible in line with the actual needs of these.

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In the medium-long term, AdviseX aims to represent an authoritative, secure and interactive point of reference on sexual health in the universe of Internet. The value added of the service is highlighted as follows:

- Access to customized contents;
- Possibility to contact a doctor at lower costs than face-to-face consultations, enabling the
- user to assess if a certain qualification is the most suitable to solve a specific issue
- Access to authoritative resources on sexual health in a private way

Specialists have the possibility to increase their network of patients. Furthermore, they will be able to get in touch with each other, in order to increase collaboration and visibility and improve user support.

During the development of the co-creation process, the solution evolved according the needs highlighted by users and specialists. In particular:

- The best suitable channel for the application was identified in web rather mobile, which was defined by users as more discrete than a mobile app
- In addition to customized contents depending on user age, gender and sexual orientation, specialists included the possibility to deliver customized suggestions also based on gender identity, which is one's experience of one's own gender.

However, the objectives of our innovation project remained the same.

4.3.2 Target groups

The most important target group is the so-called baby boomers (bb) that is all people born in the Sixties. All bb will be retired between 2010 and 2030 (in Italy, the population segment is 15%; in Europe the share is similar): this demographic tsunami will produce interesting and unprecedented long-term implications on the financial-economic market. In particular, bb's retirement will increase the demand for wellbeing, healthcare services, and services to manage free time. According to a survey by MainStay Investments, 84% of bb consider Internet and Internet-based services an unescapable need. As aforementioned, that the increase of the average age coincides with the wish to extend the period of sexual activity. That also implies new issues to be faced. Epidemiological data review resulting from surveys conducted on sexually active people (Lewis et al., 2004) shows that about 40% of adult women and 30% of adult men experienced a sexual dysfunction for at least one time.

The second target group regards the specialists in the health sectors related to sexual health (andrologists, psychologists, urologists, gynaecologists, etc.). AdviseX can represent to them the possibility to come in contact with users which are harder to engage given taboos, stereotypes and the confidentiality of the issue. In particular, this opportunity could be especially valuable for youngest specialists, who need to increase their patient network.

As an example, sexologists in Italy amount at about 1500 professionals. The demand for sexology consultations increased by 15% in the last five years, as well as the most popular disturbs did. As an example, male sexual desire disorder grew by 40% while vaginismus by 25.

A target group which may be indirectly interested in the solution are public institutions, in particular national and local healthcare systems. AdviseX can have a strong impact not only on sexual issues but also on life quality and tenor of every user. A lacking sexual harmony in a couple or, worse, arising sexual dysfunctions provokes consequences not only at domestic but also economic level, with increasing sexual diseases, divorce and domestic violence rates. This has consequences also on social and economic costs weighing on national health systems. As regards impacts, WHO points out

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that health costs due to lack of prevention and information are growing. With regards to sexually transmitted diseases, WHO estimates a 340 billion dollars annual bearing on national health systems, with a growing trend (Epicentro, 2013).

4.3.3 Activities and work performed

Work Package Number: 1 Coordination Management & Quality Assurance
Actual Starting month: Month 1 Predicted / Actual End month : Month 8
Work Package Objectives: The main activities of WP1 are: <ul style="list-style-type: none">- Coordination and monitoring project technical and financial activities- Definition of the quality plan
Description of work this period: Main achievements: Structuring of the project plan and the project quality plan. In particular, it has been set following activities and documents: business case, project requirements, scope statement, work breakdown structure, organization breakdown structure, human resource management plan, estimate activity resources, project budget distribution, project communication plan, quality and risk plans (as possible). Detailed description of work performed to reach the achievements listed above: The work started from the design proposal trying to plan and estimate at M1 human resources, financial, material and intangible assets to be used throughout the duration of the project. It was also made since M1 a plan of risks and the quality of the project in line with certain design standards to be respected. The monitoring and coordination of the project with the management of deviations from the planning and minimization of project risks was performed.
Summarise any problems you have encountered, and how they have been overcome No particular problem to detect or report. There aren't also temporal shift.
Description of planned activity for next reporting period WP1 activities finished during the last reporting period.

Work Package Number : 2 Corporate branding, communication and marketing
Actual Starting month : Month 1 Predicted / Actual End month : Month 8

Work Package Objectives:

Consistent with AdviseX project plan, this WP aims at:

- creating a credible brand for AdviseX service
- defining a marketing plan to be coherent with the brand
- define a communication and dissemination plan

Description of work this period:

Main achievements:

- Global competitive scenario definition
- AdviseX competitive positioning and Unique Selling Proposition definition
- User targets definition (at national level)
- Partnership definition and collaboration start
- Business and revenue model and price strategy definition
- Marketing materials definition
- Conversion strategy definition
- Financial projections
- Launch plan
- Distribution plan

Detailed description of work performed to reach the achievements listed above:

A benchmark level was conducted at national and international level in order to identify the main solutions supporting sexual health. AdviseX Unique Selling Proposition (USP) was designed through a bottom-up logic enabled by Living Lab methodology. User target was identified as: Gender – Male/Female/FtM/MtF; Age – 18-65; Interested in wellbeing and prevention; Minimum level of education – High School; Ability to search the Web and purchase online In search of information or solutions regarding specific issues related to sexual health

A study of AdviseX potential network was performed in order to ensure the success of the initiative. The collaboration with two stakeholders was concluded and produced the expected outputs.

AdviseX business model was identified as a multi-sided platform. Regarding the revenue model, a Pay per use model will be adopted. The pricing strategy adopted during the launch stage will be oriented to an effective penetration of the market, trying to engage as much users as possible. AdviseX marketing activities mainly will be online. However, as shown above, it is expected to intercept users and potential partners also offline. Therefore, even marketing materials were divided into online and offline materials.

AdviseX conversion strategy is based on reliability and security. Four main conversion strategy areas were identified are: Awareness → Engagement → Purchase → Community

Financial projections were achieved by estimating:

- the objective market share compared to service potential users
- user acquisition costs depending on the channels expected to be used and the degree of awareness regarding the service among the target market
- revenue structure in the first three years from the launch (premium features for

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<p>Customized Suggestions will not be included)</p> <p>The launch plan focuses on both online and offline communication channels. Online communication includes a blog (supported by a Search Engine Optimization Strategy), email marketing, online advertising and social networking. Regarding offline communication, events, offline magazines and general practitioners' collaboration will be the key elements of the launch strategy.</p> <p>The distribution plan divides depending on the two service targets, final users and specialists. Final users will be mainly reach through online social networking resources and magazines (both online and offline); specialists, in addition to the tools used for final users, will be engaged by partnering with specialist associations at national level.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>No relevant problems were experienced during this reporting period</p>
<p>Description of planned activity for next reporting period</p> <p>WP2 activities finished during the last reporting period.</p>

<p>Work Package Number : 3</p> <p>Analysis and requirement specifications</p>
<p>Actual Starting month : Month 1</p> <p>Predicted / Actual End month : Month 2</p>
<p>Work Package Objectives:</p> <p>The main objectives of WP3 are the following:</p> <ul style="list-style-type: none">- Definition of reference micro and macro environment- Definition of system requirements and technological state of the art- Definition of User Experience and mock-up
<p>Description of work this period:</p> <p>Main achievements:</p> <p>The main achievements relating with WP3 are an "User Requirement Document"(URD) to illustrate the terms of reference for the design, development and realization of the technical component of the software, an "User Experience Design" (UXD) to illustrate the characteristics of the product in order to obtain a result as close as possible to the users expectations, a guideline to design the prototype.</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <p>The URD and UXD processes of AdviseX are the result of an appropriate analysis activity, based on Living Lab sessions with users along the co-creation process:</p> <ul style="list-style-type: none">- for the URD process, during the "co-making phase" of the co-creation process, the team has involved users (final users and specialists of sexual health) and collaborators (software

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developer and legal consultant) in the development of the product; in particular, the team has conducted a [Usability Context Analysis](#) to elicit the user and SW/technological requirements;

- for the UXD design the entire process was carried out in collaboration with users during the “co-testing phase” of the co-creation process through some [Rapid Prototyping](#). This method is new compared to the recent past, during which the design was top-down, thinking primarily to technological characteristics rather than to usability. The UXD offers a completely different approach in which people become the protagonists of the project.

Summarise any problems you have encountered, and how they have been overcome

No relevant problems have affected these activities.

Description of planned activity for next reporting period

WP3 activities finished during the first reporting period.

Work Package Number : 4

Concept Development and prototype design

Actual Starting month : Month 2

Predicted / Actual End month : Month 3

Work Package Objectives:

The main objectives of WP4 are the following:

- SW components and architecture design
- Content Development

Description of work this period:

Main achievements:

Regarding the design of the software components, the prototype design of Advisex has been developed starting from the result achieved in the WP3: system requirements, software architecture and software components were defined.

Regarding the content development, the sexual specialists provided the following contents:

- periodic “Post” about sexuality for the Blog, for which the author's and the association's name will be highlighted, on request;
- “Personalized Advices” aimed at stimulating prevention and awareness about sexual matters. According with specialists, the personalization will follow three main classes of customization:
 - Gender - Male, Female, FtM, MtF;
 - Age - initially three age groups (18-34, 35-50, 50+);
 - Sexual orientation - homosexual, heterosexual, bisexual.

Detailed description of work performed to reach the achievements listed above:

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In the WP3 it was designed the mock-up of the solution, and carried out the user experience process; thanks to this two steps, in the WP4 the entire prototype was designed. During this co-design process, we have finalized the design of the solution in order to start with the development phase.

Regarding the content development, partnerships with associations of sexual health professionals and consultants of information security in the medical field have been established.

Moreover, the editorial line of the contents has been defined involving the active collaboration of both parties in order to determine a standard of content as much as possible harmonious and responsive to the target.

Summarise any problems you have encountered, and how they have been overcome

No relevant problems have affected these activities.

Description of planned activity for next reporting period

WP4 activities finished during the first reporting period.

Work Package Number: 5

Prototype Development

Actual Starting month: Month 3

Predicted / Actual End month : Month 8

Work Package Objectives:

This work package has been divided into two main activities:

- Software Components Development
- Integration and Prototype Release

Description of work this period:

Main achievements:

Currently the development of the solution is completed. All features designed during WP3 and WP4 activities were developed.

In addition, some features have been added because they have been found useful to the project.

Detailed description of work performed to reach the achievements listed above:

The work was divided in different stages with intermediate releases. The activity started with the configuration of the development environment, domain, web servers and DBMS. During the first phase of development, one of the first features implemented was the peer-to-peer video chat. The video chat starts with a simple exchange of contact information (handshake) made through the signalling server on "Node js". In subsequent phases, it has continued with the development of the frontend and with some features of the backend. In the last phase we have refined some features and added new.

Summarise any problems you have encountered, and how they have been overcome

A major problem encountered is the implementation of the video chat. Among the various technologies for the realization of video chat service, WebRTC, one of the most popular technologies, was chosen. During the implementation we realized that not all browsers supported this technology (only Google Chrome, Mozilla Firefox, Opera and Chrome for Android 5.0+ did). For this reason, it was necessary to use a self-installing free plugin developed by TemaSys to support extended functionality in Internet Explorer and Safari browsers. The plugin is required only in case of use with these two browsers.

Description of planned activity for next reporting period

WP5 activities finished during the last reporting period.

Work Package Number : 6

Validation and Testing

Actual Starting month: Month 3

Predicted / Actual End month : Month 8

Work Package Objectives:

The main objectives of WP6 are the following:

- Definition of the validation methodology and related metrics
- Test and Evaluation

Description of work this period:

Main achievements:

A prototype test involving 48 potential users of the solution (32 final users and 16 specialists) was conducted to assess if the solution features were usable by the target. Test results shown higher values than expectation in most cases. Validation methodologies and metrics enabling social impact measurement of AdviseX service were defined.

Detailed description of work performed to reach the achievements listed above:

In order to define significant methodologies and metrics, it was necessary to start from the analysis of AdviseX user target, the customer problem, the idea to solve the problem and the product to offer the solution.

Several KPIs were identified starting from that and have been useful to measure usability during the co-testing phase involving target groups.

From the same starting point, it has been possible to identify several KPIs, useful to measure social impact after the launch of the solution on the market.

Summarise any problems you have encountered, and how they have been overcome

No relevant problems have affected these activities.

Description of planned activity for next reporting period

WP6 activities finished during the last reporting period.

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

Team structured in order to closely monitor resource and budget consumption and take corrective actions if necessary. Conservative evaluation of each WP and LL approach allowed to avoid any problem or delay.

Detail any publications, publicity or other dissemination activity.

AdviseX business model needs a huge number of users to be sustainable and a strong reliability related to the use of data and the diffusion of health information. For these reasons the most part of the dissemination activity was performed in order to create a strong network of users and acknowledged health organizations around the platform.

The 10th of November 2015 the project manager and the marketing manager of AdviseX had a meeting with the multichannel marketing director of Pfizer in its headquarter in Rome in order to validate the model and keep suggestions about the prototyping activity and about the future launch of the product.

For the same reason the 22nd of December 2015 AdviseX marketing manager had a brainstorming with Abbvie in Rome.

On the 11th and 12th February 2016, beMINT will be participating in the BIAT (Innovation and High Technology Lab) 2016 at the New Pavilion – Module no. 4 of the Fiera del Levante in Bari. The aim was to meet players from investment and finance sectors from all over the world.

The 8th of March AdviseX marketing manager had a meeting in Siams (Società Italiana di Andrologia e di Medicina della Sessualità, an organization involved into Sexual Medicine activities and research) in order to validate the concept and create a partnership to reach users and specialists.

The 18th of March 2016 AdviseX marketing manager and beMINT chairperson had a second meeting with a global panel of directors in Pfizer headquarter through a conference call, with the aim to evaluate the possibility to have support for the specialists network creation.

In May 2016, beMINT team built an important partnership with eHealthNet Consortium established in Naples; eHealthNet is a consortium composed by private and public partners aiming to create innovative and integrated solutions for regional health services. Its main lines of intervention concern technologies for interoperable, pervasive, sustainable and preventive eHealth. Thanks to this, AdviseX team and project were introduced to recognized companies and organizations such as Mediamobile Italia S.p.a., Engineering S.p.a., Energent S.p.a. and CNR (Consiglio Nazionale delle Ricerche).

The 25th of May the AdviseX creative designer had a speech in Rome for Myllennium award contest in order to show to Myllennium commission, participants and partners the prototype developed

and collect further suggestions.

The 7th of July, beMINT team presented the project AdviseX to the attention of business angels and other investors during the Technology Biz event. Technology Biz is the most important multidisciplinary initiative on technology and innovation in Southern Italy. It gathers a network of ideas, people and initiatives supporting the culture of innovation and aims to partner with institutions with a global market focus.

Most of these activities have been shared on beMINT social networking channels.

4.3.4 Sustainability of the solution

The first step to be done after the CHEST funding period will be to foster and increase the network, which is partially built up. In particular, it will be necessary to:

- Increase the collaboration with professionals and associations from sexual health sector to provide AdviseX with more and more varied competences;
- Build up a relationship with both the National and local healthcare systems and with certifying organizations to provide AdviseX with a quality brand (medical device disposal, etc.);
- Stabilize and strengthen the partnerships with research and specialized centres to increase quality and compliance of data and privacy management of the solution. This will be important also for scaling up the service at international level;
- Determine the possible scalability of the solution with Internet of Things / wearable devices that can make AdviseX's concept more interesting and competitive.

Another important step to be taken for AdviseX's team will be to build a system of opportunities for further funding for the final market launch after the CHEST funding period. In particular, some business development activities are already undertaken and others are in the process of scheduling:

- Contacts with a big player in the pharmaceuticals sector are underway. The interactions between AdviseX's business and pharmaceutical company could have a very interesting outcome. The AdviseX team is also exploring contacts with other pharmaceutical companies potentially interested in the solution and in its business.
- AdviseX's team is bringing the project to the attention of business angels, venture capitalists and specific acceleration programs in the second half of 2016. These options will be evaluated especially at European level.
- AdviseX Team is considering to apply to specific European calls expanding the solution both from a technical and a business point of view. It is also including ad hoc partnerships to increase competitiveness of the solution.

A first 3-years AdviseX business plan was created supposing to activate three revenue areas:

- Revenues from fees applied (in the order of 20%) to any consultation delivered from the specialists via the service;
- Revenues from a freemium area where user will access to extra customized contents;
- Revenues from selling/booking complementary products/services (diagnostic services, therapies, etc.) delivered through the solution.

Investments for about €500.000 are expected during the next three years after the CHEST funding period in the areas: Personnel, Marketing & Networking, Platform management and maintenance, market analysis and feasibility studies.

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Revenues in the business plan will grow during the three years from the launch with a peak of 400.000€ at the end of the second year and about 650.000€ at the end of the third (excluding the percentage of revenue due to consulting price, representing a cost for the company). These results imply a net loss in the first two years, but profits and positive cash flows at the end of the third year.

4.3.5 Risks

Description	Impact	Probability of risks	Mitigate Actions
Delays and bureaucratic obstacles in the project reporting phase with contracting consortium	Slowdown of final project release with loss of competitiveness	Medium	Use of alternative forms of credit. Acceleration final closure of the project
Health services and mobile health market growing exponentially	Market saturation and very high competition	Medium	Sexual health segment poorly explored. Partnerships and stakeholders very interested to promote Advisex solution
Protection and security health data	poor reliability	Medium	Advisex's team collaborate with expert pool in mobile health legislation and in particular "data minimization", "data protection by design and default"
User security and transparency information	Poor user perception	Medium	Advisex's team are looking at different solutions to certify quality and content of the solution
Interoperability solution with other systems and devices	Low market competitiveness	Medium	The model and architecture of solution designed to interoperate with other systems
Digital divide and digital illiteracy	Groups of users excluded from the solution	Low	Number of mobile devices constantly growing
Liabilities of solution	Civil and criminal liabilities for manufacturer	Medium	Certification and prescription of the solution

4.3.6 User-based evaluation of the concept

An impactful Digital Social Innovation requires the involvement of stakeholders since the beginning of a project. For this reason, AdviseX team has developed the PSL methodology to co-create innovative solutions with citizens, companies and public administrations throughout the entire idea life cycle, from the “co-thinking” to the “co-building”, from the “co-making” to the “co-testing”.

In particular, the “co-testing” phase is an activity performed with the users during the whole project to test the product performances and improve its functionalities. Currently, AdviseX team is conducting the prototype evaluation through some [Rapid Prototyping](#) sessions with final users; it consists in the following steps:

- a. identifying the targets of the product and relating “personas”;
- b. stimulating the testing of the main functionalities of the prototype;
- c. improving the usability of the product according with user experiences.

a. identifying the targets of the product and relating “personas”;

AdviseX users have been splitted into three specific targets and, on the basis of their different characteristics (gender, age, sexual orientation, needs), several “personas” (relatable snapshots of the target audience that highlight demographics, behaviors, needs and motivations through the creation of a fictional character) have been built; thus, for the co-testing of the prototype some people with the corresponding characteristics have been involved:

Dimensions	Indicators	Variables	Number
Online Community Building	User involvement in prototype evaluation	<p>Target groups involved in co-design process:</p> <p>“final users”: users looking after their sexual wellbeing,</p> <p>“specialists”: sexual health specialists,</p> <p>“web content manager”: responsible for updating service and contents;</p>	3
		<p>Users involved in co-design process:</p> <p>“final users”: 4</p> <ul style="list-style-type: none"> - Carlotta, 25 years old, heterosexual, curious about sexual trends, - Veronica, 35 years old, bisexual, shwred to the prevention, - Matteo, 45 years old, homosexual, dissatisfied with his sexual activity, - Filippo, 60 years old, heterosexual, worried about his sexual health, <p>“specialists”: 3</p> <ul style="list-style-type: none"> - Giorgio, 30 years old, andrologist and urologist, he has just opened his studio and wants to enlarge his patients network, - Anna, 45 years old, gynaecologist, she wants to work partially at home and gain extra revenue, - Edoardo, 55 years old, Psycosexologist, he wants to spread his research and increase his on-line visibility. <p>“web content manager”: 1</p> <ul style="list-style-type: none"> - Roberta, 28 years old, blogger; 	8

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		<i>Ratio between men and women involved:</i>	50%
		<i>Ratio between young, adult and old people involved:</i> “final users” : one per each relevant age range (18-34; 35-44; 45-54; 55+) “specialists” : one per each relevant age range (28-40; 41-50; 51+)	33%

b. stimulating the testing of the main functionalities of the prototype

To assess the usability of the web application some tests of the prototype have been done with users, through the “*tree testing*” technique: a powerful instrument to test the information structure of a website through the usability of site’s mockup, with an immediate analysis of the data.

Firstly, some task of searching for particular contents have been asked to each participant. Starting with those of the first level and proceeding to the more interior, in case of failure, it has be given the opportunity to go back and try again.

Each session has been conducted face to face with the presence of a moderator.

For each task, the search path and the success or failure of research have been registered.

The results of the tree testing for the main functionalities of Advisex are the following:

b.1 Registration (for all targets: 8 participants)

- 62,5% participants (under 50) has successfully registered on the platform at the first attempt assessing the usability of the search path;
- 37,5% participants (over 50) has registered on the platform in two or three attempts because some fields of the registration form were not completely clear;

b.2 Pre-diagnosis tests (for “final users”: 4 participants)

- 75% participants (over 30) has successfully done the test at the first attempt, declaring the usefulness of the questions;
- 25% participants (under 30) has successfully done the test but some terms were not completely clear;

b.3 Specialist consultation via video chat (for “final users” and “specialists”: 7 participants)

- 57,1% participants (final users and specialist under 40) has successfully done the consultation at the first attempt;
- 28,6% participants (final users over 40) has successfully done the consultation at the second or third attempt because they haven’t understood that chat and video chat need a pre-booking;
- 14,3% participants (specialist over 50) hasn’t started the consultation because no alert highlighted the starting button.

c. improving the usability of the product according with user experiences.

At this point of the analysis it has been easy to identify any structural problems, just observing the search path of users to end each task: the actions sequences reflect their mental models and it has

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been easy to make improvements of the entire structure. In particular, the activities consisted in modifying mock-ups according with the results of the tree testing.

c.1 Registration

To improve the usability of the 37,5% participants who has successfully registered on the platform in two or three attempts because some fields of the registration form were not completely clear:

- the registration form describes the requirements of the password;

Form fields for password registration:

- Password***
[Empty text input field]
- inserisci una password di almeno 8 caratteri contenente una lettera minuscola, una maiuscola ed un numero*
- Conferma Password**
[Empty text input field]
- verifica che sia lo stesso testo immesso in "password"*

- the system of verification reports any errors returning all incorrect fields in a unique form.

Form fields and messages for registration:

- Inserisc il codice di verifica visualizzato...**
- Verification code: **jLxL6** (with a refresh button)
- [Input field containing: jLxL6]
- Stiamo verificando che tu non sia un Robot :)*
- Dichiaro di essere maggiorenne e di accettare la [privacy policy](#) e le condizioni di utilizzo.**
- Voglio essere informato su Sesso e Sapere**
- Iscriviti** **Annulla**
- Attenzione.**
 - L'anno di nascita non è valido
 - L'indirizzo e-mail inserito non è valido
 - I campi Password e Conferma Password non coincidono

c.2 Pre-diagnosis tests

To solve the problem of the 25% participants who has successfully done the test but has found some terms were not completely clear:

- explanatory contents in relation to different definitions have been included;

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2 Nelle ultime quattro settimane quando ha avuto delle erezioni in seguito a **stimolazione sessuale**, quanto spesso queste erano tali da permettere la penetrazione?

- Non ho tentato di avere rapporti sessuali
- Quasi sempre o sempre
- La maggior parte delle volte (molto più della metà delle volte)
- Qualche volta (circa la metà delle volte)
- Poche volte (molto meno della metà delle volte)
- Quasi mai o mai

Conferma e vai avanti

Indietro

include: allusioni come giochi erotici con una partner, guardare immagini erotiche, ecc.

- preliminary information about the tests have been collocated at the beginning of the page.

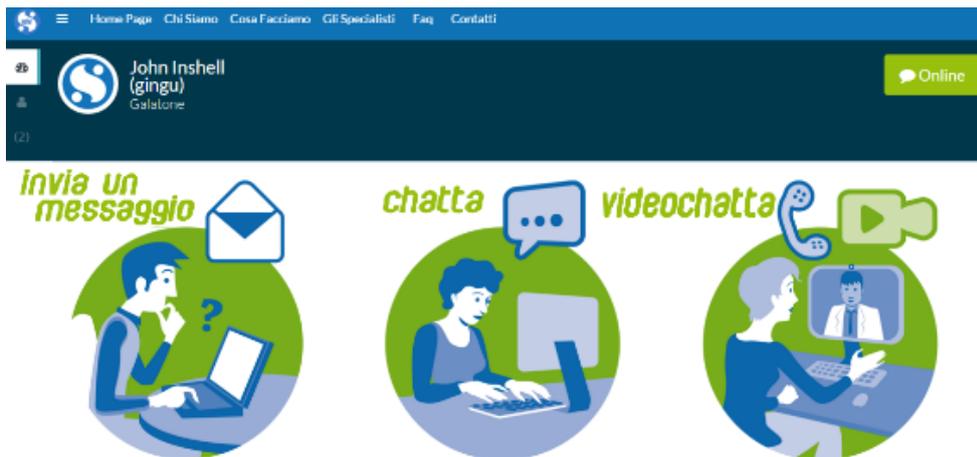
Test della Funzione Erettile

Questo test internazionale calcola quanto è ottimale la tua funzione erettile. Compila il test prendendo come riferimento le tue ultime quattro settimane. Se non sei sicuro sul significato dei termini utilizzati, posizionati con il mouse su di loro e leggi la definizione.

2 Nelle ultime quattro settimane quando ha avuto delle erezioni in seguito a **stimolazione sessuale**, quanto spesso queste erano tali da permettere la penetrazione?

c.3 Specialist consultation via video chat

- To solve the problem of 28,6% participants who has successfully done the consultation at the second or third attempt because they haven't understood that chat and video chat need a pre-booking, preliminary information about the service have been collocated at the beginning of the page;



- To solve the problem of 14,3% participants who hasn't started the consultation because no alert highlighted the starting button, the alert button "shakes"!

4.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 6

Table 6: Snapshot of project "AdviSex"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
A web application to provide a distinguished and complete resource supporting sexual health and prevention and enabling users to overcome shame during the doctor-patient first contact.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Specified product requirements in a User Requirement Document (URD) and a User Experience Design (UED) ○ Designed the software architecture and components ○ Created content with sexual health specialists. ○ Completed development of all of the front-end and back-end parts of the prototype solution. ○ Tested the prototype with 48 users (32 final users and 16 specialists) with better than expected results ○ Developed a full business plan, including revenue model, financial projections, competitor analysis and USP definition, marketing strategy and launch materials. <p>The project successfully delivered 6 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Advisex is included in the products section of beMINT's English and Italian websites: http://www.bemint.it/en/prodotti/ and http://www.bemint.it/prodotti/ ○ beMINT's social media accounts: Facebook (332 likes) and Twitter (80 followers). ○ Participated in BIAT (Innovation and High Technology Lab) and Technology Biz events. ○ Meetings with Pfizer, Abbvie and SIAMS (Società Italiana di Andrologia e di Medicina della Sessualità) ○ Built an important partnership with eHealthNet Consortium, leading to introductions to a number of national companies. ○ Speech by creative designer at the Myllennium award contest. ○ News article on the CHEST website: http://www.chest-project.eu/advisex-improving-sexual-health-via-the-living-lab-approach/ ○ 202 interactions in the project's section on the CHEST Community Forum.

Table 7 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 7: Mandatory KPIs for AdviSex

Dimensions	Indicators	Variables	Baseline	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process.	1	3	3
		Number of users involved in co-design process.	2	8	8
		Ratio between men and women involved	50%	50%	50%

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		Ratio between young, adult and old people involved.	0%	29%	29%
		Young people ratio:	50%	42%	42%
		Adult people ratio:	50%	29%	29%
		Old people ratio:			
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.) ⁸	0	5	4
	Number of tools/activities developed by the project for influencing information asymmetries	<p>With the aim of supporting the user in increasing his level of information through the simple access to the Advisex platform, different tools and functionalities were developed in order to make that process effective and easy to use:</p> <p>Users activities:</p> <ol style="list-style-type: none"> 1. Chat function 2. Video Chat function 3. Private messages function 4. Search information tool bar into the website 5. Search sexual specialist from specialists' list 6. Newsletter 7. Feedback mechanism 8. Sexual health blog 9. Sexual disease test 10. Specialist consultation booking 11. Personalized recommendations 12. Community interaction <p>Specialist activities (useful to arrange specialist consultations):</p>	0	15	15

⁸ To what extent do you agree with the following sentence: "Our project reduces information asymmetries experienced by the users". Please attribute a value from 1 to 6 where 1 is "totally disagree" and 6 is "totally agree"

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		13. Specialist calendar 14. Specialist control panel Statistics and analytics			
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	5	5
		Number of comments / replies on project blog entries on CHEST website	0	10	2
	Sharing through social media channels	Quantified measure of followers on selected social media channels (beMINT media channel)			
		Facebook	0	50	50
		Twitter	0	30	30
		Quantified measure of communications on selected social media channels (beMINT media channel)	Facebook posts	0	10
Tweets			0	10	10

5 Hybrid Letterbox⁹

This project seeks to address the challenge of developing novel forms of interaction, that bridge the gap between the digital and the analogue, through the Hybrid Letterbox, – an augmented, connected mail box where anyone can throw a physical postcard, and it is automatically digitized, and is uploaded to an internet platform to be spread and discussed.

⁹ Chapter contributors: Mathias Becker, Florian Sametinger



Figure 5: Screenshot of the Hybrid Letterbox prototype

5.1 The societal problem

5.1.1 Description of the problem

Currently, a wide range of digital tools for citizen participation and political engagement are emerging. This spans from local foci like sharing goods in a house (e.g. shareable.net) to neighborhood collaboration (e.g. neighborland.org), the city-level dimension (e.g. for discussing city planning, or fixmystreet.org), the national level (e.g. adhocracy) to the global level (e.g. awareness- and action platforms like avaaaz.org). All of these new infrastructures use the advantages of a networked world and operate on premisses of the internet. They give way to a new thinking about citizenship, political processes and responsibilities on a local, national and international level.

But these emerging possibilities are not (or very limited) available for those who are offline. This means they have no access to the internet at home or at their workplace.

The specific problem to solve is, that possibilities to participate in societal change shifts towards the digital and thus excludes a large portion of citizens who might also want to be actively involved, but do not have access one way or another. Those who are not digital natives, or do not have access to technology due to financial, political or social reasons are affected. In this project, we specifically argue, the aforementioned “opening” of societal and political processes targets mainly a digital elite and leaves out those without access to or literacy in digital media.

The societal and political inclusion of digital strangers through hybrid technologies is the main goal of our project, in contribution towards a more inclusive, innovative and just society. We aim at enabling and encouraging anybody (instead of a digital elite) to act or react in situ and to either initiate or contribute to a discourse.

Because of rapid evolvment of social web technology and improvements of web-based participation infrastructures, a large part of society not so adept in the use of technology is simply left behind. The cause of this is amongst others, missing access to appropriate technology due to a widening financial and socio-political gap in Europes societies.

In Berlin, about 81,9% of the population already have access to the internet (fig. 1). Due to rapid growth of the city, significant changes in the structure of the city and the processes tied to it are

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encountered. Berlin's various endeavors to include citizens in decision making such as town halls (Bürgerwerkstätten) or citizen participation platforms (mein.berlin.de) all focus on either non-digital or digital approaches. Since the beginning of the project in January we have gained insight into the extent that Berlin is involved in digital participatory approaches. The problem remains that those who have no access or only limited access to the internet are left out because the tools provided for non-digital participation do not match the ones provided digitally. With demographic change being almost neutralized by the influx of younger people to Berlin, it is crucial to understand how there can be a bridge between the aforementioned analog and digital tools in order to include a broader range of citizens. With our proposed analog-digital hybrid tools we attempt to address these issues.

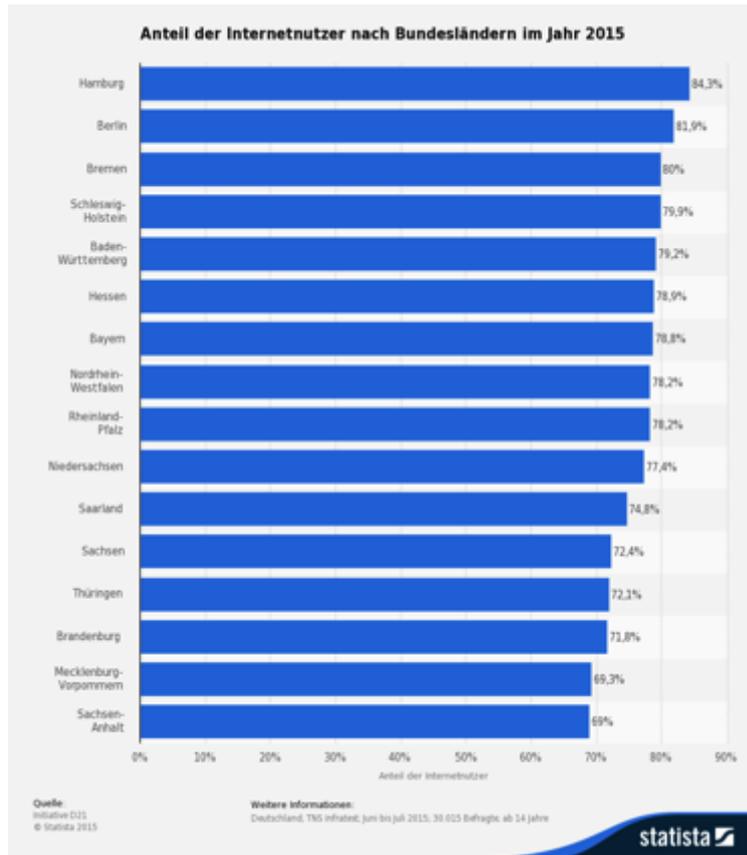


Figure 1

5.1.2 Scale of the problem

These emerging possibilities of participation are not (or to a very limited extent) available for those who are offline. According to Eurostat (Nov. 2015) these numbers keep decreasing, and while in 2009 30% of Europe's population had no access to the internet, in 2015 statistically it is only a mere 16. In Germany, 10% of the population have never been online. These very general statistics cloud the actual use of the internet beyond using a search engine or checking E-Mail. According to Eurostat, 23% of Europe's population states access costs are too high for them to get internet at their homes, 9% are concerned about privacy and security. 41% do not have internet access at home because of lack of skills and 27% do not have access because equipment costs are too high. Due to demographic change those who are affected are increasingly senior citizens, who are thus being excluded from the aforementioned participative processes that make use of internet technology. There are only few bridge technologies, which use traditional media and modes of participation.

element for their everyday life, e.g. for communicating with their grandchildren (Skype), preserving memories (Digital Photobooks) or staying in contact with other seniors (Instant Messaging).

The core problem of a gap between digital technologies and the "analog" realities of everyday life create the need for bridge technologies that slowly draw digital strangers towards the digital and provide them with access to e.g. participation systems.

5.1.3 Previous approaches to solving the problem

Digital approaches to citizen participation contrast a longstanding tradition of participation through "traditional" channels. Democratic voting, petitioning and similar practices have been widely accepted in all of the EU countries for decades. While new forms of participation have often claimed to be able to replace such traditional practices, there is significant doubt that a large part of the population will accept this.

As mentioned before there has also been a rapid rise in digital participation platforms (Adhocracy, Avaaz.org, changify.org, neighborland, etc.) and other forms of political participation via Facebook or Twitter over the last 5 years. Although they prove to be successful in certain contexts they lack analog and multi-modal input and output channels. With the existing solutions one is dependent on being online and having the skills to use the respective systems. Furthermore you have to have access to novel technology which might be too expensive or not available in your area.

Assistive technologies providing certain mechanisms to bridge the gap between analog and digital have been developed, but many of those solutions are implemented from one side only, making e.g. the user interface in a way that it mimicks analog processes without changing the perception of the actual activity through technology.

One finding is that there is a large number of especially tablet-based apps dedicated solely for senior citizens. Furthermore there are numerous applications that are addressing the security and safety issues that about 9% of the offline-population and an unknown part of the online-population are concerned about (see statistics above).

5.2 Implementation of organizational structure

5.2.1 Maturity of the project

The project has remained in its seed & early prototype phase. The project was suspended by the University of the Arts in mid-march, when notice of the changes within the CHEST project was sent out. Due to the fact that up to the day of submission of the final report no budget was accessible for us, the project remained halted.

5.2.2 Organizational structure

The project is lead by both Florian Sametinger and Andreas Unteidig who are in charge of reporting, coordination, concept development and overall oversight of the project. They plan, conduct and evaluate the testing activities with the two groups of stakeholders and coordinate the Open Source release. Furthermore they plan the possible route to market for the final outcome of the project. Interaction Designer Lutz Reiter, along with student worker Fabrizio Lamoncha, is in charge of the implementation and development, API programming, GUI-Design, desk research and prototyping.

The core team are all employees of the Berlin University of the Arts.

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Volunteers: Senior's Computer Club and the neighborhood Fischerinsel in central Berlin will be participating especially during development and implementation phase. There were around 10 committed volunteers present during our first co-design workshops.

Subcontracting: GUI design and PCB production.

5.2.3 Key personnel

[Dipl. Des. Florian Sametinger

is PhD candidate, lecturer and project lead at the Design Research Lab/ Berlin University of the Arts. His main field of work is Design for Sustainability. He is part of the design research project Neighborhood Labs in which knowledge-sharing approaches in urban neighborhoods are investigated. Furthermore he is a co-founder of the research group Civic Infrastructures. Before joining the Design Research Lab, he studied Interaction and Industrial Design at the Brunel University of West London, the Politecnico di Milano and the University of Applied Sciences Magdeburg and worked as an independent Interaction and Industrial Designer in Munich where he focused on interdisciplinary design projects with a growing emphasis on sustainability. Projects included mobile communication, automotive interfaces and household appliances.

Dipl. Des. (FH) Andreas Unteidig

is a researcher and project lead at the Design Research Lab/Berlin University of the Arts, where he explores the relationship of Design, Technology and the political. Prior to that, he studied at Köln International School of Design as well as at Parsons the New School for Design and worked as designer and consultant in various contexts. Andreas co-founded the research group Civic Infrastructures, a transdisciplinary team that researches the designability of socio-material infrastructures that enable and foster political agency for citizens in Germany and abroad.

M.A. Lutz Reiter

received his Masters degree from Chalmers University in Gothenburg, Sweden and has been working on several projects supporting the Design Research Lab in the design and implementation of various prototypes such as the Hybrid Letterbox. He worked as Freelance Designer and Programmer on several projects concerning media arts, tangible prototyping, user experience and interface design, mobile app and web programming. He is experienced in working with the aforementioned participating groups of the Seniors Computer Club and MadaMe Mehringplatz.

M.A. Fabrizio Lamoncha

He is is a media artist and designer based in Berlin. Trained in Fine Arts and Architecture, he holds a M.A. in New Media "Interface Cultures" by the University of Arts and Industrial Design Linz. His artistic research and production received the Art and Artificial Life International Award Vida14. In 2012, he joined Design Research Lab, where has collaborated in the design and craft of different renowned projects such as the Hybrid Letterbox.

5.2.4 Partnerships, cooperations, and networks

Seniors Computer Club Berlin-Mitte: As part of the Kreativhaus e.V, they provide formal and informal courses to senior citizens who want to learn about novel technologies and tools. They are active on the Fischerinsel in central Berlin and have played a major role in co-developing the early prototype of the Hybrid Letterbox, which serves as a basis for this project.

Their members are all above the age of 60, 5 of them as steady contributors to the project, making them an important partner for the testing and implementation of the project.

Due to the delay of the overall project only one group, the Seniors Computer Club Berlin-Mitte was included. To test the prototype, it was used in other projects run by Berlin University of the Arts, such as Mit-Mach-Stadt Brandis (<http://brandis.community-infrastructuring.org/>), MAZI, etc.

5.3 Implementation of the solution approach

5.3.1 Solution approach

The Hybrid Letterbox Concept:

The Hybrid Letterbox mimicks a very traditional medium of communication. It is a letterbox, made of wood, with a digitization-module inside, which is used to photograph postcards which are thrown inside a slot on the front. We use visual markers to determine the area where the content is written and capture the area with a camera, which then saves the image on a local server. From this server it can be distributed to digital platforms such as Twitter, Wordpress or the Hybrid Letterbox Website.

Fundamental participation:

The concept and the very first prototype of the Hybrid Letterbox has been developed in close collaboration with a group of technically-interested senior citizens. The idea for the prototype emerged out of co-design workshops, since some of the predominantly elderly inhabitants of the neighborhood we worked with do not have access to digital media. This presented itself as a problem, since we were working on a local social network and particularly aimed at involving those who have not been active in the shaping of their neighborhood so far. We realized that we needed an interface that connects the digital and the analog world, and hence started working on the development of the early prototype together.

Having encountered this hurdle in our own work, we started to become more sensitive towards the generally existing tendencies of exclusion that are inherent to the current digitalization of our social and political lives. The conceptual development of the Hybrid Letterbox thus is inherently participatory and emphasizes the potentials of Digital Social Innovations to make the ever-accelerating technological progress a more just, haptic, humane and rich experience for the vast majority of people.

The Hybrid Letterbox is innovative in being a “bridge technology”. It aims at enabling those who are currently excluded to take part in the described developments. It bridges gaps and overcomes hurdles that are in the way to digital participation for a vast and diverse amount of people. It is a digital/analog instrument providing a more inclusive form of (digital) participation. Operating in Living Labs on principles of Participatory Design (e.g. Binder/Ehn 2011), we build on recent developments in the smart home/environment research (e.g. Hsu, 2012, Swan et.al. 2009, Intille, 2006, Bohn et.al, 2005) that incorporate concepts ilke citizen empowerment and participation in the design of technological solutions.

In order to generate a significant amount of appropriations of the prototype, we plan to release it open source and to collaborate with others in implementing the Letterbox in various contexts. Already initiated contacts include a refugee initiative (having a tool for broadcasting living realities

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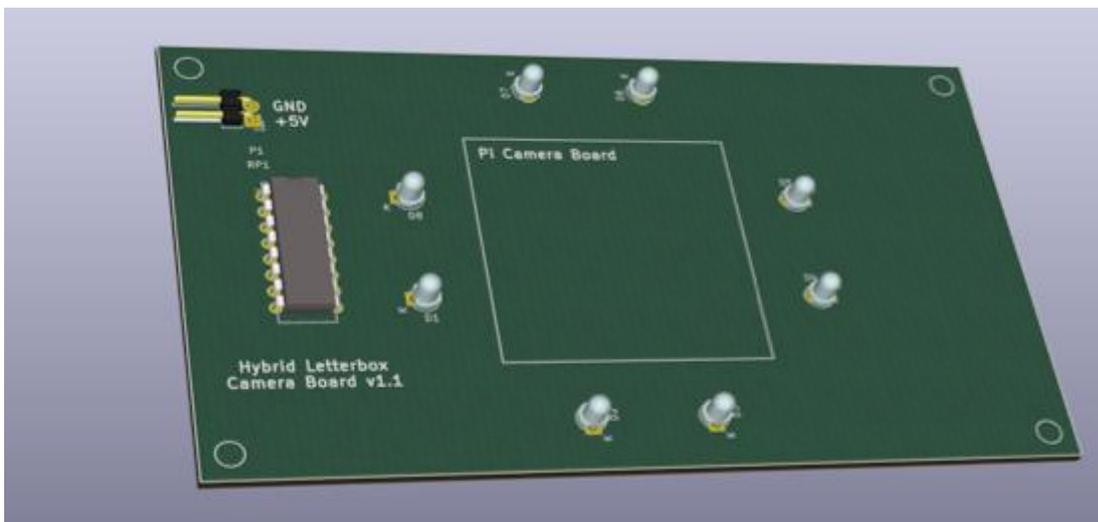
out of the camps), a NGO (enabling senior citizens to tweet) and a political party (provide novel forms of voter inclusion).

We have started building a network of five Letterbox-instances and which we will test in two different neighborhoods and in different contexts. The prototypes in the network serve as nodes that are a: connected to each other, b) are linked to and provide access to existing social networks and c) can represent contributions visually in public space (e.g. projections, city screens).

The Hybrid Letterbox setup stages:

In stage one the first working prototype included an arduino to read the postcard sensor input and control the servo and a macbook to capture the camera image. A tablet build in the front of the letterbox showed the submissions. The first prototype was not capable of sending the submissions to an internet server. The upload of images to a server was relatively slow, since the Arduino board did not yield sufficient speed. To make the setup more affordable and to also reduce the power consumption of the prototype, in stage 2 we we switched to a setup with a Raspberry Pi B+ in its core, which sped up the upload process significantly. This setup included also a wifi router and an umts stick, which made it possible to send the submissions to an internet server over mobile internet or wifi. This prototype is also able to run on battery power for a whole day. Starting from the basic setup of the Hybrid Letterbox, we improved several components over the course of WP1 and will continue to do so in WP2 (T1.3):

We are converting the electronic circuit boards to professionally printed circuit boards. The newly printed boards will be less error prone, cheaper to produce and compared to a normal prototyping board the electronic components can be placed and soldered on it within a few minutes. Providing the sketches for the open source release of the Hybrid Letterbox will also make it easier to reproduce the letterbox.



We will provide two boards with the release of the Hybrid Letterbox: The camera board, which is shown above and the control board which will be placed on the Raspberry Pi. One significant problem we noticed in the first user tests, was that the letterbox will only work, when the postcard is inserted in the correct orientation. The next prototype should be able to process the postcards independently from the orientation of the thrown in card.

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The early functioning prototype will be the starting point for the next steps. Main deliverables will be the participatory and iterative development of a) the refined prototype and b) a digital platform, which automatically digitizes analog contributions and thus makes them conversable on- and offline.

Beyond the primary challenge, the Hybrid Letterbox provides an example for novel ways of expression in public space. Sociopolitical engagement in the social network era takes on many forms that go well beyond the involvement in political parties or formal interest groups. On a local level, for example, it is important to help citizens engage spontaneously and project-based within their neighborhoods, to voice and collect ideas, to share opinions and to take on social responsibility. The Hybrid Letterbox can be one step towards a more active civil society.



Vernetzte Nachbarschaft Fischerinsel



DIZF Zukunftsforum 2015



SPD-Kampagne #digitalleben



Tag des Nachbarn 2015 Kreativhaus Berlin



Israelfestival Jerusalem 2015



Aktion „Liebe Sonnenallee“

Further development:

With the release of the next prototype of the Hybrid Letterbox, we implemented a RESTful Web API for the central webserver (<http://87.106.45.107/>). The Web API (T2.3) allows to retrieve the status of all connected letterboxes, retrieve submissions of the letterboxes, combine submissions of multiple letterboxes in one bundled feed and provide basic authorization features for accessing its content. The Web API makes it easy to build customizable interfaces to organise and visualize the content of the letterboxes. In a next step, the API could be further developed to allow commenting on/discuss submissions through a web browser and to connect to social media services like facebook, twitter, etc. The code is available open source on Github (<https://github.com/DRLabBerlin/HybridLetterbox>)

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processes. Exemplary for the first target group are elderly citizens who wish to be more involved in the processes of our society than they are at the moment.

The Seniors Computer Club group (SCC) which is active in the Hybrid Letterbox project consists of 5 core members (2f, 3m), who are all above the age of 65 and well-versed in the use of computers. They have participated in previous research projects and are somewhat familiar with the processes. They meet in their club regularly and form certain work groups (such as image processing, video telephony, etc.) where they teach themselves the respective technology and then provide guidance to others who are not as familiar with it as they are. Around the core group of 5 there are numerous participants who are not there on a regular basis, but want to provide their input to the project. This is achieved largely at events like their summer party or certain regional events where the SCC is present.

The target groups members are largely interested in learning technologies that support their everyday life. Aside from this, they use the SCC as a hub for social activities. Concerning the Hybrid Letterbox project, their goal is to use the technology in order to be able to participate in local decision making processes, to draw more attention to their club and to engage previously uninterested parties in their activities.

In the course of running the first tests and experiments with an early prototype in this neighborhood, many different groups – children, families, senior citizens – started using our technology in a broad range of ways: they formulated questions, ideas, they scribbled or contributed their thoughts in their respective mother tongue. It became clear that our target group is much bigger than we initially anticipated and that it proves useful in a variety of different contexts. Participating in discourses through the usage of our artifact proved attractive, also to those who are digitally well connected.

Due to a large interest in our first prototype, coming from the initial users (our partners at the Fischerinsel), from researchers, public institutions and civic organizations, the targeted groups are manifold: Civil society initiatives, Digital Strangers, Citizens of all social ranks, Researchers from design, art, urban planning, sociology, architecture, politics that deal with questions of participation and engagement, as well as multipliers stakeholders from public and private parties.

On the Fischerinsel, where the SCC is located, there is no quarter-management which tends to the problems regarding the neighborhood. It is not regarded a problematic area since lots of the issues, such as immobility, loneliness of some of the inhabitants of the highrise buildings or discontent with the run-down playgrounds, paths and benches, are beneath the surface. Numerous groups have initiated actions for change in the neighborhood. Some, like the SCC focus on digital education for senior citizens, others like on support structures for elderly and ill people in the highrise buildings.

Further testing has not been done, due to the delay of the project. There have however been several key events where the prototype has been set up in order to test its use. These are described in section 3.2

5.3.3 Activities and work performed

After the notice of delay and restructuring of the project, UdK has suspended all activities within the project. To date, the project has not been officially approved by the EU, thus, no further work has been conducted.

<p>Work Package Numbers : 1-4</p>
<p>Actual Starting month : Jan 2016</p> <p>Predicted / Actual End month : June 2016 / September 2016</p>
<p>Work Package Objectives: Ideation and Concept Development & Requirement Development</p> <p>In this WP which ran for approximately 7 weeks from the beginning of January to mid-February, tasks included structured ideation phases, scenario design and quick prototyping as well as network concept and analysis. It concludes with the selection of technologies and a feature set of the Hybrid Letterbox system.</p>
<p>Description of work this period:</p> <p>The WP is structured in several overlapping phases: idea generation, network concept, scenario design and quick prototyping as well as analysis, choice of technology and system requirements.</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Task 1: Stakeholder workshop with the Seniors Computer Club Berlin-Mitte (SCC) was conducted. • Task 2: Concept generation and clustering (Walt Disney method, Affinity Diagram) • Deliverable 3: Improvement of the Hybrid Letterbox components • Task 4: Scenario design and quick prototyping • Task 5: Analysis • Task 6: Choice of technology • Milestone 1: System Requirements <p>Detailed description of work performed to reach the achievements listed above:</p> <p>T1.1: The workshop included introduction to the project, discussion of concepts and ideas regarding the Hybrid Letterbox. Planning of the first Beta-Test in a public passage on the Fischerinsel.</p> <p>T1.2: Using the "Walt-Disney-Method" for idea generation, we generated concepts based on the initial concept of the hybrid letterbox. These are sketched and described shortly and clustered and evaluated regarding the scope of the project.</p>

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T1.3: This was initially in WP2, but was moved forward due to time constraints. The overall setup of the Hybrid Letterbox was re-evaluated and certain components, such as the circuitboard were improved.

T1.4: Based on the concepts from D2, 5 concept scenarios were sketched out. They will form the basis for paper prototyping and early stage testing.

T1.5: The analysis of similar projects as well as relevant technological advances is ongoing and will be concluded with the milestone system requirements

T1.6: Based on D4 and 5 a set of technologies was chosen

M1: Document containing system requirements

Summarise any problems you have encountered, and how they have been overcome

Overall the extremely short timespan of the project made it necessary to keep T1.2, T1.4 and T1.5 fairly short. Parts of the deliverables have been extended into WP2.

With the notice of the restructuring of the overall project and its consortium and the missing clarity of funding, Berlin University of the Arts decided to suspend all activities regarding the project. In this final report you will find the work conducted up to that point. Some of the later workpackages have been started (such as the preparation of the open source release and the implementation). We prepared a basic handbook as well as an online documentation on Github, which provides users with a description on how to set up a letterbox.

Description of planned activity for next reporting period

WP2, 3 and 4

WP2: Development

T2.1: System Design and Information Architecture: The system requirements (M1), T1.1 and T1.4 will provide information and the basis for this deliverable. A system architecture will be designed accordingly and will provide the framework for the following deliverables.

T2.2: Hardware development: The prototypes initially sketched out in D1.4 are developed further in this deliverable, they include design and first implementation

M.2: Testing and evaluation: This includes a stakeholder workshop with the SCC. There will be preliminary evaluation and bugfixing as well as improvements of the user interface.

T2.3: API development: During this phase the API will be developed and implemented. this phase runs parallel to design and evaluation activities of M.2.

The workpackages below have not been finished due to the suspension of the project.

WP3: Implementation

T3.1: Betatest 1 and Bugfixing: This will comprise a 3 week betatest including bugfixing and design

adaptions

T3.2: Betatest 2 and Bugfixing: This will comprise a second 3 week betatest including bugfixing and design adaptions

M4: Documentation Betatest

WP4 Documentation and Deployment

T4.1: Preparation of the open source release. Creation of a release document, consultation of copyright lawyer

T4.2: Partnering with initiatives in order to deploy the prototypes

T4.3: Final documentation and release. There will be a final report and documentation as well as the official release of the Hybrid Letterbox Open Source Kit

M5: Documentation

(See project gantt-chart)

5.3.4 Sustainability of the solution

The final prototype has not been fully developed, tested and implemented in the different environments, therefore no outline of the next steps can be given. After the last test we will release the Hybrid Letterbox Network as an open source tool for networking and sharing. The release will allow adaption, enhancements and modifications to fit different contexts.

As the Hybrid Letterbox is released open source the following features have yet to be provided:

- construction guidance with step-by-step instructions for building the Letterbox hardware and software instructions
- possibility to request consultancy for installation and utilization (through our small company)
- possibility to order a Letterbox-Kit through the small company.

We aim at releasing a prototype that is affordable also for small scale initiatives, neighborhoods and individuals. The dissemination includes a mix of various elements, with a solid distribution and communication plan. Through our own research and active participation in interdisciplinary conferences and professional discourses we will further explore the possible range and scalability of future applications.

The documentation and plans of the final prototype are in part available online on github, published open source. The basic framework for developing the Hybrid Letterbox further is available. By re-designing parts of the prototype, it has been made more reliable and is ready for long-term testing. The API and Webinterface allow others to use the Hybrid Letterbox system and to adapt it to their context.

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We have started a small company which allows us to commercialize the outcome as a service. These plans are still in their infancy and we will consult business specialists on this in the future. We are currently looking into federal and international start-up funding such as the EU Start-up grants. Furthermore we have consulted a university based start-up consultancy within the Technical University Berlin.

We have calculated the basic costs of producing a letterbox as well as providing it as a service for events, workshops or other projects. So far, we have been approached several times for lending out a letterbox for events such as the open day of federal ministries or the opening of the futurium in Berlin, or for projects such as the Mazi project (2016-2018) is supported by the ICT CAPS initiative of Horizon2020 ,or project "Mit-Mach-Stadt Brandis" and "Vernetzte Nachbarschaften NRW", all three projects of the Berlin University of the Arts.

5.3.5 Risks

High Risk: Uncertainty of funding/ overall project status. The project has failed insofar as the funding was halted and Berlin University of the Arts was forced to suspend all activities. More than half of the projects WPs could not be finished.

5.3.6 User-based evaluation of the concept

Due to the late start of the project (in early January), there have not been any concept evaluations. The next date for concept evaluation involving stakeholder groups is an event run by the SCC on March 19, 2016. There has been an initial stakeholder workshop which brought insights regarding the extent of use and several alternative user scenarios which were brought forth by the stakeholders.

This initial workshop consisted of the five core members of the SCC and 2 members of the UdK who guided the workshop. In this workshop we planned the use of the Hybrid Letterbox in a local grocery store which is in the center of the Fischerinsel and frequented by many inhabitants of the Island. In the workshop we collected all ideas regarding the use of the Hybrid Letterbox on a large paper wall, clustering them according to importance. The SCC members then decided on the most relevant topics and devices a mode in which the Letterbox would be used. They wanted it to be accompanied by a series of informational posters which were put up 2 weeks before the event in order create awareness on the Fischerinsel. After collection and analysis of results, the results were posted again on large A2 prints all across the Fischerinsel.



Gathering insights on the Fischerinsel

The topic that the SCC wanted to address with this was the missing greenery, shabby pathways and the planned construction of a new highrise building. The answers were collected in the letterbox and the passers by were drawn into a discussion regarding the topics, making them aware of the problems and pointing them towards future gatherings of interested parties who want to address the problems.



Evaluation of the gathered insights on March 19, 2016

On the evaluation event, the turnout was unfortunately very slim, even though it was communicated through all channels, both locally and digitally. On three posters the major answers were clustered

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and presented to the participants. One other poster pointed towards an event where concerned citizens could meet and discuss further steps.

Below, the major answers concerning the three questions "Are there current concerns on the Fischerinsel?", "How do we want to create floral oases?" and "how do you imagine a lively Fischerinsel?" are shown. These were the basis for analysis. Unfortunately, due to the delay of the project, the process has been halted after this analysis.

Gibt es aktuelle Sorgen auf der Fischerinsel?	Wie Wollen wir Blumenoasen schaffen?	Wie stellen sie Sich eine belebte Fischerinsel vor?
<p>Die Bebauung auf der Fischerinsel (Mühlendamm) sollte auf keinen Fall ein Hochhaus sein! Ohne die Mitbewohner zu befragen, wurden über "Nacht+Nebel" die Bäume gefällt, Sträucher vernichtet. Eine Baugenehmigung ist noch nicht erteilt; nur weil die WBH das Geld hat, will sie ohne Beteiligung der Bewohner der "Insel" einfach bauen. Das ist die sogenannte "Demokratie". Der Senat ist offensichtlich auch überfragt.</p>	<p>Kann man auch an Fassaden schaffen (Blauregen)</p>	<p>Bürger auch Ausserhalb der Arbeitszeiten ansprechen und beteiligen</p>
<p>Mehr Grün fürs Stadtklima</p>		<p>Schleusenkanal mit sauberen Wasser - aber keine Mückenzucht.</p>
<p>Gerüte und Bebauung</p>	<p>z.B. Blumenkästen entlang des Spresskanals (Kästen am Geländer oder Boden). Eimer mit Seilen zum Giessen</p>	<p>Schön wäre eine Seniorengruppe, die gemeinsam etwas unternimmt (Wandern, Kaffeetrinken, reden oder einfach bummeln; abends vielleicht Karten spielen oder im Notfall auch gegenseitig helfen)</p>
<p>Kein neues Hochhaus</p>	<p>Die Gartenfreunde auf der Fischerinsel werden hier bestimmt mithelfen, versuchen</p>	<p>Bitte melden [?] ! Wir brauchen Anwohner, die mitmachen !!! (Giessen,</p>

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	die jungen Bewohner mit einzubeziehen	[?]pflanzen, etc)
Hundehinterlassenschaften werden nicht entsorgt!	Blumenoasen sind toll, erfordern aber kontinuierliche Pflege (*Bürgerpatenschaften können das). Aufwertung der Grünstreifen und Neupflanzung von Bäumen können schon viel.	Mit viel grün - Bäume, Sträucher, Blumenrabatten. Bänke, Sitzinseln besonders für ältere und gehbehinderte Bewohner. Treffpunkte für Gespräche und auch mal ein Kartenspiel u.s.w.
Unebene Wege und ungepflegte Grünflächen	Wechselnde Bepflanzungen nach Jahreszeit. U.U. mit Patenschaften durch Anwohner. Die Blumenbeete müssten natürlich zunächst angelegt werden.	Mit attraktiven Treffpunkten für Jung und Alt, die zum Verweilen und zum Gespräch anregen. Auch für Kinder sollte etwas geboten werden.
Aufstockung des Gebäudes vor der Fischerinsel 1	Grüne Rasenflächen sind ja sehr schön + vor allem mit Mäh-Technik "pflegeleicht". Grün ist in der Tat sehr schön. Aber man sollte bei den "Umweltsorgen" endlich mal mit dem Gejammer (Bedrohte Schmetterlinge, Hummeln, Bienen, etc) aufhören. Bei allen Grünflächen ein 2m breiter Streifen mit Blumen-Mischung-Ansaat, eben für die genannten Bedrohten.	öffentliche Toiletten fehlen entlang der Touristenwege, Dampferanlegestellen, Hist. Hafen.
Gerüste am WBM-Gebäude	Entlang der Wege, Ufer die allerdings von Stolperfallen befreit werden müssten. Hinter / Vor FI 4/5 gibt es leere Beete.	- Mehr kleinere Geschäfte, wie Fleischerei, Blumenladen, Drogerie (wie DM oder Roßmann) Schuhgeschäft o.a. mehr. - Mehr Parkplätze für die Bewohner der Fischerinsel (bezahlbar) - KITA - Einrichtung - gesellschaftliches Zentrum, wie z.B. "Das Kreativhaus"

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Defekte Bänke und kaputte Wege	Die bisherige Parkanlagenpflege ist nicht ausreichend. Geschützte Grünanlagen müssen besser in Ordnung gehalten werden. Früher haben die Bürger selbst Hand angelegt und auf Ordnung geachtet, fehlende Kontrollen! Deshlab die Bepflanzung durchführen, damit auch auf der Fischerinsel wiueder eine "grüne Oase" zu finden ist.	1000 Sonnenblumen am Ufer der Friederichsgracht
Wenn schon gebaut wird, sollte der Innenhof mit hoher Aufenthaltsqualität angelegt werden. z.B. Wiedererrichtung der Stele, die auf der FI stand.		
Ja, die vor uns stehenden Baumaßnahmen und die dazugehörige konkrete Information.		
<ul style="list-style-type: none"> - Riesen - dauerhafte - Pfützen am Uferweg Spreekanal - Taubenfütterer - Behindertengerechte Zu+Abgänge an Gehwegen, vor allem zum Uferweg im Bereich der FI 9 + 10 		
Vermüllung... wilde Feiern auf der Inselbrücke mit jeder Menge Scherben!		

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Final event with the Seniors Computer Club



Projection of Letterbox Cards at Haus der Zukunft Berlin



Setup for the event at Haus der Zukunft

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Event at the Federal ministry open days (Bundesministerium für Familie, Senioren, Frauen und Jugend)



Kick-Off Event Mit-Mach-Stadt Brandis



Field Test in the city of Brandis, Saxony

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The short events shown above each ran one or two days, testing the status quo of the Hybrid Letterbox Prototype. As a result of conversations with the ones using the Letterbox during these events, a short How-To document was created, illustrating the most important features and settings of the Letterbox (see the Letterbox-How-To.pdf)

5.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 8.

Table 8: Snapshot of project "Hybrid Letterbox"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
A device that mimics the very traditional communications medium of a letterbox, with a digitization-module inside, which is used to photograph postcards that are thrown inside using visual markers to determine the area where the content is written and capture it with a camera, which then saves the image on a local server so they can be distributed to digital platforms or the Hybrid Letterbox website.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Specified product requirements in a User Requirement Document (URD) and a User Experience Design (UED) ○ Designed the software architecture and components ○ Created content with sexual health specialists. ○ Completed development of all of the front-end and back-end parts of the prototype solution. ○ Tested the prototype with 48 users (32 final users and 16 specialists) with better than expected results ○ Developed a full business plan, including revenue model, financial projections, competitor analysis and USP definition, marketing strategy and launch materials. <p>The project successfully delivered 11 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Hybrid Letterbox is included on Design Research Lab's website: http://www.design-research-lab.org/projects/hybrid-letterbox-connecting-digital-strangers/ and http://www.design-research-lab.org/projects/hybrid-letter-box/ ○ Dedicated social media activity: Facebook (2,482 likes) and Twitter (93 followers). ○ Participated in events including Design Research Society Conference 2016, Transmediale 2016 and CEBIT 2016 ○ Participated at NetFutures, including presenting in CAPS Concertation Meeting as part of CHEST's session, which was advertised on the CHEST website: http://www.chest-project.eu/caps-netfutures-chest-presentations/ ○ Creation of a "Letterbox how to" PDF explaining how to use the Letterbox. ○ 196 interactions in the project's section on the CHEST Community Forum.

Table 9 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (civic and political participation) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 9: Mandatory KPIs for Hybrid Letterbox

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	2	5	4
		Number of users involved in co-design process	10	25	20
		Ratio between men and women involved	50/50	50/50	50/50

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		Ratio between young, adult and old people involved	0/10/90	20/30/50	5/20/75
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.) ¹⁰	4	5	2
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1	5	2
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	1	5	4
		Number of comments / replies on project blog entries on CHEST website	0		1
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	2900	3500	4500
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	600	1100	800

¹⁰ To what extent do you agree with the following sentence: “Our project reduces information asymmetries experienced by the users”. Please attribute a value from 1 to 6 where 1 is “totally disagree” and 6 is “totally agree”

6 Jourvie¹¹

An app, created to support people suffering from eating disorders like anorexia or bulimia and make their therapy easier and more efficient. The solution provides them with the tools they need for a successful recovery, such as a food journal, coping tactics, motivation and support from peers. 'Jourvie' also help them to communicate more efficiently with their therapist.

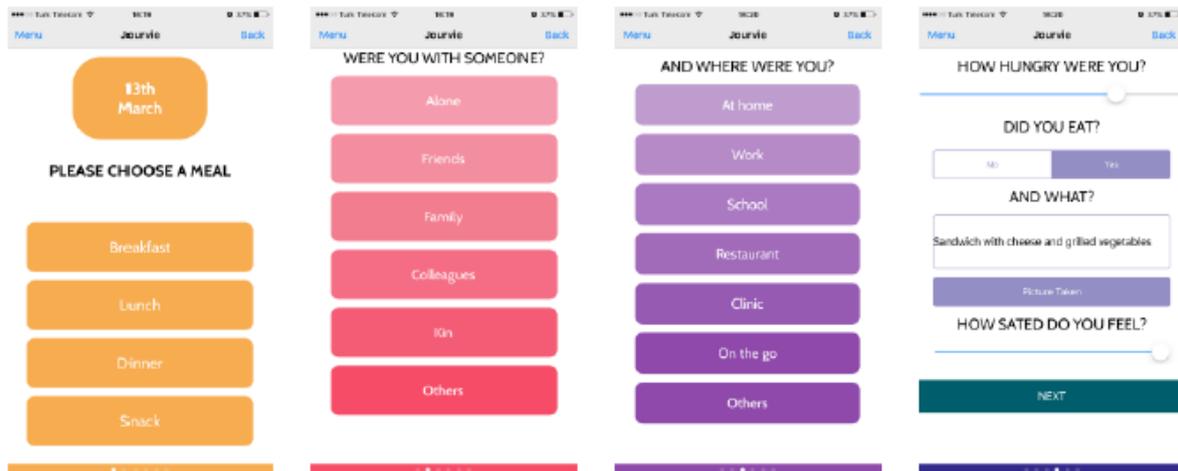


Figure 6: Screenshot of the Jourvie app (food diary)

6.1 The societal problem

6.1.1 Description of the problem

Eating disorders

Eating disorders (ED) are behavioral disorders, characterized by frequent mental and emotional involvements to food (Fairburn 2012: 9ff., World Health Organization 1992). EDs affect food intake or its refusal and are associated with psychosocial disorders and healthy body image issues. The most popular forms of eating disorders include the refusal to eat (Anorexia nervosa), compulsive eating (overeating) or binge eating followed by purging (Bulimia nervosa).

Eating disorders cause collateral physical damages - i.e. internal organs can be damaged, a high risk of cardiac arrhythmia, and the electrolyte and hormonal balance are maladjusted (Zeeck 2008: p. 120f.).

Course of the outpatient therapy

The regular therapy lasts at least two years and ED can even accompany the person for the rest of his/her life. The course of therapy usually consists of weekly meetings with a therapist, as well as regular doctor visits and self-help group meetings. A core element of therapy is the self-observation and self-reflection done through different protocols.

The patients are asked to fill out food journals and complete a behavioral analysis on paper ideally after every meal. They write down what, when and where they consumed. It is important to note down the exact feelings they had, while and after eating, (e.g. guilt, disgust or self-hate), and if any important occurrences have influenced the food intake, e.g. fight with a friend or stress at school. Another important piece of information is if the patient had the urge to binge, vomit or take laxatives and if this actually happened.

The information is analyzed together with the therapist and is of high importance for the progress and success of the therapy. Certain behavior patterns can be discovered and targeted through therapy and the therapist can optimize the sessions based on patients' individual needs.

¹¹ Chapter contributors: Mathias Becker, Ekaterina Karabasheva, Verena Porsch

Problems and challenges in the therapy

Statistics have proven that only a minority of patients fill out their protocols (Baumer/Wunderer 2009; Burke et al., 2005). That has several reasons:

- big and bulky paper-based charts with a lot of fields and boxes; can easily be forgotten at home.
- indiscreet and very stigmatizing character; makes it a big hurdle for patients. Protocols are not directly filled out after a meal, much later, which leads to inaccuracies in the evaluation.
- Sinking motivation during treatment process. The therapy sessions are offered once a week or even every two weeks. Hence, it is difficult to stay motivated and fill out food diaries. Especially in this time optimal support for patients is needed.

6.1.2 Scale of the problem

Prevalence of eating disorders

- Prevalence: Overall, 21.9 percent of young people between 11 to 17 years show symptoms of eating disorders (Robert Koch Institute, 2011: p. 38). The official figures do not account for underreporting in reality, as people are often ashamed of the illness and therefore don't seek counseling or therapy.
- Patient groups: mostly female adolescents, but they increasingly also adults and men (vgl. Hungrig-Online e.V. 2002: 1, Nolte 2013: 9).
- Prevalence in Germany: around 2 million people are suffering from various eating disorders (German Institute for Nutritional Medicine and Dietetics (DIET)).
- Prevalence in Europe: around 17 million people affected by eating disorders (Smink et al. 2012, Swanson et al. 2011).
- Prevalence worldwide: the number for people with eating disorders worldwide is 70 million (Jcobi et al. 2013, Makino et al. 2004).
- Mortality: 17%, (highest death rate among mental illnesses (Medical Association of Lower Saxony)).
- Success in therapy: 50% (Bauer/Okon/Merman 2008: p. 208; Shapiro/Bulik 2008: p. 153).

The number of people affected by an eating disorder is continuously increasing.

Access to **treatment places** is limited by financial requirements in some countries; long waiting times for therapies are normal in almost all European countries. Further, there is a **limited amount of specialized therapists**. In recent years the focus switched to **low-threshold therapeutic approaches**, such as self-help (books, CDs or apps) and telephone or online-based group therapies. More and more **modern technologies** are used in the context, because they offer many advantages: economic efficiency, interactive design options and coverage even in regions where medical and therapeutic care is not fully accessible. Such digital solutions can be used as a companion and to bridge the waiting times of patients' therapies.

Social consequences and costs

Eating disorders cause very high direct and indirect costs. In Germany alone the **cost of treatment and cost of productivity-loss are estimated to be 195 million € per year** for anorexia and 124 million € for bulimia (Suchtmedizinische Reihe 2013). That shows that eating disorders present highly expensive medical treatments and there is need for more cost-effective treatment options.

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The indirect costs of eating disorders shall also be taken into consideration when observing the problem. The burden of mental health disorders on health systems has long been underestimated. The European Mental Health Agenda of the European Union (EU) has recognized the prevalence and impact of mental health disorders (including eating disorders) at workplaces in EU countries (Harnois/Gabriel 2000).

6.1.3 Previous approaches to solving the problem

Personal advice: Counseling centers, organizations specialized on eating disorders, general doctors or friends and family can help those affected with finding initial contact. There they can determine the severity of the disorder and support them with the right treatment. Trained staff for recognizing eating disorders is difficult to find and not available especially in smaller cities. The threshold for specialized therapists is very high.

Telephone and online communications: Consultation via telephone as well as online communication plays an important role, since it allows for an anonymous and low-threshold exchange. This is very important especially for initial contact. The online consulting services for eating disorders, however, are limited and a lot of professional centers don't have the capacity to provide such services.

Websites: The affected people don't contact counseling centers always directly. Often they first seek a neutral source of information in the internet. Information websites of the federal health bureau for example or the exchange with other patients in various forums play a major role, be it on the websites of counseling centers or even in private groups on social networks like Facebook or WhatsApp initiated by individuals. Unfortunately, often this communication is not being monitored, which is why sometimes users with the intention to upset others or "trigger" them into bad behaviors can initiate upsetting and contra productive conversations.

Online-based research projects: Online-based therapy approaches are also being evaluated in studies by research institutes. The majority of these studies are limited to a particular medical condition and are not therefore suitable for a wide audience. Other disadvantages of these therapies are in the temporal limitation of the research projects, after which the patients cannot rely on the offering anymore.

Apps: There are two US-based initiatives, which developed similar solutions like Jourvie. Other applications cover the information aspect or provide tests for awareness, but a lot of them lack a scientific background and validation.

In contrast to the existing offerings, we aim to provide a mix of the classical therapy methods and modern technology in an attractive design. Jourvie combines initial contact as well as motivation and adherence during the course of the treatment. This approach does not yet exist in this form in Europe.

Another difference lies in the nature of the communication. Unlike many other offerings available Jourvie does not communicate with a wagging finger or moralizingly, but gives the users the feeling of being understood, precisely because the project was developed by former patients and is very user-oriented.

6.2 Implementation of organizational structure

6.2.1 Maturity of the project

Pilot Phase:

Jourvie gUG is developing and testing a version of its iOS-application to support patients with eating disorders during therapy. We have conducted user research and gathered feedback on a very early stage of the prototype, and launched the application at the beginning of September.

6.2.2 Organizational structure

Jourvie is a non-profit entrepreneurial society (Jourvie gemeinnützige UG (haftungsbeschränkt)), founded and based in Berlin, Germany. The core team covers the following fields of activities:

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- concept development,
- software development,
- design,
- public relations
- community building
- research and development.

With the help of pro-bono partners, freelancers and volunteers, we cover the areas of finance and law.

The project described here is executed by the core team and described in 1.3. “key personnel”.

The work packages (WP) are delegated by Ekaterina Karabasheva who is also in charge of the WP Concept Development as well as Direct User Engagement and Stakeholder Engagement (WP1 and WP4). Georgi Alipiev is in charge of the WP Software Development (WP2); Verena Porsch is managing the WP Public Relations and Community Communication (WP3) as well as the WP Evaluation and Growth (WP5). Marie Brombach is in charge of research and development at Jourvie and co-managing WP5 Evaluation and Growth.

6.2.3 Key personnel

Ekaterina Karabasheva is the head of Jourvie. She developed the concept for the application and has a background in communication science, digital technologies as well as PR and marketing. Ms. Karabasheva studied Media and Communication Studies (B.A.) at the University of Trier and Zurich and completed her studies in Social and Business Communication (M.A.) at the University of Arts in Berlin in 2013. Her Master thesis was part of the development of Jourvie.

Her professional experience reaches from content management, over online marketing and social media to social start-up organisations (e.g. Youth Press Germany, Social Heroes, etc.). During her work on Wheelmap (an online platform helping for people in a wheelchair to find easy access to elevators etc. in cities) she became acquainted with software project management skills. She has experience in the field of Digital Health and profound project management with industry certified methodologies and principles. There, she was able to get in contact with valuable stakeholders in the scientific field and the digital health scene.

Her motivation for Jourvie arises from personal experience with an eating disorder and the vision that she can turn this experience and her knowledge about the challenges as a patient into positive value for other patients.

At Jourvie Ms Karabasheva oversees the whole project and takes care of the scientific cooperations and presents Jourvie in front of different stakeholders. For her commitment at Jourvie she was awarded a scholarship from the "Engagement mit Perspektive" program of Ashoka Germany and SAP.

Verena Porsch joined Jourvie in 2014. Previously she has studied Global Health (MSc.) and Social Anthropology (B.Sc.). Her international orientation, her knowledge about eHealth products and her practical experience with mHealth help her in developing Jourvie’s PR-strategies. Mrs Porsch’s wish was to work in the non-governmental sector and with social projects such as Jourvie. Therefore she completed an EU-fundraising training at emcra GmbH. Hence, she is also taking care of fundraising issues.

Her personal motivation to work for Jourvie is her desire to pass on healthier body images to young women. She believes that complexes about physiques are a major trigger for mental health problems such as depressions, eating disorders or antisocial behaviors: “Seeing an eHealth product combined with a supportive tool for people with eating disorders makes me happy.”-Verena Porsch

Georgi Alipiev is responsible for all technology issues surrounding Jourvie. Mr Alipiev owns a Master’s degree in Computer Science and more than five years of experience with IT project management. He

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also worked in mobile and web development. Mr Alipiev worked for DHL and Hewlett-Packard and managed big IT projects. For Jourvie he is developing the iOS-software and takes care of all technical issues, as well as the data privacy and protection within the app.

His motivation to work for Jourvie is to tackle a cause that is rarely spoken of, but is a big everyday challenge for the affected people. Therefore he is happy to solve treatment issues with the technical solution such as Jourvie is providing it.

Marie Brombach is a studied Communication Scientist (B.A.). She is currently pursuing a Master's degree in health care management with a strong interest in eHealth. At Jourvie, she is responsible for research and development and conducting a thorough search into current trends in digital health and digital solutions supporting the therapy in the field of mental health. Furthermore she developed a survey on the acceptance of utilizing a mobile application as a supporting tool for the therapy of eating disorders among German psychological psychotherapists.

Her motivation to work on the project arises from her personal interest in the topic of digital health and the intersection with psychology and healthcare management. Resulting from the thorough research, strategies can be worked out to encourage the reimbursement of the costs of digital tools through the statutory health insurances.

The dedicated team developed the concept of the project and shares the vision to create a product that provides added value for both: those affected and those involved in the treatment such as physicians and therapists.

6.2.4 Partnerships, cooperations, and networks

Health funds

Jourvie has developed a new partnership with one of the leading statutory health funds of Germany, AOK Nordost. We have signed a contractual agreement in December 2015. The goal of the collaboration is to spread the word about Jourvie among the AOK Nordost insured patients and to get in contact with therapists, who will test our application in their daily work. In April AOK Nordost organized a special "Eating Disorders Expert Round" with therapists and representatives of both counseling centers and general practitioners' associations. Discussions were held to address the challenges in the eating disorders field in Germany and how these can be tackled with technology. The second expert meeting was held in September. In April and May Jourvie was featured in an AOK owned TV format, in which the health fund presented the app in an exclusive report. Further dissemination activities as well as collaboration projects are planned for the last quarter of 2016.

Furthermore, we were selected by another big statutory health fund – the Techniker Krankenkasse - to present at their Innovation conference in September.

In the last months we also conducted talks with other health funds and clinics in order to discover interfaces and common goals which can become the base of a cooperation project. Such negotiations take time, but we are continuing having conversations in the future. By staying in contact to insurance companies, we can discuss needs of the German health system and further e-health developments.

Associations

In September 2015 Jourvie became a member of the Federal (Germany) Association of Eating Disorders e.V. which offers a platform for healthcare professionals, clinics and hospitals. We participated in the annual meetings for 2015 and 2016 and had the chance to present Jourvie in a 15-minute presentation slot. We received great feedback. Some of the members in the association - especially counselling centers - said that they already knew Jourvie and recommend it to their patients. We were also approached by multiple interested clinics.

Clinics

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Our long lasting partnership with the Department of Psychiatry, Psychosomatics and Psychotherapy of Children and Adolescents at the Charité Universitätsmedizin Berlin now tackles a clinical trial (RCT).

Together with the Eating Disorders department of the University Medicine Mainz, an adjusted version of the Jourvie-app and the Charité Berlin we are measuring if Jourvie can support patients with ED to bypass waiting times for a place on treatment programs. Staying in touch with clinics and hospital departments, we are in close contact with patients and potential users.

Clinic "Wysshölzli" in Herzogenbuchsee, Switzerland (potential partnership) - after meeting at the Eating Disorders Congress in Alpbach, Austria, in 2014, we have remained in contact with the Clinic which works with women with addictions and eating disorders. Due to the personal shortage at the clinic there was a longer break in the project planning, which started again in September. The goal of the collaboration is to start a small pilot study in the clinic and the possibility of such shall be further discussed in 2016.

Other partnerships

ANAD e.V. from Munich, Germany (potential partnership) - a supporter, working as well in the online sector of eating disorders. By mentioning each other on our respective Facebook pages and websites, we help to increase our communities. ANAD has also housed sharings for people with eating disorders.

Partnership with the Law Firm White and Case - the team of White and Case in Germany has been a pro bono partner for our legal issues. The cooperation started in 2014 and has supported us in different legal questions, such as data privacy questions in terms of the app, partnership contracts with other institutions etc.

Cooperation and exchange with individual therapists - we have met a lot of therapists during our participation in conferences who have confirmed their support and their willingness to implement the software in their work and also recommend it to their patients.

Community

Through our work and engagement in the field we have built an engaged Jourvie-community - not only of those affected, but also their relatives - both in Germany and in other European countries. Cooperations with influencers in the field of eating disorders and e-health (such as bloggers, speakers, key-persons) are also relevant because they will spread the word for us and establish contacts with potential Jourvie-users.

(Inter)national conferences

We have presented the idea on academical level such as on conferences in Europe (Austria, Bulgaria, Germany, Italy). This provided us with an evidence of the need for a solution like Jourvie as well as the willingness of the users to implement it in their treatment process.

Further networks and supporters:

- Google.org via "Google Impact Challenge"
- BMW Foundation Herbert Quandt, Berlin
- Bayer Cares Foundation, Leverkusen
- Program "Engagement mit Perspektive" of Ashoka Germany and SAP
- Social Impact Lab Berlin, an incubator for Social Enterprises, Berlin
- Mondlicht Berlin - Therapeutic residential communities for girls and young women with eating disorders

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- Prof. Klaus Gasteier - Professor for new and interactive media at the University of the Arts, Berlin.
- Melanie Haßlinger, Senior Project Consultant, Global Health Management, SAP AG
- Prof. Volker Amelung, Medical University Hannover
- Impact Hub Berlin, a coworking and co-creating space for social innovators

6.3 Implementation of the solution approach

6.3.1 Solution approach

Jourvie's goal is to support people with eating disorders during their therapy. We want to help patients to recover faster and easier. Jourvie solves the problem of tedious paper protocols, lack of support and sinking motivation. Through a smartphone app we provide patients with tools they need during recovery: a food journal, coping tactics, motivation and support through peers. We also help them to communicate more efficiently with their therapist.

To do this we adopt the established therapy methods (such as the food diaries) and offer them in a new, digital, comfortable way, in order to help young girls and boys to find their way back to a healthy life and body image.

Functions of the app

As discussed before the content and functions of the app are based on classical therapy methods for patients with eating disorders. We have developed Jourvie together with the help of the Department of Child and Adolescent Psychiatry, Psychosomatic Medicine and Psychotherapy of the Charité Universitätsmedizin Berlin who provided scientific guidance during the concept work. We also have provided a new and appealing design for the program.

The app provides following features:

- (1) a digital food diary with an archive and data export function,
- (2) a reminder to fill out the food diaries, with the possibility to write down own reminder text
- (3) coping strategies for dealing with difficult situations as well as
- (4) additional information and feedback functionality.

It will make it easier for patients to accomplish the tasks they receive from the therapists, e.g. to write down their nutritional intake, as well as their feelings, or coping tactics, which help them in challenging moments. The goal is to accompany the patients to complete their therapy in a more efficient and pleasant way and thus, recover faster.

The digital form for therapeutic logging of patients' eating behaviors is a suitable solution, because users can fill in logs easily and discreetly via smartphone. Patients no longer have to reflect elements of their therapy on paper, but can enter it discretely in the app which also motivates them to continue their treatment. The users can fill out the journals while they're on the bus, when they have a couple of minutes directly after lunch or by typing in their mobile phone very quickly during a dinner at a restaurant.

Long-term objective

Our Vision: A world without eating disorders.

Our Mission and long-term objectives are:

- To carry the taboo topic of eating disorders to the public and create awareness for the problem.
- To create public trust for digital health solutions and their potential for treatment.

- To improve the quality of life of those affected.

6.3.2 Target groups

1. Direct target group - people affected by eating disorders

Our users are people affected by eating disorders. The vast majority is already seeking help from a therapist since they no longer deny the need for help and want to do something against their disease. Most of our users are female, young and tech-savvy. We communicate on eye-level with our target group through different channels:

- Through our partners: our partners and supporters spread the word for us, so that more and more people know about Jourvie. Our professional partners of the field (Charité, University of Mainz, other therapists) recommend Jourvie to their patients.
- Press releases and networking: contacts to the field of (e)-health and eating disorders.
- Social media: platforms covering the topic of eating disorders (e.g. online forums) and existing channels of communication in large networks like Facebook (e.g. secret groups of those affected) give us the chance to reach out to potential users and make it present and discuss Jourvie's approach.
- Search Engine Optimization (SEO): Our website is optimized for search engines and the content is designed in a way that it can be found not only by people who are looking specifically for an app for support in eating disorder therapy, but also by people who are generally looking for help with eating disorders, unpractical food diaries or declining motivation.
- Availability in different languages: we provide the application in different European languages.

2. Indirect target group - relatives and friends of those affected

Relatives and friends of those affected play a very important role in the lives of patients and contribute a lot to the success of the therapy. Jourvie will have an indirect impact on this group, because they are interested in the successful healing of their family members. While it is sometimes difficult for the affected to overcome fear and shame, family members are very open and actively seek help. Therefore we integrate their feedback and opinion in the co-creation process of the application.

- Through our partners: through our partnership with the Charité, through the membership in the Federal Association of Eating Disorders as well as through the communication with single therapists we get in touch with families and friends of those who are affected.
- Press releases and contacts with established online portals in the field of health/eHealth and eating disorders.
- Social networks: networks covering the topic of eating disorders (e.g. online forums) and existing channels of communication on larger scales such as Facebook or Twitter; we make Jourvie present for everyone.

3. Indirect target group - therapists, doctors, medical experts

Another indirect target group is the medical staff (therapists, doctors, nutritionists and other medical experts who work with eating disorders patients). We are constantly exchanging ideas and possible

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collaboration plans with therapists in different countries, e.g. Germany, Austria, Netherlands, United Kingdom and Bulgaria.

- Through our partners: through partnerships such as those with Charité, the University Medicine or the health fund AOK we are able to get in touch and exchange with therapists and other medical professionals.
- Through scientific communities: Our learnings from the interaction with these target groups confirm their focus on the scientific aspect and evidence based innovation. Therefore, to reach this target group we have presented our concept at the different conferences, such as the Congress of the German Society on Eating Disorders (DGESS), Congress of the German Association for Psychiatry, Psychotherapy and Psychosomatics (DGPPN), the international Eating Disorders Congress in Alpbach, Austria, as well as the London Eating Disorders Conference 2015. We are also planning at least one scientific publication about Jourvie and the reception of the application among users which shall be published in a scientific journal in 2016.

6.3.3 Activities and work performed

WP1 “Concept Development for an iOS-app” was started in summer 2015 and was finished by delivering an outlined a version of Jourvie for iOS users. Due to our knowledge for the existing Android version of Jourvie, we were able to finish WP1 in July 2015.

WP2 “Software-Development for iOS-app”. As reported in our interim report, we have initiated the alpha and beta testing of our prototype in early 2016. Our first product feedback by test-users of the first version of the app came back in the end of April, and we have since implemented it in the software development. The user testing helped us a lot to identify key issues for the development. Minor errors had to be corrected in order for the app to be usable on different devices. Furthermore, we received feedback on the functionality and unclear design elements and did a couple of iteration rounds by improving the app more and more.

Currently the app has been submitted to the Apple AppStore for a final review and we are expecting to receive positive feedback and green light for the release in the coming days.

WP3 “Project Communication” - We continued our dissemination activities based on our strategy for social media work and press relations which had been created at the beginning of the project. During the second half of the funding we were able to achieve good dissemination activities in the German press landscape (see a list of our media appearances in Appendix 1). Throughout social media and other communication tools, we kept our community (users, partners, supporters) informed about the project progress. We have furthermore sent out newsletters to our users. Another item achieved is also the creation of an image film in German and English languages, which presents the challenges during the recovery of an eating disorders and presents the features and support that Jourvie offers. The creation of the movie used a collaborative approach as well and our users were involved in giving feedback about the animation techniques as well as the content of the movie.

WP4 “Direct User Engagement and Stakeholder Management” - Since this WP is closely related to the product development, it is an ongoing process during the project timeline. During the second reporting period, we participated in even more conferences than expected (see full list in Appendix 1), since often times we were invited to present at a conference after we have been mentioned in the media and have participated in a previous congress. This showed us once again how important it is to establish good a long lasting contacts with leaders in the field. After the establishment of new partnerships with the Health fund AOK Nordost and Google.org, we were able to deepen our collaboration with these new partners, and even engage in conversations about possible collaboration with other health funds (Techniker Krankenkasse, BKK) and other counseling centers.

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WP5 “Evaluation and growth” – Evaluation is an important topic for us not only in terms of the product evaluation from the users’ side, but also in terms of impact measurement. Therefore we concentrated on both topics during the second half of the project. In terms of the product, we continued conducting user and expert interviews focusing on the app and its benefits. After delivering the beta-version, we collected feedback also via an online questionnaire. We will deliver the last results from the users’ evaluation of the official app in September.

Furthermore, we spent time on reviewing our impact on the involved project beneficiaries and discussed the output, outcome and impact of our activities. During WP5 we also explored our next steps for Jourvie and created a plan for the further plan in the next two years, considering our goals, the financial requirements as well as the required roles in the team and needed personnel.

Work Package Number: WP1 - concept development for an iOS app
Actual Starting month: June 2015 Predicted / Actual End month: July 2015
Work Package Objectives: Concept of the iOS-app
Description of work this period: Main achievements: - Outlining the idea (completed) - Final draft of textualization and design (completed) - Draft of the technological development (completed) Detailed description of work performed to reach the achievements listed above: We started with our first work package in June 2015 and outlined a first draft of Jourvie for iOS users. Due to our knowledge of the existing Android version of Jourvie, we were able to finish WP1 in July 2015. It helped us to realize the design and the textualization faster.
Summarise any problems you have encountered, and how they have been overcome. During the concept planning we voted against building the application in the main programming language at the time - Objective-C. It’s archaic syntax and structure creates a prohibitive environment, while we wanted to be able to continue the development and support of the application after the CHEST Program. At the same time, the other language for iOS Development (Swift) is not completely mature. We decided to use a framework for rapid application development (Appcelerator): - it is based on JavaScript - a vastly used language on the internet - it shortens the development time enabling us to fit within the programme timeframe - it enables us to continue the development and support of the application after the project
Description of planned activity for next reporting period This work package is completed.

Work Package Number: WP2: Software Development of iOS-app
Actual Starting month: October 2015 Predicted / Actual End month: September 2016
Work Package Objectives: Completion of Development and Public Release
Description of work this period: Main achievements:

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- Technology Selection (completed)
- Application development and Implementation (completed)
- Prototype-Testing (completed)
- Alpha-Testing Prototype (completed)
- Public Beta-Testing (completed)
- Enhancements, improvements and release in the App-store (completed)

Detailed description of work performed to reach the achievements listed above:

We started with WP2 in October. The prototype was developed and the first alpha-testing has been accomplished. The public beta version of the application was tested after being sent to Apple for review, as per the requirements of the iTunes store. There we conducted the public beta-testing and evaluation and made improvement and fixes. The improved version has been submitted to the Apple AppStore for a public release and we are awaiting for the review and release approval by Apple.

Summarise any problems you have encountered, and how they have been overcome

We have ambitiously planned the IT development and application roadmap, based on our existing experience from Android. However, as we found out it was necessary to increase our resources in the area in order to achieve our commitments, it was required to get a second developer involved. Another parameter to consider was the Apple release process which can take between 1 day and 2-3 weeks which makes it difficult to plan the release of the app as well as the communication activities around it.

Description of planned activity for next reporting period

- Bug fixes if necessary

Work Package Number:

WP3 (Public Relations and Community Communications)

Actual Starting month: October 2015

Predicted / Actual End month: September 2016

Work Package Objectives:

Delivering a perfect project communication

Description of work this period:

Main achievements:

- Development of PR Strategy for the launch (completed in November 2015)
- Development of promotional materials/image film (completed)
- Social media and users communication (completed)
- Release of a website targeting therapists (therapeuten.jourvie.com) (completed)
- Press release and media communication (completed)

Detailed description of work performed to reach the achievements listed above:

We started the work on this work package by developing a concept for the project duration, which helped us to constantly track and report the current progress of the project. Most important for us is the communication with our users, fans and press through social media channels, newsletters and press releases.

The beta-testing was communicated through different channels and with the help of partners. Furthermore, we created an image film, presenting the challenges during the eating disorders therapy and showcasing the ways Jourvie can help. The film is being widely disseminated with the release of the iOS app.

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As part of the preparation for the launch of the iOS app, we have prepared a newsletter to our users and followers, a press release to relevant media and we conducted an update on our PR mailing list, by adding not only journalists and media from Germany, but also from the whole world.

Related to the development and the launch of the app, this activities is an ongoing work package that we are being pursued until the end of the project.

Summarise any problems you have encountered, and how they have been overcome

The media is always changing. Therefore, we always have to review our project. This includes:

- Monitoring the media (Jourvie, e-Health sector, eating disorders, competitions)
- Responding to changes in media and social media channels
- Responding to changes in other work packages

We are happy to write that we were able to respond to any changes in a timely manner. We have created a blog where people who are currently suffering or have suffered from an eating disorder share their thoughts and experiences in a positive way. So far we were able to convince one person to write for our blog. The feedback showed that there were other solutions preferred by the users. We have actively approached these potential bloggers and asked them to write for Jourvie, but not many responded. Many of the people we spoke to already had their own blogs, and preferred to continue sharing their experiences there. Unfortunately we decided to freeze our blog for this section of the project, because its maintenance is very time consuming without any positive results. Further, we believe that it is difficult to gather critical mass to create a lively discussion, which is always an obstacle when trying to create a new community.

Description of planned activity for next reporting period

- Communication activities accompanying the launch of the app

Work Package Number:

WP4 - Direct User Engagement and Stakeholder Management

Actual Starting month: October 2015

Predicted / Actual End month: August 2016

Work Package Objectives:

Users' feedback and implementation

Description of work this period:

Main achievements:

- Workshop with users on their needs and wishes (completed in October 2015)
- Workshop with therapists on their needs and wishes (completed in September 2015)
- Conference: Congress in Alpbach (Austria), feedback from health professionals (completed in October 2015)
- Summit: Yearly summit of the Bundesfachverband Essstörungen, feedback from healthcare professionals (completed in November 2015)
- Conference: DGEES-Congress in Essen, feedback from health professionals (completed in March 2016)
- Fair: GKV-Infotag, feedback from insurance companies (completed February 2016)
- Conference: "eHealth for health funds", feedback from health fund professionals (completed in April 2016)
- Summit: Yearly summit of the Bundesfachverband Essstörungen, feedback from healthcare professionals (completed in June 2016)
- Expand partnerships with relevant organisations and key persons (completed)

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- Workshop with users and experts (completed in April 2016)
- Online surveys (completed in June 2015, March 2016, September 2016)

Detailed description of work performed to reach the achievements listed above:

We have conducted workshops with people with eating disorders, and have implemented their needs and wishes into the app. Furthermore, we have presented Jourvie at the 23rd International Conference on Eating Disorders 2015 and at the Summit of the Bundesfachverband Essstörungen, where we received feedback from therapists and other health professionals. Likewise, we collected feedback in a workshop with therapists. Another two conferences (GKV Info-Tag and Ideenküche für Krankenkassen) has provided us some insights into health insurances and their opinion about e-Health products. We continuously enlarge our network of relevant key persons in the e-Health sector (Prof. Volker Amelung), as well as engage with organisations working in the field of eating disorders (cooperations with AOK Nordost, ANAD e.V., Hospital Mainz, member of the federal association for eating disorders).

The WP4 objectives have been achieved.

Summarise any problems you have encountered, and how they have been overcome

Our collected feedback of therapists so far is diffuse. While our target group is tech-savvy and open for a solution such as Jourvie provides it, there are therapists who object to new technologies and their features. Some therapists are of the opinion that Jourvie creates more work for them instead of facilitating it. On the other hand, there have been many positive responses to the app. Therefore, we decided to adjust our communication strategy towards therapist and address their concerns in our communication. Therefore we created the website therapeuten.jourvie.com, where we answer the relevant questions they have.

Our communication with health funds has shown us that they are interested in the topic of eating disorders, but that it also takes a lot of time for them to make a decision. Therefore we have adjusted our time planning in terms of collaboration with health funds.

Additionally, we have discovered that they need specific information and indicators to base their decision on. With the help of our mentors, we have adjusted our strategic approach to health funds and provided them with the information they need in order to facilitate a faster decision-making process.

Description of planned activity for next reporting period

-

Work Package Number:

WP 5 - Evaluation and growth

Actual Starting month: January 2016

Predicted / Actual End month: September 2016

Work Package Objectives:

- Evaluation of project development

Description of work this period:

Main achievements:

- CHEST-interim report (completed)
- Users questionnaire for evaluation I (completed)
- Users questionnaire for evaluation II (in progress)

- Agreement on the next steps and project development steps (completed)
- Final CHEST report (completed)

Detailed description of work performed to reach the achievements listed above:

We sent out our first user questionnaire to the beta-testers in March and received valuable feedback, which we evaluated and integrated in the further development of the app. A new online questionnaire has been prepared which was sent to the users of the official app version after its launch.

During WP5 we also wrapped up knowledge gained from the process so far, explored the next steps for Jourvie and agreed on the milestones for the upcoming two years in the team.

Summarise any problems you have encountered, and how they have been overcome

Due to the delay of the software development, the deadline for our user questionnaire has been postponed too.

Description of planned activity for next reporting period

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

There are no management concerns at the moment.

Detail any publications, publicity or other dissemination activity.

Press:

- July 2016: [NDR-TV](#)
- July 2016: [Otto group blog post about digital health](#)
- June 2016: [Ikar Press](#)
- June 2016: Ekaterina Karabasheva nominated for [“25 women who make our world a better place”](#) by the Edition F magazine
- May 2016: “Startup of the week” in Tagesspiegel
- April: [Reset Health Blog](#)
- April 2016: [AOK TV](#)
- February 2016: LaViva magazine (print media); Healthcare Start-ups: [Jourvie erhält mindestens 250.000 € bei Google Impact Challenge Goingpublic.de](#),
- January 2016: Ekaterina Karabasheva nominated for the [“Emotion Award: Social values”](#) by the Emotion magazine
- January 2016: various print media, radio and TV in Bulgaria, such as [Money.bg](#), [National radio](#), [Nova TV](#), [BTV](#) and many others, [Forbes Poland](#)
- January 2016: [Virgin Unite Magazine: Why innovation in healthcare will come from the patients](#)
- January 2016 [Bayer Research Magazine: App Against Eating Disorders](#)
- December 2015 [Buzz Feed: 17 Amazing Apps For People Recovering From An Eating Disorder](#)
- September 2015 [HP Blog post](#)
- June 2015 [Mit einer App gegen Essstörungen](#) (Switzerland)
- June 2015 “Stunde der Frauen” (Brigitte, print-media)

- Jourvie mentioned in: [Social Start-ups](#), [Good Impact](#), [Libertarian Home](#), [Good Impact](#), [Vodafone](#)

Other public presence:

We supported the first worldwide “Eating Disorders Action Day” on June 2nd and became part of more than 300 organizations worldwide that spread 9 truths about eating disorders.

Others:

- September 2016: Presentation at the Innovationstag of the Techniker Krankenkasse
- September 2016: Panel discussion about eating disorders with the participation of Parliamentary Secretary Widmann-Mauz
- September 2016 : Presentation at the Forbes 30 under 30 Summit in Sofia, Bulgaria
- September 2016 : Presentation at the Hubperitivo event by the Impact Hub Berlin
- July 2016: Presentation at the event “IT for good”, organized by The Changer in Berlin
- July 2016: Presentation at an event by the VBKI (Association of Berlin Merchants and Industrialists)
- June 2016: Presentation in front of employees of Boehringer Ingelheim interested in Digital health
- June 2016: Presentation at the Bayer Alumni Day, Berlin
- June 2016: Selected as one of 6 startups to present in the startup track at the Hauptstadtkongress “Gesundheit und Medizin”, Berlin
- April 2016: Presentation at the Conference “Connected Health IT” in front of 4 health funds, Berlin
- April 2016: Presentation at the Conference “eHealth for insurance funds”
- March 2016: Presentation at the Congress of the German Society for Eating Disorders (04.03.2016)
- February 2016: Presentation of Jourvie at the GKV-Infotag (statutory health insurance) (11.02.2016)
- January 2016: Presentation of Jourvie at the Congress of the Federal Association Managed Care (20.01.2016)
- November 2015: Presentation of Jourvie at the Summit of the Federal Association of Eating Disorders (20.11.2015)
- October 2015: Presentation of Jourvie at Health Week Berlin (10.10.2015), Presentation of Jourvie at the Eating Disorders Conference in Alpbach, Austria (16.10.2015)
- Outreach on social media: See above

6.3.4 Sustainability of the solution

Further development

The further product development is going to be based on the current learnings from the work on the project and the exchange with users and other stakeholders, as well based on the profound scientific research about therapy approaches in the field of mental health.

Before developing more elaborated functions for the application, we tested the basic functionalities such as the food diary, the coping strategies and motivational tactics. During the project period and the development of the iOS application we gathered feedback and ideas for further desired functions. After delivering such proof of concept based on the positive users’ feedback, we will target other unfulfilled needs of the patients and the medical experts and develop solutions also for them.

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The feedback during the workshops, surveys and usability sessions with both patients and therapists has also shown a possible direction for further development in regard to a better system of communication between the two parties and better integration of the application in the therapy process. Such a solution be delivered through the development of a dashboard for the therapists who work directly with the patients and users. According to our current research and the generated insights in the communication with medical experts, they can benefit from a software, where they can get access to the data that the users have generated and react promptly to any abnormality in the behavior. In this case the therapy can be adjusted to the exact needs of the patient and thereby they can raise the possibility for success of the recovery. The different functionalities of such a support tool for the therapy will be developed with the continuous input of medical experts, both from our current partner organisations, but also from other institutions or individuals.

Sustainability

A crucial condition for the sustainability of the project is the scientific evaluation of the efficacy of the tool in the clinical practice and the positive outcome for the patients. Our learnings in the exchange with therapists and scientists have shown that such clinical evidence is of great importance for the project. The reason clinical evidence holds such significance is that clinics, therapists and insurance companies insist on receiving proof of such efficacy before being open for collaboration or partnership. On the other hand, it is very important for us as individuals to know that the solution we are working on contributes effectively to the quality of life of our target group.

To prepare for this we have started our first randomized clinical trial together with two partners - the University Medicine Mainz and soon also the Charité University Medicine Berlin. We are planning on conducting also further different pilot projects on a small scale, as well as further clinical trial with cooperation partners. Such undertakings will enable us to deliver the needed evidence of the tool, and adjust accordingly to the needs of patients and the medical community so we can be supplemental to treatment.

We are considering starting a process for a medical device certification. This is a step which was formulated in the risk assessment at the beginning of the project. Our experience from the exchange with scientific institutions and potential partners has shown us that some partners are more open for a collaboration and discussions if the product that we offer is certified as a medical device and has a quality label for data privacy. Therefore we will evaluate the importance of this topic for the sustainability of the project in the scientific field.

Financing

One of our ongoing tasks during the project development was the evaluation of the opportunities for sustainable financing which can arise after the development and launch of the iOS version of Jourvie. We have discussed and elaborated different options for a financing model for our organisation, such as financial support via scientific cooperation and collaboration in studies, donations from users and families as well as partnerships with clinics who will offer the app exclusively to their patients.

Another opportunity for financing, which we are evaluating based on our first collaboration with the statutory health fund AOK Nordost and on our contacts and exchange also with other insurances, is the reimbursement by health funds. Our experience so far shows that such source of funding is very time consuming because of a number of regulations and contractual frameworks in the healthcare system that make a collaboration difficult. Nevertheless we have gathered a lot of valuable insights on the regulatory requirements for the implementation of an innovative solution in the healthcare system in Germany, such as the selective contracts and the medical product law. Such learnings allow us to position our strategy in a specific direction to be able to enter into collaboration with these parties.

After a long application process beginning in October of 2015, we were selected as one of ten finalists in the Google Impact Challenge in Germany during February of 2016. Being enlisted as a

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finalist means that we will receive funding in the size of 250,000 Euros in the last quarter of 2016. This funding will allow us to continue our work on Jourvie in the next years.

6.3.5 Risks

Type of Risk	Risk	Possible Consequences/ Impact	Relevance	Probability	Total	Plans for offsetting consequences
Regulatory	<ul style="list-style-type: none"> Regulatory need for certification of the app as a medical device and hurdles with the certification 	<ul style="list-style-type: none"> Impossibility to implement the application as part of a treatment program or impossibility to enter a reimbursement program by insurance companies. 	M	M	M	<ul style="list-style-type: none"> Plan resources for a certification process if needed (So far no certification as a medical device required)
Society	<ul style="list-style-type: none"> Eating disorders remain a taboo topic in the society 	<ul style="list-style-type: none"> No public discussions on the topic Difficult to spread the word around Jourvie 	L	L	LL	<ul style="list-style-type: none"> Already opening the public dialogue by sharing the personal experience and addressing the underrepresented topic in the media Engage directly with institutions that are working on the topic
Stakeholder	<ul style="list-style-type: none"> Aversion of medical experts towards new technologies as a supporter of the treatment Conservative structures in the medical field with low readiness for innovative solutions 	<ul style="list-style-type: none"> Difficulties to implement the solution in the everyday work of the therapist Difficulties to reach patients through their therapists Difficulties to start partnerships with health funds and clinics 	M	H	HM	<ul style="list-style-type: none"> Already establishing scientific connections and planning trials to prove the efficacy of the application Work further with the medical society in order to research how a digital application can supplement and improve existing therapies
Regulatory	<ul style="list-style-type: none"> No clinical evidence to efficiency of digital health solutions Slow decision making process in institutions and health funds 	<ul style="list-style-type: none"> Low trust in digital health solutions altogether Conservative community Difficulties in entering the reimbursement system 	M	L	LM	<ul style="list-style-type: none"> Planning a randomized controlled trial with two clinical partners Adjusting the approach when communication with institutions and health funds
Technology	<ul style="list-style-type: none"> Technology opportunities and limitations 	<ul style="list-style-type: none"> Most current medical software is very vendor locked, limiting integration with existing systems 	L	H	LH	<ul style="list-style-type: none"> Explore possibilities to partner with established vendors. The necessity to integrate with existing systems will be dictated by the stakeholder.
Operational	<ul style="list-style-type: none"> Sudden temporary absence of a team member 	<ul style="list-style-type: none"> Critical deliverables not completed in time 	L	M	LM	<ul style="list-style-type: none"> Assign primary and backup to tasks

6.3.6 User-based evaluation of the concept

Focus group

In September 2015, October 2015 and April 2016 we conducted two workshops with a group of potential users (people with eating disorders), but also with therapists who work with patients as well as relatives to people with eating disorders. Altogether there were around 26 participants. The goal was to identify issues which may need to be tackled and discuss together how important these issues are in the everyday lives of the patients. The format was led by us and provided a multi-faceted perspective on the different topics and points of view. We were able to discuss with participants the challenges they see during therapy and the whole recovery process and also brainstorm ideas for solutions.

The benefit of this format was that we were able to hear various opinions from a range of people with different perspectives on eating disorders and the challenges occurring during the recovery process. While some of the views were widely differing, they were also relevant perspectives, because they provided a wholesome overview of the illness and the problems connected to it.

The downside of the method was the difficulty to discuss a variety of the arisen topics in a short time and to keep the focus of the group on the main topics.

Main problems we have identified were:

- patients feel shamed
- patients feel lonely

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- patients feel that they are alone with the problem
- patients feel overwhelmed by the self-reflection and self-observation that they have to carry out as part of therapy.

These points confirm that there is a need for tools supporting people with eating disorders in their daily life situations.

Interviews

In order to deepen the understanding of the challenges discussed in the focus groups, we conducted semi-structured interviews with both patients with eating disorders and therapists. This method was useful for a more detailed analysis of the topics already mentioned in the group discussion.

Our positive impression was that the interviewees trusted us and after a while were very open to discuss also very personal feelings and thoughts. They also enjoyed the feeling of having their feedback and input considered for the development of the app.

We are also aware that what is being told in interviews can sometimes differ from what people actually think and do in their everyday lives. Therefore this limitation of the interviews should be taken into consideration and be enriched by observation methods.

A problem we don't have a solution for yet, but which was mentioned in the interviews, is the need for a better communication system and more direct feedback on a regular basis between the therapist and the patient. This is a topic we will concentrate on in the future development of the concept and the application.

Usability tests

We have conducted individual usability tests with users of iOS devices, who tried out an early prototype of our iOS version. For this purpose we conducted one-on-one sessions with potential users who had never seen the app before. We used the observation and thinking-aloud methods by which the users shared their impressions and experience directly in front of us.

We tested different devices to see if there are differences between the different sizes and screens which might impact the usability and the user experience with the app. We used this method early in the design of the product, and used it throughout the lifecycle of the product in order to use the insights in a continuous improvement process. We find this a very useful method to gather insights about the context of the usage of the app and the difficulties which might arise in regard to this. We recognized a couple of small problems in the users' flow, and based on these observations adjusted the user interface of the app to assure a better experience.

Online Survey

We have conducted surveys both with therapists and patients. In the first quarter of the year we developed a survey aimed at gaining the insight of German psychological psychotherapists (specialized in mental health) regarding health apps for eating disorders. A questionnaire has been developed which covers areas such as possible functions and components for a health app related to and inspired by the therapy of eating disorders, as well as general computer expertise and basic personal data. A sample of 291 psychological psychotherapists resident in the region of northern Germany has been recruited. Questionnaires were sent out to the target group in February 2016, and the responses were evaluated in June 2016. We aim to have the final evaluation published in the fourth quarter of 2016. With the aid of these findings, we can evolve our app in order to strengthen its role for supporting the therapy of eating disorders.

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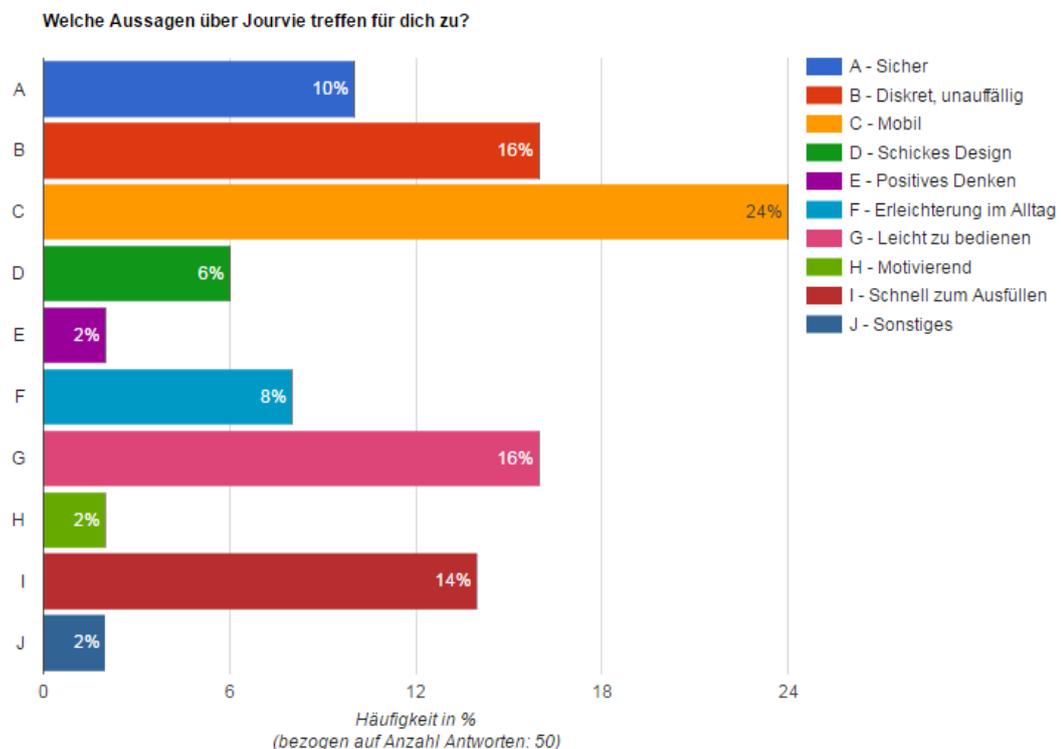
Furthermore, after we launched a closed-beta version for those users who registered on our website as willing to test the app, we sent them an online survey via email asking for feedback.

We have received promising results from the survey.

One of the indicators is how often the users use the app to fill out their food diaries. Compared to paper diaries, which the majority stated to fill out maximum once a week (35%) or never (41%), with Jourvie the users fill out diaries after each meal (17%), once or twice a day (17%) or several times a week (22%).

We also received helpful indications for steps in the app which weren't quite clear for the users, e.g. the tracking of urges such as the urge to purge or to take laxatives. These have been reviewed by our team and improved in the next iterations of the app.

The characteristics of Jourvie that the users value most, are the mobility (75%), the discretion (50%) and the ease of use (also 50%). Further results show that the users value that it is easy to fill out (44%) and secure (31%) (The sum exceeds 100%, because more than one option were possible.)



6.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 10.

Table 10: Snapshot of project "Jourvie"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To support people with eating disorders during their therapy by solving the problem of tedious	The project has accomplished its main goals and milestones: <ul style="list-style-type: none"> ○ Concept development for an iOS app including 	<ul style="list-style-type: none"> ○ Dedicated project website in German and English: http://www.jourvie.com/ and http://en.jourvie.com/ ○ Dedicated social media accounts: Facebook (765 likes) and Twitter (264 followers).

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<p>paper protocols, lack of support and sinking motivation, via a smartphone app providing patients with the tools they need during recovery (a food journal, coping tactics, motivation and support through peers) and to help them communicate more efficiently with their therapist.</p>	<p>textualization and design.</p> <ul style="list-style-type: none"> ○ Software development completed for the iOS app, including technology selection, app development and integration. ○ Prototype testing including alpha testing, public beta testing, enhancements and improvements ○ App submitted to the Apple store for public release. <p>The project successfully delivered 5 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Participated in 16 events (in 3 countries) including Health Week Berlin, Congress of the German Society for Eating Disorders, and a Bayer Alumni Day. ○ Featured in over 20 publications, including BuzzFeed, Virgin Unite magazine and the Good Impact blog/website. ○ Produced videos in German and English for YouTube: https://www.youtube.com/watch?v=CveYGpwSrCg and https://www.youtube.com/watch?v=ko_sNLjIWbE ○ News article about the project on the CHEST website: http://www.chest-project.eu/jourvie-the-app-for-eating-disorders-therapy/ ○ News articles about reaching the Google Impact Challenge finals on the CHEST website: http://www.chest-project.eu/chest-call-3-projects-in-the-google-impact-challenge/ and http://www.chest-project.eu/jourvie-nominated-for-the-google-impact-challenge/ ○ 294 interactions in the project’s section on the CHEST Community Forum.
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Table 11 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 11: Mandatory KPIs for Jourvie

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	3	3	3
		Number of users involved in co-design process	14 people in workshop	38 people in workshops, interviews and usability testing with 47 people, 102 questionnaire responses by therapists, 180 beta-testers	38 people in workshops, interviews and usability testing with 43 people, questionnaire responses from 103 therapists, 944 beta-testers
		Ratio between men and women	20%:80%	11%:89% ¹²	10%:90%

¹² Since 89% of those affected are female, this is the value we are aiming to reach.

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		involved			
		Ratio between young, adult and old people involved	0%:90%:10%	50%:40%:10% ¹³	60%:30%:10%
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	4	6	5
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	3	2	1
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	12	5
		Number of comments / replies on project blog entries on CHEST website	0	18	10
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	483 FB-friends, 151 Twitter-Followers, 0 blog followers	680 FB-friends, 210 Twitter-Followers, 3 blog followers	741 FB-friends, 243 Twitter-Followers, 4 blog-followers
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0 Tweets, 2 FB-Posts, 0 Retweets, 0 blog entries, 0 newsletters	100 Tweets, 78 FB-Posts, 35 Retweets, 1 blog entry, 3 newsletters	122 Tweets, 134 FB-Posts, 36 Retweets, 1 blog entry, 2 newsletters

¹³ Since eating disorders are common mostly among people in young age and partly among adults, we are adjusting the targeted ratio respectively.

7 Kidslox¹⁴

Kidslox is about giving carers a platform to help children learn to use tablets and phones constructively. Kidslox has already built an app for Apple devices and an associated website. The app and the website give parents and carers (hereafter “carers”) automated and remote control over the time children spend with devices and the activities they engage in. It uses iOS in an innovative way, effectively giving carers the ability to create different profiles for the same device and to monitor how the device has been used. The project is seeking funding for upgrading this version by using feedback from beta users and expanding this solution to include the cheaper but more technically varied class of ‘Android devices’. In the longer term, once the platform is implemented across different operating systems, the project will develop the product allowing parents to link educational content to recreational time.

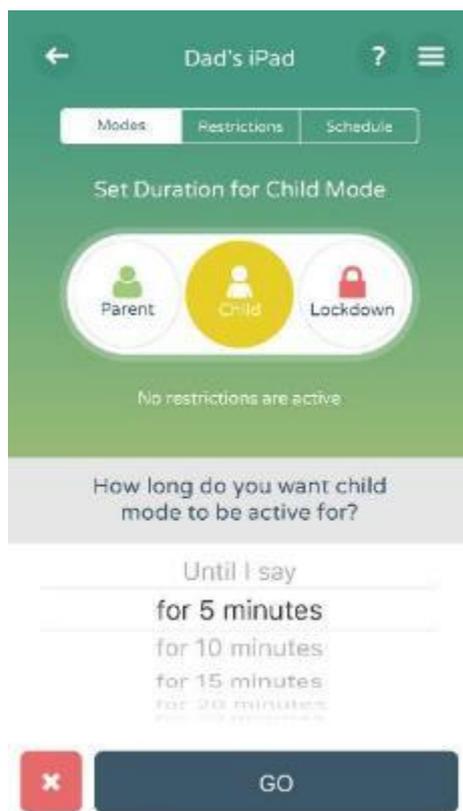


Figure 7: Screenshot of the Kidslox app

7.1 The societal problem

7.1.1 Description of the problem

The growing adoption of mobile devices, their extension into the lives of children through digital media, games and in education is of growing concern for Parents, Educators, Charities and Government. The implications on emotional and physical health are uncertain, and the social impact of engaging remotely whilst leaving a digital imprint is motivating these stakeholders to take action.

Kidslox addresses a significant need by providing a solution to the problem of what content is consumed, how much time is spent on digital devices and when, and finally, what imprint children are leaving on the web.

Children need boundaries. Traditionally these have been regulated by parents and educators. This is being undermined in the digital age by the growing adoption and dependence on mobile digital devices, which can open up access to both the positive and negative aspects of the world. Kidslox

¹⁴ Chapter contributors: Mathias Becker, Tom Jones

offers a first step toward ensuring that parents and children are engaged with and informed about the impact of the technology they interact with on a daily basis and that they can address this positively to shape behaviour.

7.1.2 Scale of the problem

Over the past 7 years the growth in smartphones and tablets has been exponential (Gartner Research). User adoption of these devices as a means for consuming content, whether games, tv, music or other digital media has been huge, with the highest rates of adoption focused on lower age demographics, particularly teenagers. This generation have become dependent on these devices for their social engagement too, and the growing trend of adoption within the education system is increasing their role in the economy and as critical instruments in the Internet of Things.

Against this backdrop, there are very few effective safeguards for young children using digital devices in an increasingly 'mobile' world. Internet Safety, Screen Time and the Digital Imprint children may be leaving are of growing concern to Parents, Educators, Charities, and Government. There is also uncertainty over the impact such exposure may have on young minds and a child's Emotional and Physical Health.

The number of smartphone users worldwide was forecast to reach 1.75bn in 2014 (emarketer). The anti-virus market, focused on PC's stood at \$8bn in 2014 (Norton/Symantec). There are around 100m children between the ages of 4 & 14 in the UK, EU & USA (childstats.gov), many of whom already spend hours on these devices each day.

In contrast, the market for parental controls is currently in its infancy. Whilst steps have been made in some territories to introduce controls over broadband networks, open wi-fi and 3G/4G connectivity generally do not afford the same security. Parents are seeking a way in which they can manage the impact these changes are having on their children and family life.

Our market research, conducted during February/March 2015, illustrated parents' shock when asked to document the amount of time their children across all age categories spent on digital devices. It identified the lack of control parents had in forming agreed boundaries across the different environments these devices were used in and how there was an assumed trust or feeling of powerlessness over the type of content that was viewed. Whilst guidelines were provided for prioritising time for tasks such as homework, there was no sense in which there was guidance for the parent to make informed and enforceable choices. This was particularly the case with parents of younger children who now routinely use digital devices as a means of distraction or to pacify their children. Finally, there was no consideration for the impact such engagement might have for their physical or emotional health, or for the dangers pose externally by the internet/interaction with others on it.

7.1.3 Previous approaches to solving the problem

Previously, attempts to solve the problem of what access is granted to children on the internet were attempted by ISP's in the UK by setting up content filters on their routers. This proved problematic due to user adoption and the growing trend toward mobile devices where 3G/4G connectivity and use outside of the home rendered these filters inapplicable to modern use. The ability of certain websites to get around such filters also created problems and the lack of age restricted filters on sites such as YouTube made management of this problem very difficult. Applications that addressed the quantity of time children spent in front of screens existed but did not provide a readily workable solution. The proposed solution has therefore been superseded by the technological evolution and consumption of various media through digital and social platforms.

Within the competitive space of App related solutions on both Android and iOS the focus has tended to single out the parent as a consumer rather than the child. The technical challenges and relative immaturity of user readiness and adoption makes one of the greatest challenges and opportunities pursuing the right route to market. In this respect current evidence would suggest that this has yet to be achieved. Moreover, despite a very large demographic existing these utilities do not feature highly

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in the respective app download charts. Finally, proposed solutions can be said to be reactive rather than pro-active in addressing the changing habits of children and parents alike where digital devices are sometimes used as a means of distraction and respite by parents.

Many parents, feeling technologically inferior to their children, feel like they are losing their children to the attraction of communicating and consuming through digital media. This may explain why attempts to bridge this divide have yet to reach maturity. Furthermore, the general reluctance of the two main software providers (Apple & Google) to address this issue in a holistic and responsive way to the concerns of parents has required the intervention of 3rd party developers in attempt to tackle what is a growing issue.

Postscript 2016: The above description remains broadly true, but the market has developed. However, Kidslox has also moved forward since 2014; and we believe that the type of solution we are now working on (which was identified in late 2015) will be far better than any of the other solutions which are on offer from other providers.

7.2 Implementation of organizational structure

7.2.1 Maturity of the project

We have released both Android and iOS versions of our App, and processed 100s of different user feedback (surveys, support tickets). On 17th May 2016 we released “version 2” which is our attempt to address the majority of feedback, to make the system easier to use. This is the culmination of the work we have done under this CHEST project.

7.2.2 Organizational structure

Board: The major shareholders. Set direction of the business, manage the development. Running the digital and offline marketing. Establishing partnerships with retailers, charities, etc.

Viktor Yevpak: product manager. Viktor as the product manager and he is responsible for organising and prioritising the features that users require. Viktor is also responsible for making sure the developers understand what is required, and then testing the work that they have done.

Fred Cox: the key developer and CTO who manages the other developers in his team.

7.2.3 Key personnel

Joel Freeborn (Creative Director)

Joel has over 10 years design experience and specializes in UI / UX design. His recent work includes visuals for Premier League’s social media channel (30 million) and design for the Fantasy Premier League app and website (3.5 million players). Joel oversees the brand and user experience at Kidslox.

Fred Cox (Lead Developer)

Fred has over 5 years experience developing apps, managing development teams and developing solutions for app based businesses. Fred holds a B(Eng) degree in Computing from Imperial College London.

For Fred the motivation is that he enjoys the technical challenge of coming up with a system that manages to work around the restrictions in Apple’s iOS, and is also easy for a parent to use.

Viktor Yevpak (Product manager). Viktor is a parent of two children, and has a desire to build a ‘product’ business.

Rob Sturgess (Founder and Board member). Rob is a parent of two children, and as one of the 3 fathers who first got together to form Kidslox (together with Laurence and Tom). All 3 of us had a

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desire to manage the way our children used devices as we could see that without some technology it was very hard to restrict the amount of time our children used devices, or to guide the things that our children did on devices.

Laurence Emmett (Executive co-Chairman). Second of the 3 founders, with 4 children.

Tom Jones (Executive co-Chairman)

Tom is an entrepreneur and early stage investor. Previously, with 2 partners, he built and sold a software company called SMARTS (sold to NASDAQ in 2010). Tom is the 3rd of the 3 founders, has 4 children under 12 years old.

7.2.4 Partnerships, cooperations, and networks

digital community

Engagement so far has included Ofcom and their work on Social Media guidelines for digital businesses. It has also included the WeProtect organization and their collective stakeholder community who have a parallel interest in developing technology that delivers a safe and secure environment for children to participate in the digital world.

charities and churches

We have presented at St Mary's Church, Bryanston Square.

schools

Specifically, we have presented Kidslox as part of Internet Safety sessions at a number of primary schools including Colet Court, Wetherby Prep school and St Mary's Primary School Richmond. We have also engaged with head teachers and are supporting one in north London producing an article about the benefits of using a tool such as Kidslox.

Networks

Outreach to date includes one of the largest UK parent forums (Mumsnet) and other smaller stakeholders in the UK. A database of other organizations and communities with large followings is being compiled.

Retailers

John Lewis in the UK.

7.3 Implementation of the solution approach

7.3.1 Solution approach

Our motivation as both parents and entrepreneurs is to provide a solution that engages both parents and children, helping to educate and provide a disciplined framework for children to embrace the benefits of technological innovation whilst maintaining a healthy and balanced attitude toward them, understanding the risks and maintaining dialogue with those who care for them. This is where Kidslox helps. We provide an App that allows parents to manage the time spent and content viewed on their child's devices (our iOS and Android apps are both available to download), allowing them to explore only what their parent deems appropriate and to choose when they can do so.

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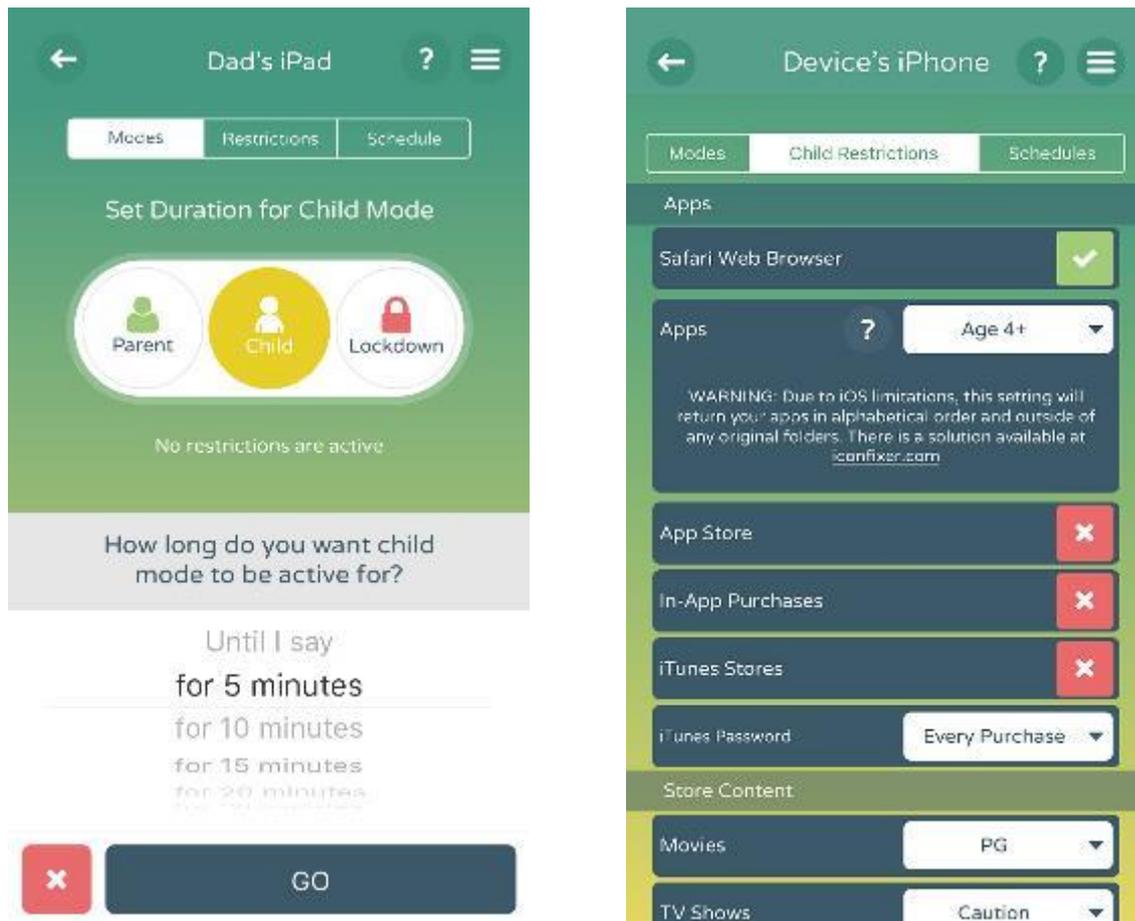
Our vision is to allow children to explore the digital world as it will be essential to their future, but to learn to be responsible for their own choices. We aim to give parents peace of mind, as Kidslox empowers them to decide for themselves where these boundaries should be set. By targeting the point at which children first become engaged with these devices, all the way up to the time they enter secondary education, we will cover a very broad age and demographic and have the opportunity to make an imprint on the way children engage with digital media. If successful, an even greater opportunity may be available to extract value from the Brand and reputation to educate and equip children through educational resources that provide skills to enhance the learning experience and skills needed throughout academic and adult life. Opportunities will also be available to tap in to the parental market as a result.

The product is delivered as an app via the respective Apple and Google App Stores. The parent purchases the App and can then install the solution on their own device and any device they wish to regulate. The parent can then control both their own device and devices used by their children. The control includes changing modes what can be done on the device for a period of time: so the device is either locked down (so it can't be used), put into a restricted mode, or totally unlocked (i.e. normal). There is a mechanism also to let parents to set schedules to automatically change the mode at different times of the day – evening lockdown, homework restricted mode, after school unlocked for example.

This solution is achieved via Apple's Mobile Device Management Solution and a custom built one for the Android platform. Once installed the app communicates with the back-end server architecture to record and send messages 'over the air' to the device being used by the child to implement the controls and settings chosen. These relate to permitted periods of use and also to limitations on content.

Postscript 2016: Given the delay in the funding, we started from the position of having the basic Kidslox app available. However, the CHEST funding will enable us to take the project to the next level. In particular, we are using the period of the contract to obtain feedback from all users and to develop our products' functions in response to that feedback. Furthermore, it will enable us to implement a number of solutions which were identified in late 2015 and which significantly improve the product.

These solutions are captured in version 2 which went live during May 2016.



7.3.2 Target groups

There are approximately 100m children between the ages of 4 and 14 in the UK, EU, and USA. Of this, approximately 8m are in the UK. Parents and carers are all facing the challenge of limiting these children's screentime, both in time used and in content. Broadly speaking, tech solutions might appeal to fathers, so the key with fathers is to make them aware the product exists. Mothers are on the other hand more likely to be the primary carers, and less interested in tech for its own sake. To reach mothers we are relying on parenting groups, online forums, social media and word of mouth.

We believe that Kidslox is strongly positioned to fill the underdeveloped market addressing parents' concerns about the growing access to and proliferation of these devices into the daily life of children. We have identified a number of channels that will help promote the product and get us visibility. These include partnerships with retailers at point of sale, online media, and parents' forums. They include social media and safer internet campaigns, and engagement with educators. Finally, charities and government are among those whose support can drive growing user adoption of a solution to manage the impact that increased proliferation seems to be having.

Kidslox conducted an extensive Market Research exercise during the iOS development phase to ascertain what the correct target market was to target the app at in terms of the age demographic of the children, the technical proficiency of the (adult) customer in being able to install and manage the application, and the price points which might offer the greatest chance of disseminating the product on the widest scale.

Whilst in the broadest sense the target demographic is universal in terms of children who have access to smartphones, there is substantial scope to customize the application to serve a broader social purpose. There has been interest expressed in us develop a solution that caters for autistic children, allowing them to enjoy the benefits of the internet whilst giving carers the peace of mind that there is a safe context for doing this. Furthermore, there may be applications for older users unfamiliar with the internet and apps.

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Strategic partnerships are crucial for the successful development, implementation and dissemination of the project. At a consumer level, providing services that help facilitate the education and supervision of children requires a high level of trust and quality control. Partnerships need to be developed so that the input of the various stakeholders is considered and wherever possible their support and influence attained. Clearly, a project that has global application has a challenge in doing this in the early stage but this advocacy is vital to the long term success of the project.

Government

The goal of this advocacy is to increase the visibility of the issue Kidslox is addressing and collaboration with this stakeholder in developing a pro-active approach to resolving the various impacts caused by the proliferation of digital devices and content.

Engagement has so far taken place at a Local, National and European level and substantial interest shown in the ambition to address the issues presented.

Digital Community

The goal of this outreach is to increase the visibility of the Brand and value of the work the project is seeking to undertake. It is to engage with stakeholders such as ISP's, Mobile Network Operators and Regulators to ensure that the interest of our growing community of supporters and customers are being taken seriously at a policy and strategic level, such that the interests of parents and children themselves represent a valid and strong consideration in the corporate and regulatory aims of these stakeholders.

Charities

The goal of this outreach is to increase support for the project and the various outputs achieved from it with a view to achieving recommendation and potentially collaboration with some of the charitable sector, including the potential development of bespoke solutions for their constituent communities. There has been some interest in the synergies that could be achieved in this latter goal.

Schools

This network represents one of the best ways to reach our potential customer base, and though challenging in its' extent, provides an opportunity to begin to find supporters and key ambassadors who can help to disseminate the value of the project and educate those parents concerned for the future of their children and the impact digital devices have on them.

Engagement to date has focused on investing in a small number of stakeholders in the Internet Safety community, both private and state sector, and also with head teachers. Research has centered on establishing who if anyone is providing the direction for Internet Safety.

Parental Sector influencers and networks

This network is extremely broad internationally but tends to have a shared view over their concern for the issue our project seeks to address. They also represent a number of diverse communities and digital and social platforms that offer tremendous potential for disseminating the output from the project.

Retailers

The objective here is to align the interests of retailers of digital devices with their customers through research we have conducted and through presentation of the added value our service can bring to their retail offering and customer base.

7.3.3 Activities and work performed

As it turned out because the CHEST timing meant that we had made good progress on WPO, WP1, WP2 and WP3.

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The original Gantt was from May to November 2015, but has now moved from September through to June 2016.

So all work packages are starting from September 2015 (except for WP4 which is the final report). The delay in funding has meant that we start from a position which is further advanced than it would have been in May 2015; but we believe that pursuing the above tasks now (in some cases, for the second time) is a more valuable exercise.

Our strategy is to continue developing the roadmap as outlined in our CHEST application. By the start of September, we were able to start working towards version 3.0 of the product, which was released in May 2016.

Progress:

Work Package Number : WPO
Actual Starting month : September 2015 Predicted / Actual End month : June 2016
Work Package Objectives: Feedback from initial users
Description of work this period: Main achievements: <ul style="list-style-type: none">● Engage with users, both active users and inactive users, to understand what they do and don't like about Kidslox● Design major new version of Kidslox app and website, incorporating feedback from initial users (In the App Store as version2.0). Detailed description of work performed to reach the achievements listed above: WPO: this is a continuous process. Because we already have a version in the App store, now for both IOS and Android, we get approx 100 tickets a month through support. We use these tickets to prioritise features for the upcoming version 3.0. However, we have recently sent out a mail shot to all users and collated their responses to inform our decisions over the coming weeks and months. We also get ad hoc feedback from users by way of reviews on the app store and play store, and by direct communication (e.g. email) or via twitter. Our users are quite engaged because they really do care about this problem.

Summarise any problems you have encountered, and how they have been overcome

As with any mass market software product, there are lots of challenges and we have had to overcome them as best we can, e.g.:

1. Apple iOS makes it hard to do some of the things parents want. On iOS you cannot block a particular app. You cannot measure how much time a child has spent on the device and put a restriction in place.

To overcome these apple restrictions, we have had to explain carefully to our users (through FAQs and support tickets) that these are inherent limitations not problems with our software.

2. Users obviously want a variety of improvements for each new version of the product. In order to make the best priorities, we have tallied the feedback and summarised the key feature requests. We have then estimated development times and focussed on features that give us the best “bang for our buck”. These features include:
 - a. Schedules so the device moves between the key modes (parent mode, child mode, lockdown mode) according to a schedule chosen by the parent.
 - a. Block apps including Web Browsers, Facebook, YouTube and Minecraft
 - b. Prevent in-app purchases and iTunes Store / Google Play downloads
 - c. Restrict TV, movies, books and audio
 - d. Set time limits and schedules
 - e. Disable device camera - prevent selfies & live video broadcasting

Description of planned activity for next reporting period

N/A

Work Package Number : WP1

Actual Starting month : September 2015

Predicted / Actual End month : June 2016

Work Package Objectives:

Product a Marketing Plan / Execute the plan.

Description of work this period:

Main achievements:

- Produced an initial Marketing Plan
- Began executing parts of the plan. Each time we execute a part of the plan, we measure the effectiveness (e.g. how much it costs to acquire new views of our app on the Apple Appstore). We then either refine that aspect of marketing to improve it further, or stop doing it if the results not compelling.
- Built out our website: www.kidslox.com and our marketing pages on both the Apple Store and the Android Play store:
- <https://itunes.apple.com/gb/app/kidslox-parental-controls/id914825567?mt=8>
- https://play.google.com/store/apps/details?id=com.kidslox.app&hl=en_GB

All these pages are now produced in English, Russian, Ukrainian, Dutch, Japanese, French, German.

Also you may note that we have contacted “mum bloggers” and obtained support & quotes, for instance:

Recommended by ITV This Morning Parenting Expert Sue Atkins

Sarah Ockwell-Smith, Mother of four, Parenting Expert and bestselling author of six parenting books

- & -

Amber Mac, Canadian TV personality and technology commentator, who calls Kidslox “a beautifully designed cross-platform service that enables parents to set screen time boundaries”

Detailed description of work performed to reach the achievements listed above:

An initial marketing plan was developed during 2015 which we are continuing to work on. Current work involves developing our use of social media and building on conventional media contacts, as well as increased use of data-driven marketing (e.g. collating data on word searches that are used to land on the kidslox page).

We have built up our presence on social media – over 580 twitter followers and as many Facebook followers.

<https://twitter.com/kidslox>

www.facebook.com/kidslox

www.youtube.com/kidslox

www.instagram.com/kidslox

We have a series of favourable bloggers and technology personalities who talk about Kidslox as part of their advice to parents and schools (including Sue Atkins, Sarah Ockwell-Smith, and Amber Mac)

Summarise any problems you have encountered, and how they have been overcome

We haven't yet figured out how to get large numbers of potential customers onto our website (which is one sales channel). Our strategy to solve this this year is to increase the amount of blogging we do (3 a week min) and also to publish our blog entries onto popular sites such as Reddit and Medium, to find a bigger audience.

Description of planned activity for next reporting period

Continue to build our audience on twitter, our website, facebook.

Work Package Number : WP2

Actual Starting month : September 2015

Predicted / Actual End month : June 2016

Work Package Objectives:

WP2: Kidslox market ready version (incorporating WPO)

Description of work this period:

Main achievements:

- We build and released a major upgrade of Kidslox (known as v3 in the pre-existing CHEST documentation, but known to the market and our users as v2). This product incorporated the feedback we gathered under WPO. Essentially we gathered a better understanding of the key "use cases" – i.e. what are people trying to do when they apply a software solution to the problem of "managing screentime for children". IN our early prototype versions, we had some key features correct (ability to lock device down, ability to schedule active and lockdown modes). But we had over-complicated the solution, and the major release under WP2 enabled us to simplify the solution to make it easier for new and existing users to manage the main use cases.

Detailed description of work performed to reach the achievements listed above:

WP2: Scope for version 3.0 is set and includes: optimised user interface (which we may be able to patent and so won't declare in this interim report). A content version of the product (see our 'Innovation' in the CHEST Call 3 proposal), which rewards children for educational tasks. We also may have a feature that allows blocking of specific apps (which we previously thought was not possible with iOS). In addition, we are working on foreign-language versions. We have obtained translations that will enable a Japanese version; and we hoped by the end of the CHEST period to have versions in at least the major European languages (French, German, Spanish, Russian, Scandinavian languages). Right now we have finished the translations and are due to release them by the end of June 2016.

<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>This is the major part of our work, to combine the feedback we receive from our users into a Roadmap (supplied as an attachment) which will meet all their key requirements. We believe that the version we call version 3 meets all the key user requirements including ease of use.</p>
<p>Description of planned activity for next reporting period</p> <p>N/A</p>

<p>Work Package Number : WP3</p>
<p>Actual Starting month : September 2015 Predicted / Actual End month : June 2016</p>
<p>Work Package Objectives:</p> <p>Android version of the software produced for WP2 (it is important for our users that the system works across both iOS and Android, and looks the same on both platforms)</p> <p>So the kidslox product is now available on Android, and, also, it is possible to control an Android device from an iOS phone or tablet, and to control an iOS device from an Android device. In all cases the user experience is almost identical, which is quite an achievement.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> ● We have built and released a version of Kidslox for Android (so an Android native app) to sit alongside and perform the same way as Kidslox for iOS. ● We have also upgraded this Android version in parallel with the iOS version so any improvement we make to the iOS version also is released on Android ● This means that our users are able to use Kidslox “cross platform”. A common case is that a parent will have an iOS device (such as an iPhone) and use that to control Android devices which are used by children, as Android devices are cheaper and so more appropriate for children. <p>Detailed description of work performed to reach the achievements listed above:</p> <p>WP3: Android version develops in parallel with WP2 iOS version</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>Because Android is more flexible than iOS, but iOS is our main market, it has been relatively simple to keep Android with the same functionality as iOS. The main challenge has been to make the user experience as close to identical as possible on the two systems. Through careful coding and testing, we have achieved this.</p>

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Description of planned activity for next reporting period N/A
Work Package Number : WP4
Actual Starting month : June 2016 Predicted / Actual End month : June 2016
Work Package Objectives: A final report.
Description of work this period: Main achievements: <ul style="list-style-type: none">• We have produced this final report describing the achievements of our work packages and the impact, particularly the social impact, of the upgraded versions of Kidslox. Detailed description of work performed to reach the achievements listed above: This final report.
Summarise any problems you have encountered, and how they have been overcome One challenge was establishing how we established feedback and calculated metrics from our users, as our business methodology is suited to gathering feedback from lots of lots of small ad hoc interactions (support tickets, customer emails, customer reviews), and combining that feedback into an overall picture of what we are doing right and what we need to change. I hope in this report you can get a sense of how that has worked – we believe it is a good methodology for a mass consumer product like ours, where there is no established way of doing things, so immediate customer feedback (through the channels I mention) is very desirable.
Description of planned activity for next reporting period N/A

7.3.4 Sustainability of the solution

The current Android product has been developed to a level whereby the compatibility with the iOS solution has been achieved. This will now enable us to attract a manageable level of beta-test users to help test and ensure functional robustness and usability and to refine the product prior to full deployment. Many of these early adopters are likely to be users of our iOS app that wish to enrol Android devices in their home.

After the CHEST funding period, the prototype will be ready for full deployment, but will then have an increased level of functionality and additional features available on a bespoke basis. It is intended that there will be investment in product development in other areas related to the parental and educational sectors which take advantage of and overlap with the features in the app. For example, homework time could be regulated by submission through the platform, and supplementary skills modules could be adopted to develop a well-rounded education in areas that are either core or non-core to the school curriculum. Finally, lifestyle personal management areas like financial management of pocket money or saving could be developed to add to the benefits children could receive from the platform under the supervision of their parent or carer.

In terms of the sustainability of the project results, in Q4 we raised a further £100K or so equity finance. We are now on a path to achieve positive cashflow from sales. Initial sales at a price of £5 per app (£3.50 comes to us) are delivering approximately £1K or £2K a month revenues.

In order for us to be financially sustainable we realise that we need to move to some sort of ongoing, regular charging, for instance subscription pricing. It is our next goal after this CHEST period to try subscription pricing (say, 1 dollar a month), and then we can see how many of our customers are happy to keep paying on an ongoing basis. If a substantial number are, then we can use the funds to develop further improvements.

7.3.5 Risks

There are a number of external risks that could affect the future success of the project. These include activity in the competitive environment, where speed of development, funding misalignment and marketing can all impact prospects. Countering this, the size of the market is so great that opportunities are likely to exist well beyond the end of the project expiry. The one caveat has always been the development of a native solution by Apple or Google, though the likelihood of this seems small and the chance of any cross platform solution even more remote. Our plan to stay ahead in the competitive environment involves maintaining a very active competitor analysis that means we can quickly respond to any threat posed. Aligned to this is our own product development which is backed up by validated research targeted at our growing customer base and our target market. Finally, our marketing strategy offers many contact points to acquire customers at a low acquisition cost, any of which could offer the opportunity to gain sufficient traction.

It is possible, though not very likely that our infrastructure could come under attack and there are risks associated with this. There would be little incentive in doing so in that we do not hold information about our customers such as credit card information that would be of value. Sabotage of this kind or where competitors or those opposed to offering parents the capacity to regulate their child's activity seek to undermine either the product or brand pose a realistic threat. This can be mitigated through good communication, up to date metrics and a responsive development team.

7.3.6 User-based evaluation of the concept

Because we are distributing our solution as an "app", the easiest way to engage users was to build a minimal "version 1.0", and put it in the app store. This we have done, for both iOS and Android. We then pick up users (generally they have found the product themselves, but we have done piecemeal marketing). These users then give us feedback, through two mechanisms (a) they use the support mechanism of the product to either mark their own suggestion or to ask how to use a certain aspect of the product. This feedback is incredibly useful to then tell us how to change the product so *that this support request will not be necessary next time*. To illustrate, we have had a lot of users getting confused between our Kidslox PIN and the iOS PIN. We have been explaining the difference

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using the support mechanism (a system called Apptentive), but have now used this to specify a new product feature (which will be part of “version 3”) which is simply to rename our PIN to “passcode”. There are many more similar examples, where the support process leads to customer feedback and better design. (b) The second mechanism is that within the app we can query users for direct feedback. So we used Apptentive in January to ask users for the “1 feature they would like to see in Kidslox”. We got 113 responses in a week, and have used those also in specifying the improvements for version 3.0. We release version 2 during May 2016. The next step is to gather feedback about this version. There are a number of ways we are doing this:

- (a) Organically – users will complain about things that they don’t like, especially things that have changed from our previous version
- (b) Systematically – we are sending out a survey by email to our users and soliciting specific feedback
- (c) Face to face. We have gathered a focus group of “typical users” and once they have had enough time to familiarise themselves with the product we will do another round of workshops or further feedback.
- (d) I note that we are already aware of a number of features that we still lack, so we are to some extent guiding the feedback we get to prioritise those features, but we are also open to unguided feedback.

The way that we measure user response to our feedback is through direct contact from users through support, and through reviews left on the App Store and Google Play Store. We rapidly iterate new releases (we have made over a dozen releases in the last 12 months), each time responding to this feedback. This is the emergent way that modern SaaS products (including Facebook, Twitter, Instagram etc), develop their products: initial prototypes and face to face user feedback. Then release a “minimum viable product”, and follow up with rapid iterations with improvements.

Here are a set of recent reviews (August 2016) that we monitor from the App Store and the Google Play Store. You can see that users give both positive and negative feedback. Positive tells us we are on the track, negative gives us issues to consider, and often direct problems to fix.

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August 7th

AF AppFollow BOT 7:46 AM

 Kidslox FREE Parental Controls
Google Play, Kidslox Trading Limited

★★★★☆ English

Has potential.

Slow to enforce changes. Sometimes hangs at change screen. Works most of the time.

Windows app has unworking tabs.

by [Timothy Westacott](#) · [Reply](#) · [Permalink](#) · [Translate](#) · [Add tag](#)

 **Review Monitor by LaunchKit** BOT 9:55 AM
Kidslox has a new App Store review!

 ★★★★★

Love this app!

This app really works. Unlike other reviewers I've had no issues. I can lock my kids devices remotely from my phone whenever I want, and I've been able to schedule their screen time to suit our family's needs. There are three different modes - parent, child and lockdown. I set a schedule for lockdown overnight and child mode for when I want to allow them to play games but not access the Internet.

Great value for money. Definitely recommend.

by [Gala_75](#) for v2.2.1 · Australia · [Permalink](#) · [Tweet](#)

August 8th

 **Review Monitor by LaunchKit** BOT 8:02 PM
Kidslox has a new App Store review!

 ★★★★★

Excellent

Great app, when my son is meant to be doing his homework there is no more faffing about on his phone! Gives a lot of peace of mind!

by [SpacyJB](#) for v2.2.1 · United Kingdom · [Permalink](#) · [Tweet](#)

 **Review Monitor by LaunchKit** BOT 9:07 PM ☆
Kidslox has a new App Store review!

 ★★★★★

AMAZING!!!

I am an eleven year old who just detests screen time and video games. I mean, who would want to learn stuff on Trivia Crack or exploit your creativity on Minecraft? So when this app was introduced to me, I jumped at the chance to minimize my entertainment. I just love it when your iPad switches off, removing all apps from your device and sending thousands of innocent children into instant grief. Ahh...grief...it's just so beautifully poetic. Kidslox provides the answer that I have always been looking for. I have recommended this amazing app to all my friends and they are filled with immediate glee upon having all fun snatched from them like a mouse from a cat. Again, I wish I could sing praise of this app all day, but I can't because my device closes at 10:00 AM thus preventing any more comments.

by [NReichman](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

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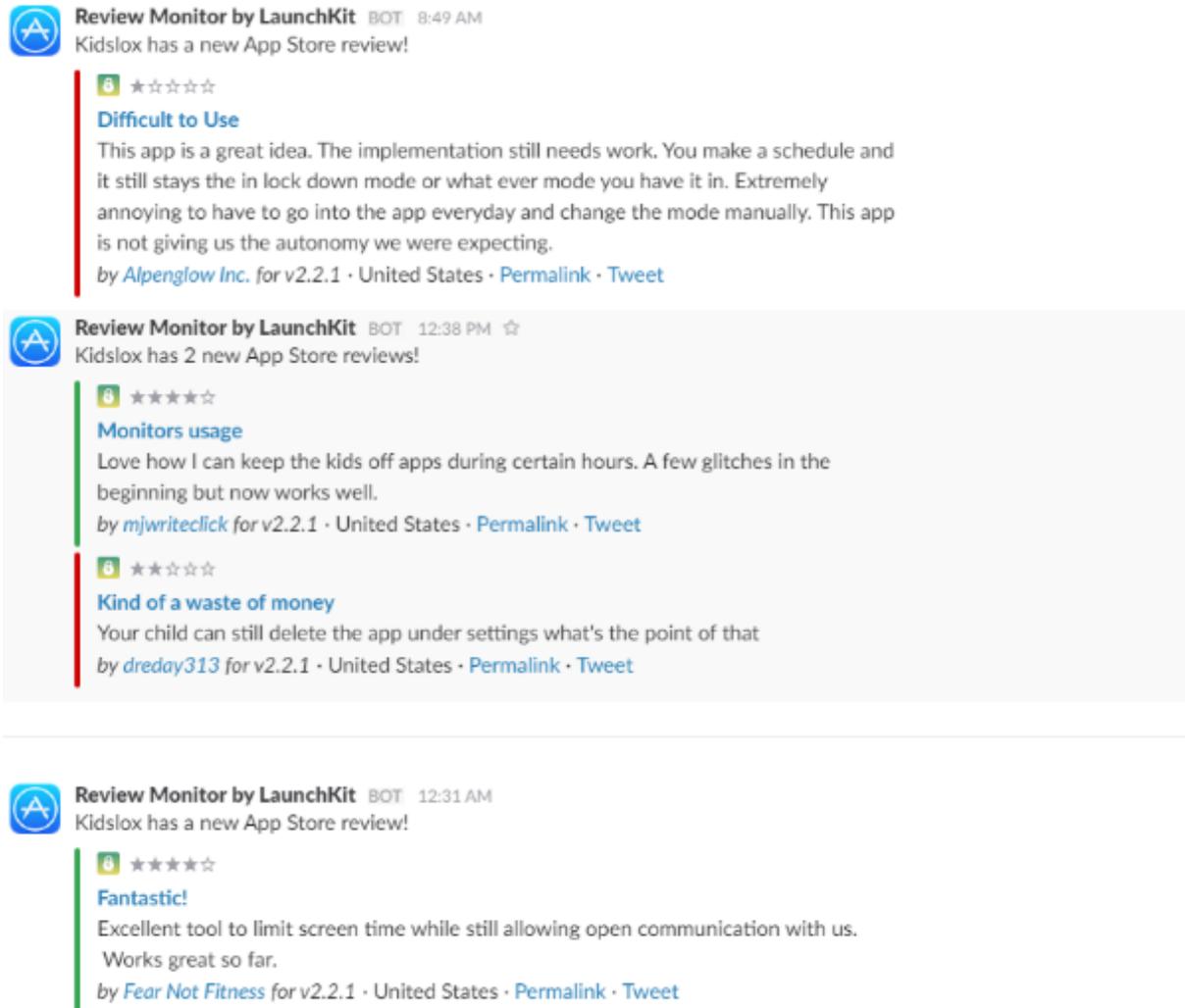
 **Review Monitor by LaunchKit** BOT 12:55 AM ☆
Kidslox has 3 new App Store reviews!

 ★★★★★
So far so good
Just to let you know about our freak out session. My child and I sat down and figured out an iPad schedule for the school year last night that we agreed on. Today he opens up the iPad and all the apps have disappeared. I thought the apps were supposed to be in alphabetical order-not disappear. So he's near tears thinking he has lost all progress on his games. He says the app is a virus and wants it deleted. I can't even delete the app. So I hook it up to my computer to try to back it up to a previous iCloud version. And the iPad is dinging like crazy. So I go back to my phone to see if I can open up Kidlox and do something. Then the big realization-----the iPad was merely in lockdown mode and as soon as I switched it back--all the apps came back. OMG we both felt so stupid. But just so you know when it's in lockdown mode that's what your screen is going to look like. I don't think he even saw a message saying its in lockdown mode. ***update***so far Kidslox is working pretty good. I just shut down the iPad remotely from the other room LOL. Been wanting the ability to do that for a long time. That being said, this morning when it was time for the schedule to switch out of lock down mode the iPad wasn't able to reach Kidlox servers? It was on our wifi but was not able to talk to change modes. So no iPad this morning and I had to let him on my laptop. We have only been using this a couple days now but my child has been playing music and listening to music rather than being on the iPad so I'm very pleased.
by [Treasurefolk](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

 ★★★★★
Best app of its kind
I'm taking the time to write this because as parents, we are in this together. First, you should know that of all the apps like this one, this is the only one I trusted that does not charge a subscription. You pay once and you're done.
With this, I don't have to worry about having to enter a code every time they want to use it. Now, whenever I do not want them to play, I can just make all their apps disappear. I can do it anytime with my phone or have it happen automatically on a schedule, customizable [Show more...](#)
by [Oobrown](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

 ★☆☆☆☆
Not what expected
Wanted a way to lock out our teen during the night. Can't lock her out because she has a passcode and thumbprint on her phone for school and activities that she needs.
by [Skw73](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

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Review Monitor by LaunchKit BOT 8:49 AM
Kidslox has a new App Store review!

★★★★☆
Difficult to Use
This app is a great idea. The implementation still needs work. You make a schedule and it still stays the in lock down mode or what ever mode you have it in. Extremely annoying to have to go into the app everyday and change the mode manually. This app is not giving us the autonomy we were expecting.
by [Alpenglow Inc.](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

Review Monitor by LaunchKit BOT 12:38 PM ☆
Kidslox has 2 new App Store reviews!

★★★★☆
Monitors usage
Love how I can keep the kids off apps during certain hours. A few glitches in the beginning but now works well.
by [mjwriteclick](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

★★★★☆
Kind of a waste of money
Your child can still delete the app under settings what's the point of that
by [dreday313](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

Review Monitor by LaunchKit BOT 12:31 AM
Kidslox has a new App Store review!

★★★★☆
Fantastic!
Excellent tool to limit screen time while still allowing open communication with us. Works great so far.
by [Fear Not Fitness](#) for v2.2.1 · United States · [Permalink](#) · [Tweet](#)

2. Statistics about participation (target groups and users involved, no. of answers)#

All our users are invited to either submit support tickets if they have a problem or to write a review. Both of these mechanisms lead to 100s of pieces of feedback every month.

3. concrete examples of feedback/answers that were given

An example of negative feedback is above: “Your child can still delete the app under settings..”.

Our response to this was to make it harder for a child to delete the app by requiring that the requiring the device PIN in order to remove the app.

A further example of negative feedback is that if the app doesn’t work as intended (i.e. doesn’t lock or unlock the child’s device when requested), the parent will sometimes leave a negative review. As part of the most recent release we rewrote the part of kidslox that scheduled the status changes, in order to leave more complete log files so we can debug further incidents where the service has not performed as intended.

4. A concrete example of the improvements we made as a result of feedback.

The most important piece of feedback that we received, over a period of many months, led to use changing our concepts and design. With the original version of Kidslox (prior to our CHEST work) we allowed the parent to set up 2 different modes on the device: “parent” mode and “child” mode. However this meant that the only way to lock the device was to use one of these modes as a “do

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nothing mode” where all apps are unavailable. But actually, and user feedback led us to realise this, there are actually 3 modes that we want: “parent” mode, which actually means no restrictions at all. “child mode” which is a mode that you are happy for the child to use the device (e.g. with some restrictions on content. And, finally a THIRD mode which is to have the device totally locked down so nothing is possible (which we call “lockdown mode”).

This was a revolutionary change because it means that we now cover the key use cases.

7.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 12.

Table 12: Snapshot of project "Kidslox"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
A solution that engages both parents and children, helping to educate and provide a disciplined framework for children to embrace the benefits of technological innovation whilst maintaining a healthy and balanced attitude toward it, via an App that allows parents to manage the time spent and content viewed on their child’s devices, allowing them to explore only what their parent deems appropriate and to choose when they can do so.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Engaged with active and inactive users to receive feedback to improve Kidslox iOS app and the website. ○ Developed and released a major upgrade to the Kidslox iOS app using the feedback received from users. ○ Developed, trialled and upgraded an Android version of Kidslox. ○ Produced and started implementing a marketing plan. ○ Built the Kidslox websites in 7 languages. <p>The project successfully delivered 6 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated Kidslox websites in English, French, German, Dutch, Russian, Ukrainian and Japanese, for example: https://kidslox.com/en/ https://kidslox.com/fr/ ○ Dedicated social media accounts: Twitter (615 followers) and Facebook (343 likes). ○ Dedicated #crowdparenting blog: https://kidslox.com/en/blog/ ○ Featured on Canadian TV: https://twitter.com/morningshowto/status/746335427947171841 ○ Reviewed in by producthunt.com and ‘Mom Does Reviews’ blog: https://www.producthunt.com/tech/kidslox http://www.momdoesreviews.com/2015/11/05/set-boundaries-with-the-kidslox-parental-control-app/ ○ Featured in a book called “Outsmarting Your Kids Online: A Safety Handbook for Overwhelmed Parents” ○ Recommended by parenting expert Sue Atkins: http://www.sueatkinsparentingcoach.com/recommendations/ ○ 266 interactions in the project’s section on the CHEST Community Forum.

Table 13 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 13: Mandatory KPIs for Kidslox

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation /	Number of target groups involved in co-design process	2	8	4

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	test usage	Number of users involved in co-design process	525	5.000	20.053 ¹⁵
		Ratio between men and women involved	50:50	50:50	50:50* we don't measure this
		Ratio between young, adult and old people involved	2:1:0	2:1:0	Our survey results suggest 2 children per adult
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	1	1	1
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	n/a	n/a	n/a
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	10	2
		Number of comments / replies on project blog entries on CHEST website	0	100	5
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	300	1000	571 twitter + 262 FB = 833
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	2 a week	3 a day	625 tweets @kidslox 306 Facebook likes.
		Number of comments / replies on our own kidslox #crowdparenting blog	0	100 a week	45

¹⁵ Note that the Measured Value for “number of users involved in co-design process” is 20,053, which is far higher than we anticipated. This means that we managed to get this many registered accounts (users) actively using Kidslox over the period of the project. All of these users are active participants in the co-design process, because from them we get the following feedback: (a) users who have problems or don't like the Kidslox solution show this by 1. Bad reviews 2. Support Requests and 3. By stopping to use the system, which we can see. In all cases we can then gather feedback, which we did by engaging with the users over email and at times over the phone. We also get (b) positive feedback by users who give 1. Positive reviews 2. Positive feedback using support channels and 3. Active users of the solution who don't give any formal feedback. All this is important, because to simply rely on negative feedback, when a large majority of users are happily using the system, would give a false impression.

8 Medhance¹⁶

Medhance aims at creating an online knowledge sharing and education online platform and app aimed at patients and their care-givers about specific clinical skills, preventing hospital admissions, reducing the number of emergency department attendances caused by incorrect use of medical equipment and lowering overall costs. It uses an interactive and visually stimulating approach with its distinctive layout to maximize the information retained.

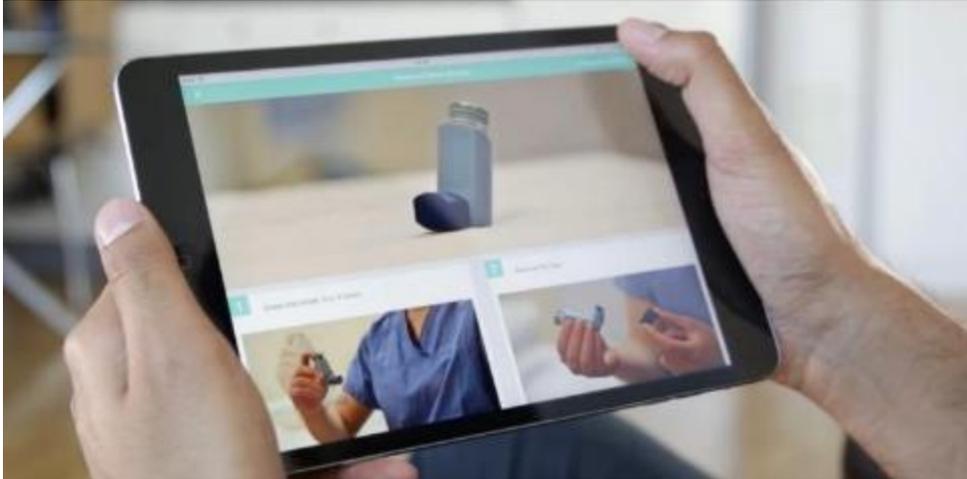


Figure 8: Photo of the Medhance prototype

8.1 The societal problem

8.1.1 Description of the problem

The current method of delivering information about medical devices to patients is lacking. Statistical evidence has shown that, for a wide range of medical conditions requiring use of a medical device, both teaching and subsequent information is poor. Taking allergies as a case example, patients with severe allergies are prescribed an adrenaline auto-injector (e.g. an EpiPen). This is used for the emergency treatment of a life-threatening allergic reaction. A study in the *Journal of Allergy and Clinical Immunology* found that only 44% of patients with an allergy to insect venom were able to demonstrate a correct EpiPen self-administration technique (Goldberg, A. et al. 2000). This issue is a major challenge for healthcare professionals and affects a large patient population across Europe. The European Academy of Allergy and Clinical Immunology estimates that food allergy alone affects 17 million people in Europe, of which 3.5 million people are under 25 years old (European Academy of Allergy and Clinical Immunology, 2015).

The data for allergies mirrors that of other medical specialties across Europe, reflecting the wide spread nature of the project. It is clear that the case on adrenaline pens can transfer to other medical devices such as patients with asthma who use inhalers, or diabetic patients dependent on measuring blood sugar levels.

These are just some of the groups of people that use home medical devices and are therefore at risk of not using these devices correctly. Other devices used commonly in patients include various types of inhalers (Accuhaler, Metered Dose Inhaler, Turbuhaler), subcutaneously injected insulin and blood glucose home monitors. The number of people affected by this issue has highlighted the societal need for patient education, regarding medical devices and the clinical skills necessary to use these devices correctly.

Medhance's perception of the problem has evolved during the reporting period. Although rare, there is some patient education material available to patients regarding some of the devices we are hoping

¹⁶ Chapter contributors: Mathias Becker, Uzair Adam

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to include in our application. However, Medhance have found another issue to be the regulation and quality of material already available. Videos that are currently on the Internet are poorly produced and edited. They mostly have a dated style, bad scripting and are not very clear to the viewer. In addition to this, the majority of the patient information on the Internet has not been validated by a healthcare professional and thus might be incorrect. Therefore, the new perception is that not only is the current method of delivering information regarding medical devices lacking, what little is available is not effective nor reliable.

As far as we are aware, the social problem has not evolved over the time that Medhance have been working on the project. It is hard to tell how the problem will develop in the future if it isn't tackled, but it is clear that there are many advantages of tackling this issue. The National Review of Asthma Deaths shows that there is a correlation between lack of information and asthma hospital admissions and deaths. The review shows that 75% of asthma related hospital admissions and 90% of asthma related deaths would have been preventable and a large factor in these findings is improper inhaler technique (Royal College of Physicians, 2014). In addition to this, the Allergy, Asthma & Clinical Immunology Journal (AL-Jahdali, H., Ahmed, A., AL-Harbi, A., et al, 2013) states that improper inhaler technique is associated with poor asthma control and frequent emergency department visits.

Medhance aim to educate patients on their technique for their medical devices, thus reducing poor disease control and frequent emergency department visits. Once this is achieved this should reduce the size of the societal problem aforementioned.

AL-Jahdali H., Ahmed A., AL-Harbi A., et al. 2013. Improper inhaler technique is associated with poor asthma control and frequent emergency department visits. *Allergy, Asthma, and Clinical Immunology : Official Journal of the Canadian Society of Allergy and Clinical Immunology*, 9(1), pp. 8.

Asthma UK. (2014). Asthma facts and statistics. [Online] Available at: <https://www.asthma.org.uk/about/media/facts-and-statistics/>

European Academy of Allergy and Clinical Immunology. 2015. 'European Academy of Allergy and Clinical Immunology Press Book'. [Online] Available at: http://www.eaaci2015.com/wp-content/uploads/2015/06/EAACI_Press-Book_Allergy_Congress2015_EN_Final.pdf

Goldberg, A. et al. 2000. Insect sting–inflicted systemic reactions: Attitudes of patients with insect venom allergy regarding after-sting behavior and proper administration of epinephrine. *Journal of Allergy and Clinical Immunology*, 106(6), pp. 1184 – 1189.

Royal College of Physicians. 2014. Why Asthma Still Kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry Report. London: RCP. [Online] Available at: www.rcplondon.ac.uk/sites/default/files/why-asthma-still-kills-full-report.pdf

8.1.2 Scale of the problem

The beneficiaries of the project will be patients who require the use of medical devices for a given medical condition. The initial targeted conditions have been decided on in collaboration with healthcare providers and general practitioners; taking into account prevalence of conditions and data on medical emergencies encountered by patients. To begin with, Medhance will target a variety of ten medical devices. The list includes three different types of inhalers for asthma, peak expiratory flow meter for asthma, a spacer device for use with an inhaler, sublingual spray for angina, adrenaline pens for allergies, pre-drawn subcutaneous heparin, subcutaneous insulin pens and glucometers for those with diabetes. As Medhance evolves, further conditions will be added in line with needs expressed by healthcare providers.

We take the use of inhalers in asthma as a case example to illustrate our target customer's needs. 30

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million Europeans suffer from asthma and rely on the use of inhalers to relieve symptoms (Braman, S., 2006). The National Review of Asthma Deaths highlights the challenge of inhaler use in asthmatics. A lack of information on how to use an inhaler contributes to 10% of asthma deaths occurring within one month of discharge from hospital for a previous asthma attack (Royal College of Physicians, 2014). 21% of newly diagnosed asthmatics had attended an emergency department at least once in the previous year (Royal College of Physicians, 2014). Improper inhaler technique has been shown to be a large factor in preventable asthma related deaths. *Allergy, Asthma & Clinical Immunology Journal* (2015) states that improper inhaler technique is also associated with poor asthma control and frequent emergency department visits. This is reiterated by the *Respiratory Medicine Journal*, which reports that inhaler mishandling remains common in real life and is associated with reduced disease control (Leung, J.M., Bhutani, M., Leigh, R., et al, 2015).

It is difficult to estimate the true impact of asthma as a disease, on the population. In England and Northern Ireland, there are no accurate published data on A&E attendances for asthma. Deaths can be multifactorial and different research groups will measure absolute numbers using varying techniques, and different population groups. In an effort to quantify the magnitude of the impact of asthma on the health services, Asthma UK (2014) quote that 'in 2014 (the most recent data available) 1216 people died from asthma'. It has been quoted that 'every ten seconds, someone is having a potentially life-threatening asthma attack' (Asthma UK, 2014). NHS Digital (2014) quotes a figure of 54,300 for the number of emergency admissions related to asthma.

The potential economic benefit of resolving improper inhaler use across Europe is enormous. In the UK alone, 19,317 avoidable emergency hospital admissions related to asthma occur annually, costing the health care system £34.6 million (Asthma UK, 2014). According to the European Respiratory Society (2003), productivity losses from work impairment due to poor asthma control are established at €9.8billion / year globally.

Research shows that a correlation exists between social deprivation and higher rates of emergency hospital admissions across Europe. Medhance takes this fact into account by ensuring that its product is suitable and accessible for any patient, regardless of their social background. Accessibility is guaranteed by making the product available for free to all patients covered by any European Healthcare System. Suitability is addressed by ensuring that our videos and step-by-step guides require no prior knowledge or medical terminology to be understood. Patients can choose video, picture illustrations or written instructions in line with their learning preferences and abilities, and all resources can be consumed at the patient's own pace or repeatedly.

The social consequences that have already occurred include unnecessary hospital admissions, preventable deaths, economic cost occurring from hospital admissions, economic costs in producing leaflets and patient information and the time and cost of consultations educating patients. If this problem remains unsolved, then all of these consequences will continue to occur and cost healthcare systems time, money and most importantly patient's lives and well being.

We have used asthma as a case example and this only discusses the scale of the problem for one of the ten chosen devices. All of the devices Medhance will be including in their application are used commonly and have a large impact upon healthcare costs and patient morbidity / mortality.

Asthma UK. (2014). Asthma facts and statistics. [Online] Available at:

<https://www.asthma.org.uk/about/media/facts-and-statistics/>

Braman., S. (2006). The Global Burden of Asthma. *Chest Journal*, 130(1), pp. 4-12.

European Academy of Allergy and Clinical Immunology. 2015. *'European Academy of Allergy and Clinical Immunology Press Book'*. [Online] Available at: http://www.eaaci2015.com/wp-content/uploads/2015/06/EAACI_Press-Book_Allergy_Congress2015_EN_Final.pdf

European Respiratory Society. (2003). *The European White Lung Book: The First Comprehensive Survey in Respiratory Health in Europe*. [Online] Available at: <http://www.erswhitebook.org/>

NHS Digital. (2014). *'Asthma emergency admissions: fall in August, rise in September'*. [Online] Available at: <http://digital.nhs.uk/article/4989/Asthma-emergency-admissions-fall-in-August-rise-in-September>

Royal College of Physicians. 2014. *Why Asthma Still Kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry Report*. London: RCP. [Online] Available at: www.rcplondon.ac.uk/sites/default/files/why-asthma-still-kills-full-report.pdf

Leung, J. M., Bhutani, M., Leigh, R., Pelletier, D., Good, C., Sin, D.D. (2015). 'Empowering family physicians to impart proper inhaler teaching to patients with chronic obstructive pulmonary disease and asthma'. *Canadian Respiratory Journal : Journal of the Canadian Thoracic Society*, 22(5), pp. 266-270.

8.1.3 Previous approaches to solving the problem

Medhance merges a powerful medical reference tool with academically validated online learning methods; thus setting itself apart from what is currently used. Through our research we have found that the market consists largely of plain leaflets and links to websites, which are not interactive and typically focus on specific medical problems. As these resources are dispersed across several different locations – both physically and online – it creates difficulties for users to source relevant information; it is time consuming and leads to a high risk of vital knowledge being forgotten.

Despite the major form of information transfer being the printed leaflet, many patients interviewed state that either threw these away or they lost them – not realising their importance at the time.

Some patients had been suggested YouTube videos or websites that had other shortcomings, requiring the user to 'pull' towards them, being too detailed, not validated by healthcare professionals or not targeted to patients. By not being specifically targeted at the patients there is a risk that jargon will be used that the patients won't understand or that it won't be relevant information for the patient.

Some patients have been suggested validated websites but have encountered poor quality content that was difficult to navigate. Most of the medical videos available on the market that involve a step-wise process have poor videography and editing skills involved. They usually have a dated style, with distracting backgrounds. One of the problems that exist with the examples currently on the market includes the scripting of these films. The actor featuring in the videos usually does not have a specific script resulting in the viewer receiving an overload of information. In addition to this, a lot of camera angles of the videos currently on the market are wide pan and do not highlight the finer details of the technique. This style of videoing means that the audience cannot see in great enough detail the necessary information and skills.

Below are some examples of medical device videos that are available on the market, with a description of their shortcomings:

- <https://www.youtube.com/watch?v=6W0EhIIIHGI> - dated / pixelated stepwise approach, too lengthy, computer automated voice over giving it a impersonal effect
- <https://www.youtube.com/watch?v=rMMpeLLgdgY> - done in real time, not slick, bad lighting, no zooming in the focus on the technique, only shot from one view so can't see how to use the product from the users point of view
- https://www.youtube.com/watch?v=ma_cmlU9DxU - poor quality filming, doesn't look professional, dated

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- <https://www.youtube.com/watch?v=b5WzpTsdVWE> - distracting background, dated, too much voice over, not clear instructions
- <https://www.youtube.com/watch?v=m2voqmmntEc> - not validated by a governing body or nationwide charity, read off a script, white noise present, background distracting, very poor quality

Medhance differentiates itself by acknowledging these failings and addressing them head on. Medhance will be user-friendly, validated, made of high quality content and users will be 'pushed' notifications when necessary, increasing user engagement. A continual consultation process will be undertaken with health care professionals, end-product users, academics and user experience experts to name a few.

The creative direction for both the videography and photography will also address the aforementioned problems. We aim to deliver videos that possess a new style – non-distracting backgrounds, using camera angling and zoom to highlight important areas for technique, using the focus tool to direct what we require the viewer to be concentrating on and simple voice overs which state each step clearly. With all of these taken into account, this will overcome the current issue of uninspiring, educational videos being on the market.

8.2 Implementation of organizational structure

8.2.1 Maturity of the project

The project is currently in the pilot phase. During the seed phase, Medhance created content for the application and processed it. Medhance are currently incorporating the content into the technology and executing a marketing plan to launch the application.

8.2.2 Organizational structure

The organizational structure involves a small team of two individuals working on the project; a Managing Director (MD) and Chief Operating Officer (COO).

The MD's responsibilities include communicating the creative vision of the application to guide the team, managing the legal aspects of the project, liaising with individuals from the CHEST project and other outside parties such as Salford Hospital, and assignment of work to other employees. The MD is a permanent employee.

The COO's responsibilities involve creating the content for the application, creation and implementation of a digital and social media marketing plan, and completion of mid point report and final report. The COO was a full time, temporary employee between the dates 11/04/16 – 01/07/16. They have also been hired from 01/08/16 – 02/09/16 to support the MD in his role and continue to execute the social-media marketing plan and support Medhance through the pilot phase.

Other individuals involved in the structure of the project are freelance videographers and photographers. Medhance have also subcontracted an application developer to assist in building the technology for the app.

8.2.3 Key personnel

Uzair Adam is the MD and founder of Medhance LTD. He is managing the 'Medhance' project. He has studied at Manchester Medical School and is now working as a doctor in the North West deanery. His motivation for the project lies in being its founder, and also in his interest for medical education and technology. With a background of being a paediatric basic life support instructor he has the knowledge of what is required when teaching / learning a new clinical skill. He has been the chair for a health education specialist interest group at the 'Digital Health and Care Alliance'. In his role as chair he has gained experience in leading a group of people and has deepened his expert knowledge of applying technology to medical education.

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Kathryn Hogan is employed as the COO. She is working as a doctor in the South West deanery. She shows a keen interest in medical education and has various experiences in peer-assisted teaching. Her motivation comes from a passion for medical education and an interest in coupling that with technology. She has been a part of various target groups involving the implementation of new medical technology across the South West and is currently the 'Fellow for Simulation and Medical Education' in Bristol. Her leadership experience involves leading two quality improvements projects (QIPs) aimed at researching and improving the management of sepsis in North Devon. She also has experience and knowledge in directing, creating and executing education videos in her last department. These experience and skills will become useful when working as part of a team and creating the content for the application.

8.2.4 Partnerships, cooperations, and networks

A subcontracted company has provided the technical work required to build the prototype, as Medhance do not possess sufficient programming knowledge within the team. We have used 'Pixel.' for the programming work, including writing an iOS application. The goal of working with 'Pixel.' is to develop the 'front-end' and 'back-end' of the app to a high standard and in keeping with the creative vision and requirements of Medhance. Also included in the goal is for 'Pixel.' to maintain Medhance's website. There is a contractual agreement in place, lasting until the project has been completed. As Medhance do not harness the skills or experience within the team to create an app and maintain a website, 'Pixel.' hold high strategic significance within this project.

Medhance have employed a freelance videographer, Nick Singleton, to undertake the videography work needed for the content of the application. The team did not possess the equipment or experience necessary to fully execute this without professional expertise. The subject of the relationship was purely for filming and editing the content for the application. The goal of the partnership was to have ten edited videos that are suitable to be used as content in the application. Medhance's strategy to reach this goal involved using storyboards to communicate the creative vision and ensure all requirements of the videos were met. The contractual agreement with the videographer included subcontracting him for the duration of three days and until the editing is complete. He has also been hired to create a promotional video which will be used on social media and for publicity for Medhance.

The videographer's work is paramount to the success of the application, thus their strategic significance was great. Without their expertise, equipment, editing skills and guidance the content of the application would not exist or be of a high enough standard and the social media marketing plan would not be as successful.

8.3 Implementation of the solution approach

8.3.1 Solution approach

Having identified a need for an innovative product to increase patient education, Medhance seeks to fulfill the following core objectives:

- Educate patients on health content with a focus on medical devices
- Deliver content through academically proven learning methods such as the U.S. Department of Health and Human Service's: The Patient Education Materials Assessment Tool (PEMAT)
- Enable patients by educating them on how to understand and thus take control of their conditions – reduce the number of hospital admissions / emergency department visits
- Improve patient quality of life by avoiding emergency medical situations – reduce healthcare cost associated with avoidable emergency department visits and hospitalisations
- Reduce waste of medication or equipment resulting from incorrect use
- Improve communication between patients and doctors allowing joint decision making

These objectives will be achieved through an innovative platform that uses academic best practice to educate patients and carers, and more importantly help them retain what they have learnt. The Medhance online platform and app will be simple to use and intuitive, engaging users through a variety of media (text, photographs and videos). The catalogue of skills covered will be created through extensive consultation with all parties involved with the Medhance project. Academic reviews will be conducted to help target areas where increased patient knowledge has been shown to significantly decrease attendance to hospital and overall healthcare costs.

The point in the causal chain that Medhance hopes to address will be the lack of information available, and also the lack of quality information available. This in turn will hopefully achieve the goals stated above.

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The added value we offer to our target groups is a high quality tool, available in a mobile technology format that will enable them to use their medical devices in the correct technique. This might be on a day-to-day basis, ensuring that the user administers their daily preventative medication correctly to avoid an exacerbation. Alternatively, the tool could also be used in an acute situation to treat themselves when medical advice is not on hand, for example when using an EpiPen.

The solution also addresses the issue uncovered by our initial research, which showed patients had a tendency to throw away or lose the traditional leaflets used for patient education. The application creates an easily accessible wealth of information that the patient cannot misplace or discard.

8.3.2 Target groups

The prospective target groups that Medhance aims to reach with our project are patients who require the use of medical devices for a given medical condition. This involves:

- 1) Asthma patients:
 - Patients who are asthmatic or use inhalers – particularly those who use a metered dose inhaler, Accuhaler or turbuhaler (5.4 million asthmatic patients in the UK – www.astham.org.uk)
 - Patients who are being diagnosed with asthma or are asthmatic and take regular peak expiratory flow meter readings (impossible to quote an exact number but most asthmatics are required to monitor their disease with a peak expiratory flow meter so roughly 5.4 million patients in the UK - www.asthma.org.uk).
 - Patients who use a spacer device with their inhaler (similar for above, roughly 5.4 million people in the UK - www.asthma.org.uk)
- 2) GTN spray users:
 - Patients who use a GTN spray (2.6 million people in the UK are affected by CHD and a large proportion of these will have been prescribed GTN spray www.bhf.org.uk)
- 3) Allergy patients:
 - Patients who have allergies and require an EpiPen (17 million people in Europe – Academy of Allergy and Clinical Immunology)
- 4) Heparin using patients:
 - Patients who have been prescribed pre-drawn subcutaneous heparin e.g. pregnant ladies at risk of a DVT, post-surgery patients recovering at home, patients who are immobile for long periods of time, patients with a DVT / PE who are under ambulatory care (unable to quote how many people are prescribed this annually)
- 5) Diabetic patients:
- 6) Diabetic patients:
 - Those who monitor their blood sugar regularly (4 million people in the UK with diabetes, it is hard to estimate how many monitor their blood sugars regularly but a large proportion of these will, and definitely all of the type 1 diabetics will which alone amounts to 400,000 people www.diabetes.co.uk)
 - Diabetic patients who inject themselves with insulin subcutaneously (4 million people in the UK with diabetes, 10% of these will be type 1 diabetic and insulin injectors therefore this target group is roughly 400,000+ www.diabetes.co.uk)

The main concern is that there are large numbers of people in the UK having to use medical devices at home who might be unsure the correct technique of how to use their devices and administer their medication.

The goal for the target groups would be to be taking their medication / monitoring their disease to the best of their ability to prevent acute exacerbations, reduce hospitalisations and to ultimately reduce morbidity or mortality.

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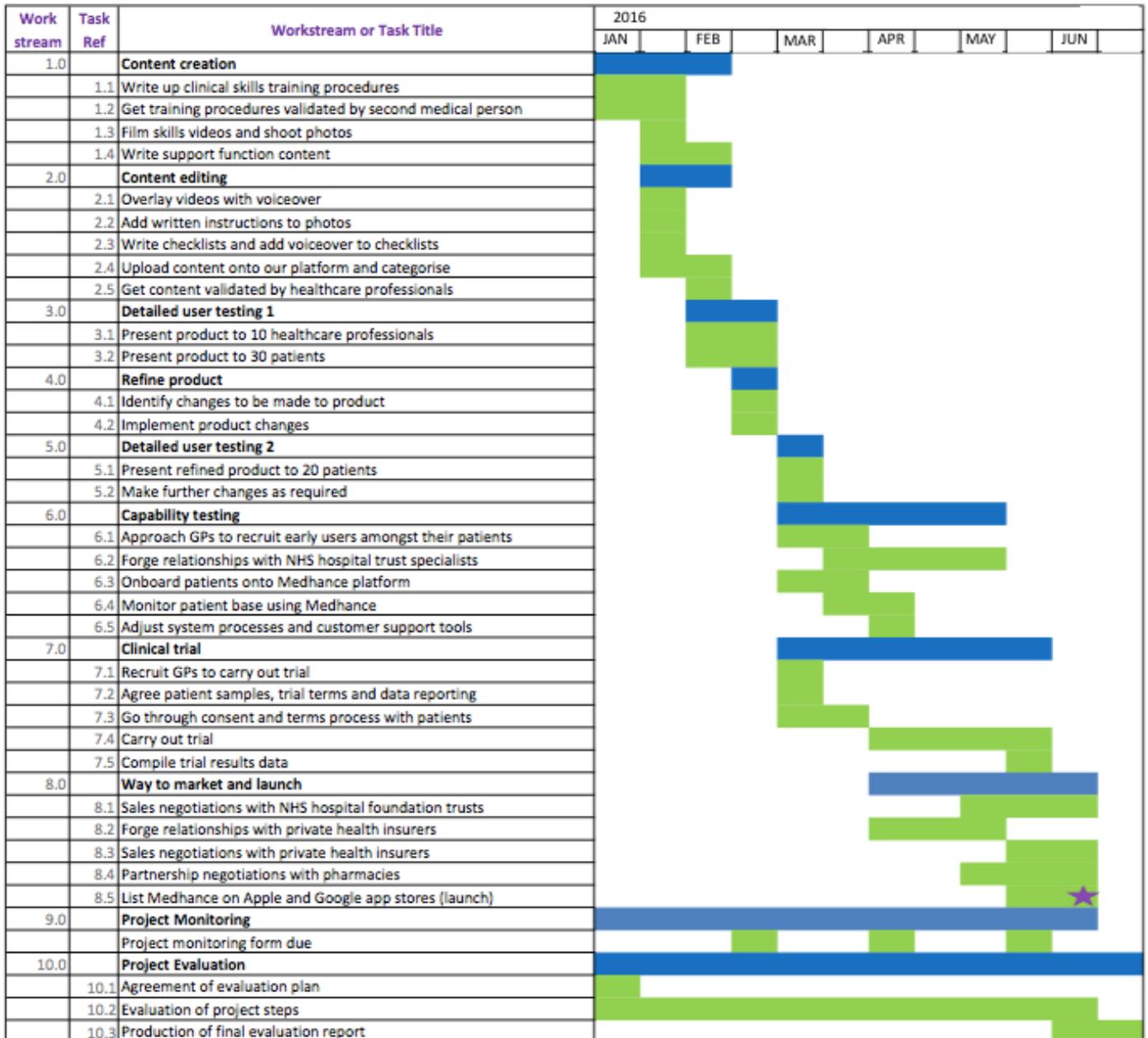
Our project can address all of the above by empowering the patients with the ability to educate themselves on their technique.

8.3.3 Activities and work performed

The original Project Plan, which can be seen below, summarises the time scale that Medhance had

PROJECT GANTT CHART

Organisation Name:	Medhance Ltd
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initially envisaged the project would take. However, Medhance have had to revise this Project Plan due to a change in circumstances.

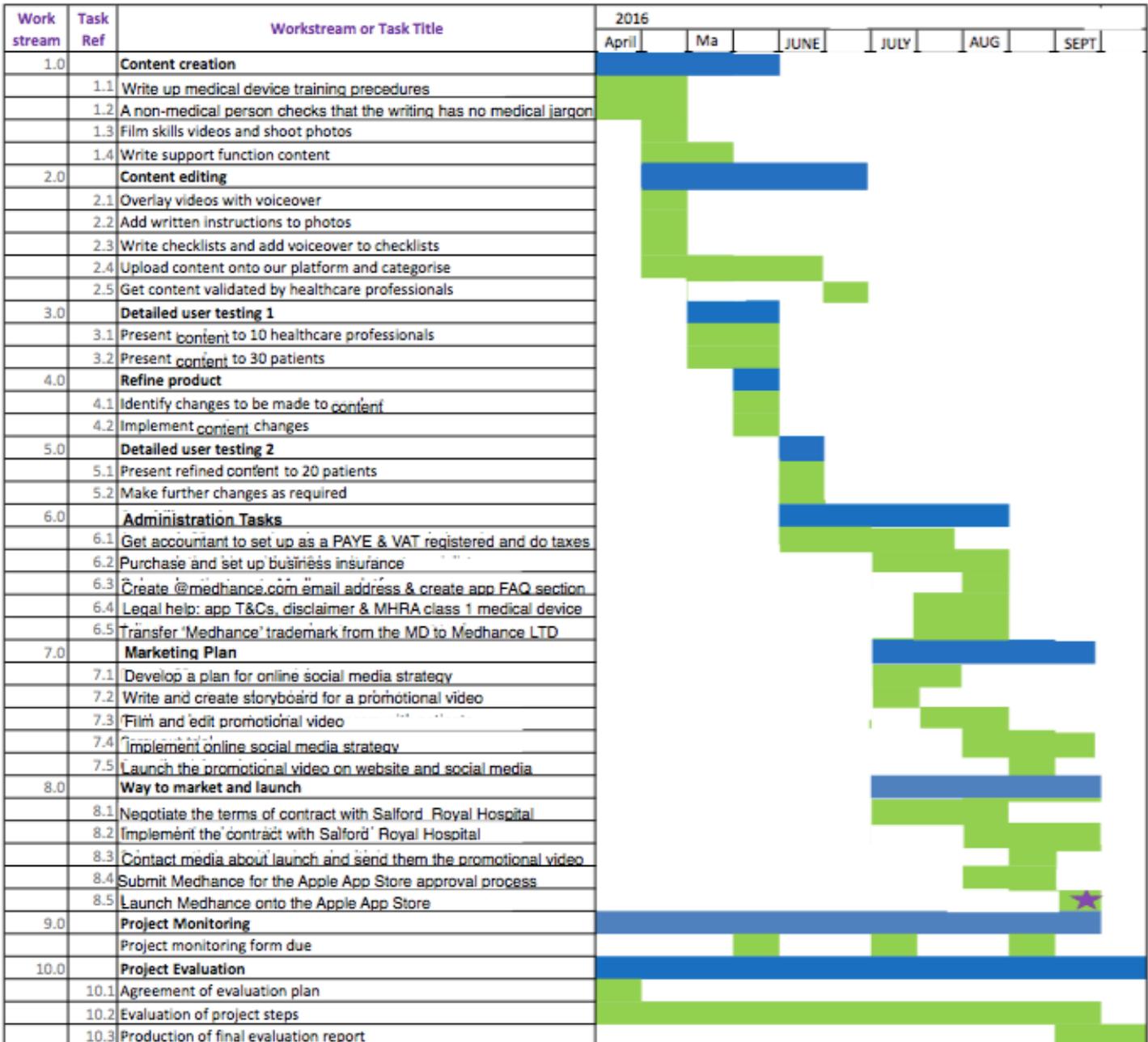
The original Project Plan was due to start earlier and run until June. However, due to late acquisition of funding and a knock on affect from that, work wasn't started on the project until April. The original funding was due in June, whilst the MD was still to be situated in London. However, there was a

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delay in receiving the funding, by which time the MD had moved away from London and no longer had the same team. In addition to this, his medical finals were looming and Medhance was no longer his main priority. It took time to rebuild a team and as a result the Project Plan was delayed by a few months. Therefore, the deadline for this project has been moved from the end of June to the end of September. This has been discussed and agreed between Uzair Adams and James Craven. Some of

PROJECT GANTT CHART

Organisation Name:	Medhance Ltd
Project Name:	Medhance
Document Date:	17th June 2016



the original aspects of the Project Plan have changed as a result of time pressures. The revised Project Plan is overleaf.

The main alterations with the Project Plan have been the dates, the rest of the plan will be almost followed exactly the same with an exception to Work Stream 6 and 7. 'Work Stream 6' has been changed from 'Capability Testing' to 'Administration'. Medhance deem administrative tasks more of

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a priority than 'Capability Testing' at this stage. Capability testing is an important part of the process and can be time consuming. Medhance do not want to rush this vital part of the process so have decided to postpone this until after the application is complete, at the end of September. Medhance did not account for administrative tasks such as arranging an accountant and seeking legal support to write disclaimers. As a result Work Stream 6 has been changed to this.

'Work Stream 7' will be changed from 'Clinical Trial' to 'Marketing Plan'. The 'Clinical Trial' will be delayed along with 'Capability Testing' for the same reasons. This is an important part of the process as it directly measures the impact the application will have. Therefore, it needs time and consideration and it will not benefit Medhance to rush this process. Medhance plan to execute this part of the Project Plan after September. We previously have considered a 'Way to the Market' in 'Work Stream 8' but have decided to complement this with a newly revised 'Work Stream 6' renamed 'Marketing Plan'. This will mainly be focusing on social media marketing and will help to distribute our brand and product and also to gain a following of users.

Below we have outlined each individual Work Stream that has been completed and any concerns the occurred.

Work Package Number: 1 – Content creation
Actual Starting month: April Predicted / Actual End month: May (on time with new Project Plan)
Work Package Objectives: <ul style="list-style-type: none"> - Write up medical device training procedures - Get training procedures validated by a non-medical professional - Film skills video - Shoot skills photos - Write support function content
Description of work this period: Main achievements: <ul style="list-style-type: none"> - Write up medical device training procedures - complete - A non-medical person check that the writing has no medical jargon - complete - Film skills video - complete - Shoot skills photos – complete - Write support function content - complete Detailed description of work performed to reach the achievements listed above: <ul style="list-style-type: none"> - The medical device training procedures have been researched and chosen, we have 10 devices, which consist of; Accuhaler, Turbuhaler, MDI, spacer, PEFr meter, GTN spray, s/c pre-drawn heparin, EpiPen, s/c insulin pen, blood glucose monitor. - The training procedures have been validated and checked by a layperson and do not contain any medical jargon. This is to ensure their user friendly and don't confuse the user. - The filming of the skills videos is complete and they have been fully edited and are ready to be uploaded onto the platform. - The photographs for the application content are also complete and fully edited and are ready to be uploaded onto the platform. - The written content for the application is complete. This has been checked and edited and is also ready to be put into the platform.

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<p>Summarise any problems you have encountered, and how they have been overcome.</p> <p>The entire process has been delayed due to reasons aforementioned. The start date of Work Stream 1 was delayed from January to April. However, once we initiated Work Stream 1 there have been no delays within the time scale of what we set. The only issue encountered during the filming was that one of the days of filming had to be postponed due to illness. This did not affect the outcome and only delayed filming by one week. It did however incur an increased cost, as the videographer needed payment for hiring of the equipment and cost of travel for that day.</p>
<p>Description of planned activity for next reporting period:</p> <p>There is no planned activity for Work Stream 1 for the next reporting period as all tasks are complete.</p>

<p>Work Package Number: 2 – Content editing</p>
<p>Actual Starting month: April</p> <p>Predicted / Actual End month: June (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Overlay videos with voice over - Add written instructions to photos - Write checklists and add voice overs to checklists - Upload content onto our platform and categorise - Get content validated by healthcare professionals
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> - Overlay videos with voice over - complete - Add written instructions to photos - complete - Write checklists and add voice overs to checklists - complete - Upload content onto our platform and categorise – complete - Get content validated by healthcare professionals - complete <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - The video voice over was recorded and edited along with the filming of the videos. All the material has been recorded and is has already been edited to overlay the film content. - The written instructions to sit alongside the photographs have also been completed ad are ready to be uploaded onto the platform. - The checklists have been written and the voice over for these has been recorded. They are at the stage where they are ready to be uploaded to the content. - The content has been uploaded onto the platform, with the edits recommended by the user testing. The app developers were fully compliant and did this in a timely manner. - We had the content validated by a GP. He was happy with the content and only had minor points for improvement which we took on board and edited the content accordingly.
<p>Summarise any problems you have encountered, and how they have been overcome.</p> <p>No issues were encountered during the recording of the voice-overs, writing of the checklists or written instructions. No issues were met with uploading the content. There was some final editing that was needed after Work Stream 5 was complete – ‘detailed user testing 2’ – to incorporate all the feedback from the user testing session, but we had accounted for this and delayed uploading until this point.</p>
<p>Description of planned activity for next reporting period:</p> <p>There is no planned activity for Work Stream 2, as all the tasks are complete.</p>

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Work Package Number: 3 – Detailed user testing 1
Actual Starting month: May Predicted / Actual End month: May (on time with Project Plan)
Work Package Objectives: <ul style="list-style-type: none"> - Present product to 10 healthcare professionals - Present product to 30 patients / users
Description of work this period: Main achievements: <ul style="list-style-type: none"> - Present product content to 10 healthcare professionals - complete - Present product content to 30 patients / users - complete Detailed description of work performed to reach the achievements listed above: <ul style="list-style-type: none"> - 10 healthcare professionals have viewed and given us feedback on the content and endorse what we have produced. They have seen the content separately to the app, as the content is yet to be fully uploaded to the platform. They have also viewed and given us feedback on the application interface based on the 'front-end' of the app. - Reviewing and feedback has also been attained from a group of 30 patients to get the user opinion on the application, its interface and usability and content.
Summarise any problems you have encountered, and how they have been overcome. No issues were encountered during the user testing stage and this was all completed within the time scale for the Project Plan.
Description of planned activity for next reporting period: There is no planned activity for Work Stream 3 for the next reporting period as all tasks are complete.

Work Package Number: 4 – Refine product
Actual Starting month: May Predicted / Actual End month: May (on time with Project Plan)
Work Package Objectives: <ul style="list-style-type: none"> - Identify changes to be made to the content - Implement content changes
Description of work this period: Main achievements: <ul style="list-style-type: none"> - Identify changes to be made to the content - complete - Implement content changes - complete Detailed description of work performed to reach the achievements listed above: <ul style="list-style-type: none"> - We had identified some changes that needed to be made, from both the healthcare professionals and the users. The main issues from the healthcare professionals point of view was making sure technique was correct and that the wording wasn't too medical. The patients mainly gave good feedback about the length and content videos and written and their only concern were certain angles of the filming were unclear so they were re-edited. Some wording needed to be made more concise or clearer too. - Medhance ensured that the technique used for all devices was correct and made alterations as recommended by the healthcare professionals. This involved re-shooting some of the photographs and video for the MDI and spacer. We also altered the issues with wording and camera angles.

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<p>Summarise any problems you have encountered, and how they have been overcome. No issues were encountered during the user testing stage and this was all completed within the time scale for the Project Plan.</p>
<p>Description of planned activity for next reporting period: There is no planned activity for Work Stream 4 for the next reporting period as all tasks are complete.</p>

<p>Work Package Number: 5 – Detailed user testing 2</p>
<p>Actual Starting month: June Predicted / Actual End month: June (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Present refined products to 20 patients - Make further changes as required
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Present refined products to 20 patients – complete - Make further changes as required – complete <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - The second round of patient feedback occurred and changes were made accordingly to the content and way it had been uploaded.
<p>Summarise any problems you have encountered, and how they have been overcome. There were no problems encountered at this stage. We had a good idea of what the user’s wanted and how they would want it presented from Detailed user testing 2 and most of the feedback involved minor hiccups with the technology or the format in which things had been uploaded. There was nothing to change on the actual content in terms of videography or photography.</p>
<p>Description of planned activity for next reporting period: There is no planned activity for Work Stream 5 for the next reporting period as all tasks are complete.</p>

<p>Work Package Number: 6 – Administrative tasks</p>
<p>Actual Starting month: June Predicted / Actual End month: Mid August (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Set up PAYE and VAT tasks with accountant - End of year taxes - Purchase and set up business insurance - Create @medhance.com email address and an app FAQ section - Acquire legal assistance to create the disclaimer and app terms and conditions - Register the app as a MHRA Class 1 Medical Device - Transfer ‘Medhance’ trademark from MD to Medhance Limited
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Set up PAYE and VAT tasks with accountant – complete - End of year taxes – complete

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<ul style="list-style-type: none"> - Purchase and set up business insurance – pending confirmation from LBH insurance - Create @medhance.com email address and an app FAQ section – complete - Acquire legal assistance to create the disclaimer and app terms and conditions – complete - Register the app as a MHRA Class 1 Medical Device - pending - Transfer ‘Medhance’ trademark from MD to Medhance Limited – complete <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - Set up PAYE and VAT tasks – our accountant has completed these tasks. - The taxes were submitted in July and are up to date, the next taxes are due in October. - The insurance company have taken their time in getting Medhance the quote; this is why this task has taken a little longer than envisaged. - The email address has been set up. The FAQs section for the app has been written and the developers have uploaded the content. - The terms and conditions have been created by ‘Spencer Legal Consulting Ltd.’ - Register the app as a MHRA Class 1 Medical Device - pending - Medhance already owned the trademark for ‘Medhance Ltd.’, however contact details needed updating.
<p>Summarise any problems you have encountered, and how they have been overcome.</p> <p>The only problems that have been encountered in this work stream have been the business insurance. The company Medhance is liaising with regarding this have been slow to reply regarding quotes. This should be completed by the 2/9/16.</p>
<p>Description of planned activity for next reporting period:</p> <p>There is no planned activity for Work Stream 7 for the next reporting period as all tasks are complete.</p>

<p>Work Package Number: 7 – Marketing Plan</p>
<p>Actual Starting month: July</p> <p>Predicted / Actual End month: September (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Develop a plan for online social media marketing strategy - Write and create a storyboard for promotional video - Film and edit promotional video - Launch the promotional video on the website and social media platforms
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> - Develop a plan for online social media marketing strategy - complete - Write and create a storyboard for promotional video - complete - Film and edit promotional video – complete - Launch the promotional video on the website and social media platforms – complete <p>Here is the link to the promotional video: https://vimeo.com/181008403</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - The social media marketing plan was submitted with the interim report and details a very clear approach to advertising Medhance on Twitter, Facebook, Linked In and directs traffic towards the website. - The promotional video also adds to the advertising and content posted on the social media platforms. This is under 2 minutes long and aims to engage a user in the concept of Medhance.

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<p>Summarise any problems you have encountered, and how they have been overcome. No problems have been encountered in this work stream. The plan has been executed in a stepwise manner, the video has added to the advertising aspect of this.</p>
<p>Description of planned activity for next reporting period: There is no planned activity for Work Stream 7 for the next reporting period as all tasks are complete.</p>

<p>Work Package Number: 8 – Way to the market and launch</p>
<p>Actual Starting month: July Predicted / Actual End month: End of September (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Negotiate with Salford Royal Hospital - Implement a contract with Salford Royal Hospital - Send media the promotional video - Submit Medhance for the Apple App Store Approval - Launch Medhance onto the Apple App Store
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Negotiate with Salford Royal Hospital – in process - Implement a contract with Salford Royal Hospital - incomplete - Submit the promotional video over social media - complete - Submit Medhance for the Apple App Store Approval – complete - Launch Medhance onto the Apple App Store – incomplete <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - The MD is in talks with Salford Royal Hospital and is creating a relationship with them. No contract has been implemented, however according to the Gant Chart we have until the end of September to achieve this. - We have submitted the App to Apple store, we are awaiting Apple to approve in order to launch.
<p>Summarise any problems you have encountered, and how they have been overcome. Problems we have encountered include Salford Royal taking their time to decide on a partnership, mainly due to poor communication on their behalf. They plan to review the app once Medhance has been launched on the app store. Another problem we have encountered is that we didn't realise the length of time Apple would take to approve the app.</p>
<p>Description of planned activity for next reporting period: No next reporting period, just awaiting Apple and Salford to get back to us.</p>

<p>Work Package Number: 9 – Project Monitoring</p>
<p>Actual Starting month: March Predicted / Actual End month: September (on time with Project Plan)</p>

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<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Submit an initial report to CHEST - Submit a midway report to CHEST - Submit a final report to CHEST
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> - Submit an initial report to CHEST - complete - Submit a midway report to CHEST - complete <p>Submit a final report to CHEST - complete</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - An application was submitted in 2014 / 15 and approved therefore Medhance could progress to the next stage of work and also receive the funds the company needed to execute the next stages of work. - The interim report was submitted at the end of June and was approved in mid August, along with funding. This allowed the project to continue. - The final report will be submitted on 2nd September, with all the changes suggested from the interim report.
<p>Summarise any problems you have encountered, and how they have been overcome.</p> <p>No problems have been encountered in this work stream.</p>
<p>Description of planned activity for next reporting period:</p> <p>There is no planned activity for Work Stream 9 for the next reporting period as all tasks are complete.</p>
<p>Work Package Number: 10 – Project Evaluation</p>
<p>Actual Starting month: March</p> <p>Predicted / Actual End month: End of September (on time with Project Plan)</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Agreement of evaluation plan - complete - Evaluation of project steps - complete - Production of final evaluation report - complete
<p>Description of work this period:</p> <p>Main achievements:</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> - Feedback from the interim report was received and amendments made. - Each work stream has been evaluated and problems have been discussed.
<p>Summarise any problems you have encountered, and how they have been overcome.</p> <p>No issues were raised during this work stream.</p>
<p>Description of planned activity for next reporting period:</p> <p>There is no planned activity for Work Stream 9 for the next reporting period as all tasks are complete.</p>

8.3.4 Sustainability of the solution

Once the CHEST funding period has been completed, the next step is to get Medhance evidence based backing. This is to prove that it has clinical benefit to patients. This requires performing a research trial comparing Medhance to what is currently done and also a control for learning how to use the medical device at home. The main key indicator would be emergency department admission rates within one year of being prescribed a medical device for that specific medical condition. Another possible indicator would be emergency department re-admission rates within one year of attending the emergency department for that specific medical condition due to not correctly using their medical device.

These would be adequate indicators for inhalers in asthma and home glucose meters in diabetes. However, this would not work for adrenaline pens.

Another possible method that requires research and evidenced based backing is how useful Medhance is as a tool for healthcare professionals to demonstrate how to correctly use a medical device to a patient. The key indicator in this situation would be the time saved by using Medhance as part of the demonstration on how to use the device.

The evidenced-based research would help showing savings on time and emergency department attendance costs. There would also be a benefit to patient care. It would be a huge selling point for Medhance and therefore create a huge uptake.

The sustainability plan is to licence access to hospital trusts and local clinical commissioning groups and the general practices in that area. They can then prescribe it for their patients at a per user cost. This allows Medhance to be sustainable and to further improve the company and the project. Further improvement includes making it accessible on other platforms and also in other European languages in order to reach a wider audience.

There are sources of grant funding available from the 'Greater Manchester Health Service Network'. We have already initiated a conversation with them and we plan to apply for funding as soon as the CHEST period is over.

The ultimate goal would be to liaise with medical device manufacturers, to provide access to Medhance with each of the medical devices featured in the application, when prescribed by a doctor. This would also allow for us to have talks with large charities such as 'Asthma UK' and 'Diabetes UK' to seek endorsements from them. As they have a large influence for their specific medical conditions and they liaise regularly with their patient group and healthcare specialists.

Other aims for Medhance's growth is to hire permanent employees. These would be a project manager to organise the team and liaise partners and customers, a developer for maintenance and solving technology issues, healthcare professional with expertise in medical devices to keep the content up-to-date with the assistance from a videographer who can also do photography, to maintain professional relationships and brand promoting within the public eye.

Further input will be put into the marketing plan by expanding on the social media strategy for Twitter, Facebook, LinkedIn, Youtube and Instagram. Also a video will be created to show the benefits of Medhance and it will be posted to these platforms and to the website (www.medhance.com).

8.3.5 Risks

Medhance relies on many external factors. The main risk to Medhance is not being able to perform a clinical trial. The clinical trial relies on receiving ethical approval and it cannot go ahead without it. Due to the late start of the CHEST project, it will not be possible to receive ethical approval and plan an extensive clinical trial in available time. This is a long process and it would not be possible to complete it before the CHEST project. The best alternative option would be to launch Medhance, then apply for ethical approval and to plan a more thorough clinical trial. Creating a more thorough clinical trial with a larger sample size would be worth waiting for. This plan will offset the

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consequences and will not delay the launch of Medhance. As these tasks are no longer being done time can be focused on a more thorough marketing plan. This will be achieved by implementing a social media strategy and publishing a promotional video.

Other risks to take into consideration include Medhance's reliance on external people. We collaborate with app developers, patient focus group and healthcare professionals. When these groups of people postpone work scheduled in our Project Plan it delays the launch for the application. Thus far this hasn't been a major issue and we try to minimise the probability of this occurring by being proactive from our point of view, maintaining good communication with these groups and having flexibility in our Project Plan. The flexibility in the plan comes from delegating more time than is necessary to certain tasks – such as a month for 'Detailed User Testing 1', which it wouldn't normally take. For this reason, this risk is low.

Another risk is not being able to form professional relationships with other organisations. From contacting and trying to form connections with a large range of companies, it is difficult to form and maintain these relationships. The best alternative option is to find one large organisation that can make a big impact and then focusing on maintaining a relationship with them for implementation and to further progress Medhance. A relationship with Salford Royal Hospital has been formed over multiple meetings, with them showing significant interest. However specific terms of the partnership are yet to be negotiated.

8.3.6 User-based evaluation of the concept

Medhance chose to use the 'focus group' methodology to carry out their evaluation of the prototype. They brought together a collection of stakeholders, in the form of healthcare professionals that could potentially recommend the application to future patients and a group of patients who currently use the medical devices. The format was an informal discussion and the facilitator took notes throughout the discussions.

Medhance evaluated their product on three separate occasions, with three separate target groups. The first occasion involved ten healthcare professionals, who were sub-split into groups of five. They demoed the application, on an ipad, with a version of the application that was in the early stages – it had the frontend of the application and the links were in use and it had one example of a medical device for an example. The rest of the videos / content for the application were viewed on a large screen as they had not yet been incorporated into the app. Verbal feedback was sought from the group. They were all adults, mainly GPs and there were 6 females and 4 males. Weak spots that were identified were particular wording within the text content and some technique for the medical devices. We have addressed this by re-wording some of the content and re-shooting the photographs / videos where the technique shown was not to a suitable standard.

The second target group involved 30 patients or potential users of the application. This group of people were split into five focus groups, each with six members, who also demoed the application, on an ipad, with a version of the application that was in the early stages. The rest of the videos / content for the application were viewed on a large screen as they had not yet been incorporated into the app. The facilitator took note of the verbal feedback given. The group ranged from age 19 – 54 years old and so all were adult; there were 20 females and 10 males. Weak spots that were identified included specific views and angles where the technique was unclear, the length of some of the videos and some of the interactive parts such as the countdown clocks. Medhance addressed the issues mentioned and re-shot some of the angles and endeavoured to make the technique as clear as possible. The feedback from the countdown clocks was appreciated and as much of the feedback was applied as in keeping with Medhance's creative vision.

The final target group are yet to contribute their feedback as this is planned for the end of June. Currently Medhance has organised a group of 20 patients, all adults, 11 female and 9 male to attend

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this target group. They will be delivered the application in a demo mode, with a prototype that has had changes made to the content based on the previous focus groups feedback.

Medhance have chosen their primary social impact area to be ‘impact on information’. The dimensions chosen to be measured are ‘access to information’ and ‘quality of information’. The data available on the platform has gone from, no data at baseline to video, photographs, word content and checklists for each medical device. The focus groups have evaluated these forms of data. The variety of the methods of delivering information meets the requirements of everyone in the focus groups. The application aims to be delivered to a range of people, information therefore needs to be delivered in format that will meet the needs of this vast group of people. Medhance have included the broadest range of formats that were appropriate.

The quantity of information was another indication Medhance chose to evaluate. After discussions with healthcare professionals regarding which medical devices were the most common, a list of ten devices was chosen. For each device a video, photographs, written instructions and a checklist has been created. Medhance have met their target value with regard to ‘quantity of information’ KPI.

The third indicator chosen to be measured is ‘quality of information’. By choosing to include healthcare professionals in our focus group, we can ensure that the information included in the application is of an appropriate standard expected within the healthcare community. The indicator target was to have feedback from 11 professionals, and at this stage only 10 professionals have given us feedback. The target is predicted to be reached by the end of June.

The secondary social impact area chosen was ‘impact on education and human capital’. The dimensions within this area are ‘training provided by the project’ and ‘change in personal investment in patient education’. At the beginning of the project Medhance had not created any tools to educate patients with – we now have a fully running iOS application, with frontend and backend, and content to incorporate within the application. Therefore this target has been met.

Medhance set out to educate patients in an effort to increase the quality of patient’s technique of medical devices after engaging with the application. At the beginning of this project we were hopeful that this would happen, we aimed to build this confidence from a 3 (where 1 is not confident that our project will increase patient’s technique after engagement and 6 is totally confident in the applications ability to increase technique). However, since running focus groups and receiving feedback, our original target of 4 has been surpassed. We have created content that was of a higher standard than originally predicted and thus we are able to say our confidence in the platform is now a 5. After receiving feedback from healthcare professionals they also seem to think it will save more time during their consultations than we had originally predicted. Therefore, we have also surpassed the expectations of timesaving effects on healthcare professionals.

8.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 14.

Table 14: Snapshot of project "Medhance"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop an innovative platform that uses academic best practice to educate patients and carers, and more	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Medical device training procedures written then validated by a non-medical professional. ○ Skills photos taken and written instructions 	<ul style="list-style-type: none"> ○ Dedicated project website: http://www.medhance.com/ ○ Promotional video with over 100 plays on Vimeo: https://vimeo.com/181008403

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<p>importantly help them retain what they have learnt, by being simple to use, intuitive, and engaging users through a variety of media (text, photographs and videos).</p>	<p>added.</p> <ul style="list-style-type: none"> ○ Skills videos filmed and voiceovers added. ○ Checklists written and voiceovers added. ○ Content validated by healthcare professionals. ○ User testing with 10 healthcare professionals and 30 patients, feedback implemented before further testing with 20 patients. ○ Created promotional video and online/social media marketing strategy. <p>The project successfully delivered 9 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Medhance social media accounts: Twitter (975 followers), Facebook (170 likes) ○ Medhance blog on the project and digital health generally: https://medhance.wordpress.com/
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Table 15 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (education and human capital) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 15: Mandatory KPIs for Medhance

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	1	2	2
		Number of users involved in co-design process	30	50	50
		Ratio between men and women involved	(M):(F)- 1:2	(M):(F)- 1:2	(M):(F)- 1:2
		Ratio between young, adult and old people involved	All adult	All adult	All adult
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	3	4	5
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1 website (www.medhance.com), 1 twitter account,	1 website, 1 twitter account, 1 facebook account	1 website, 1 twitter, (still awaiting facebook – this will be achieved then the marketing plan is executed)
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	1	1

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		Number of comments / replies on project blog entries on CHEST website	0	1	1
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	98 followers on twitter, 0 facebook friends	200+ twitter followers (target value to be completed by September 2016), 200 Facebook likes (you can't friend a company)	1,013 twitter followers, 169 Facebook friends / likes
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	73 tweets	100 tweets, 150 likes on Facebook	178 tweets, 169 likes on Facebook

9 MoreLife Online¹⁷

This project aims to engage the population of overweight and obese individuals, providing support whilst encouraging effective behaviour change, through a web-based members' site. This website will provide users with a safe, support system that is accessible 24 hours a day, with unique behaviour change tools and resources enabling users not only to lose weight, but also providing a community of individuals who can offer peer to peer support, guided by experts to promote persistent behavior change and long term weight management.

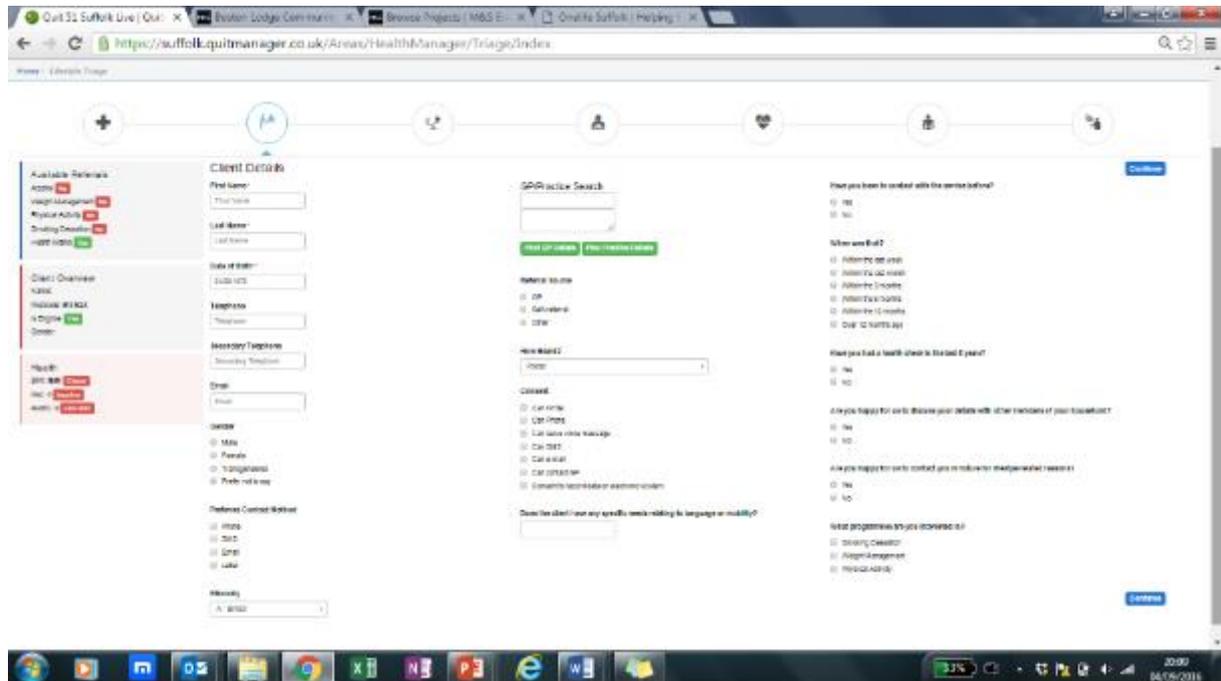


Figure 9: Photo of the MoreLife prototype (patient management system)

9.1 The societal problem

9.1.1 Description of the problem

With 1 in 3 children and 2 in 3 adults having a weight problem, obesity has been outlined as a major public health problem. The consequences of obesity are significant in terms of physical health (type II diabetes, heart disease, some forms of cancer), mental health (depression, anxiety, low self-esteem) and human capital (educational attainment, income, family functioning). Obesity tends to impact on the most vulnerable members of the community with disparities found in income and ethnic groups, those with mental health issues as well as wider social (isolated individuals) and family (bereavement, family breakdown, family members with physical or mental health issues) challenges. During these difficult economic times the more vulnerable members of the community are disproportionately challenged to engage in healthy behaviours which will contribute to their weight management and therefore long term health. .

Whilst it is clear that obesity is due to an energy imbalance (too much energy intake vs expenditure) what appears to be more important are the factors that drive these two behaviours. These are genetic (although few specific genes are responsible) environmental factors (food and physical activity environments, social, cultural), individual factors (mental health, social factors) and lifestyle factors (food and physical activity). As outlined above vulnerabilities influence the degree to which the food environment can lifestyles can be focused on more healthy behaviours vs less healthy behaviours. For example obese people report that they are more likely to eat when they feel stressed or are unhappy

¹⁷ Chapter contributors: Mathias Becker, Hayleigh Beck, Carol Weir, Paul Gately

We aim to create an effective digital approach to engaging and support our clients more effectively. Focused on delivering a safe, non-judgemental and accessible tools. A place where individuals can support each other whilst gaining expert support from the MoreLife team and a place where they can utilise online behaviour change tools to support behaviour change to improve their health and wellbeing. These tools recognise the above vulnerabilities and focus on achieving attitudinal, behavioural and lifestyle change to improve health and wellbeing.

9.1.2 Scale of the problem

1 in 3 children and 2 in 3 adults have a weight which will impact on the quality and duration of their life (Health Survey of England 2014). These figures reflect a similar issue across the Europe with obesity outlined as a major public health issue. It is recognised by WHO Europe as a major public health problem. Annual surveys of obesity are limited as they are subject to several forms of bias, however, it is acknowledged through trend data that obesity rates across Europe continue to increase with little evidence of success in tackling obesity. Obesity rates are higher in disadvantaged and marginalised communities. There is strong evidence of a bidirectional relationship between obesity and mental health issues. Such that obesity is both a cause and a consequence of mental health problems.

In addition, to the individual consequences there are a range of societal impacts namely the economic costs of obesity which are significant at £6.1bn per annum in direct costs (direct healthcare NHS costs) with indirect cost (to Local Government) estimated at a further £20.7bn per annum.

Despite the scale and consequences of obesity, action remains a low priority. HOOP, an obesity charity, have outlined that despite obesity costing £27bn (almost double the costs of substance misuse) the investment made by local authorities in 2013/14 represented 2.5% of the public health allocation. This figure is more than 10 times lower than the investment in substance misuse.

Reports suggest that obesity is likely to increase for at least the foreseeable future and whilst we have seen levelling off in some groups of the population (more affluent), those from deprived communities ("Obesity prevalence for children living in the most deprived areas was double that of those living in the least deprived areas") are continuing to see increases (National Child Measurement Programme 2016).

Whilst many comment on the physical health problems of obesity the social consequences are more profound and there is now greater understanding that the broader economic costs of obesity including social costs are 7 times that of the health related costs (Foresight 2008). Specific examples are that educational attainment is negatively influenced by obesity, obese women earn approximately 15% less than their healthy weight counterparts. Obese people are less likely to marry and more likely to divorce.

MoreLife provide weight management groups and services for children, adults and families. The changing landscape of our services (due largely to the rapidly changing landscape of the health care system in the UK) is forcing us to continually adapt to the needs of our service users and a declining budget (a recent research publication shows we have faced a 40% cut in price per person paid to our services <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4949908/>) although we have maintained attendance and outcome rates. However this maintenance of performance has been at the expense of innovation, further research, team development and marketing and communications to further develop our organisation. Despite the scale of the obesity issue the funding from Local Authorities (<http://hoopuk.org.uk/about/2014-hoop-report-tackling-obesity-all-talk-no-action/>) and Clinical commissioning groups (http://hoopuk.org.uk/wp-content/uploads/2016/06/Hoop_report_2016_stg4.pdf) continues to reduce at an alarming rate which is requiring us to be more flexible in our support programmes for clients. The specific problem is how do we offer flexible support?

9.1.3 Previous approaches to solving the problem

The most comprehensive research programme on obesity and public policy action outlined that there are approximately 125 determinants (transport policy, food production, advertising, marketing to children, and sugar content of diet, genetics, and culture of individual responsibility...) that drive obesity. These determinants are linked to varying degrees in different population groups. Therefore the complexity of obesity is high. As a provider of weight management services we are focused on providing support programmes for overweight and obese people. Engagement in weight loss programmes vary and as we learn more about the factors that influence engagement there is further recognition that different forms of support are necessary. We have feedback from service users that online support tools are of value however these forms of support are still in their infancy. This is therefore part of our overall ambition to continue to evolve our engagement tools that will both support engagement and weight management which will lead to individual and societal health benefits. We use a motivational framework called Self Determination which focuses on giving participants the necessary skills, exposing them to a solution focused and motivational climate, giving them autonomy to develop and learn.

9.2 Implementation of organizational structure

9.2.1 Maturity of the project

We have progressed to pilot phase of our project with several recent modifications.

9.2.2 Organizational structure

The project is led by a programme manager within MoreLife. This person is the interface between the research team, the web development team and MoreLife programme managers responsible for accessing the client groups we have selected to support the programme. With a new operations director in post we have taken the opportunity to focus our programme delivery into one of our new contract areas.

Our research lead will capture and collate the information provided by services users, they will provide information to the programme manager who will brief the web development team.

The web development team are a company that built the first phase of our online solution and continue to support the maintenance and development of our site. They will continue to develop the web systems as per the needs and instructions from MoreLife team members and user groups.

With some new elements identified we made the decision to develop a new patient information system as part of our programme work. This required us to develop a new system, we engaged with a new web developer as they already had a tool that was ideal for our use.

We focused our attention on two new contracts to implement our plans. These were our MoreLife camp programme and our Suffolk contract. They provided us an opportunity to test out our lessons learnt as part of our insight work. This required involvement of a local programme manager in Suffolk.

9.2.3 Key personnel

Our programme manager left us in February 2016 which had an impact on our progress. Our recently appointed Director of Operations, Carol Weir therefore took overall implementation of the programme. Carol is a registered dietitian and public health specialist. She holds a BSc (Hons) in Nutrition & Dietetics from King's College London, an MSc in Public Health and is currently completing a PhD in Obesity at Sheffield University. Before joining MoreLife, she was the Clinical Lead for children's services at Leeds Community Healthcare NHS Trust and the Head of Nutrition and Dietetics at the same trust.

Carol is supported by Professor Paul Gately. Paul is the Director of MoreLife and holds a PhD in Obesity, a MMedSci in Human Nutrition and a BA in Human Movement Studies. He is a leading expert in childhood obesity and is a visiting professor at Imperial College London. He has delivered

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over 400 keynote presentations and has presented a number of television and radio shows on the topic of obesity.

We also appointed another staff member on a temporary contract to support our ongoing project work particularly the relationship with the web company as our programme manager had always been our link with our web development company. This highlighted a gap in our infrastructure and has required us to reconsider our staffing structure and relationships with IT providers. We temporarily employed Gavin De La Tour to bridge this gap and support our IT providers during the projects. Gavin is a Senior Reporting Analyst and Data Specialist with over 20 years' experience. He previously ran his own company providing data and reporting solutions to large firms such as Connexions.

Web development team have been working with us for 6 years and have supported our website and development over that period of time. We have a strong working relationship with them. (<http://www.mckennaconsultants.com/>). McKenna Consultants are Computer Programmers and Agile Consultants and the company was established in 2004. Each of their team members has at least 10 years of software development experience. They are able to develop bespoke software systems as well as mobile apps and other platforms.

We have also developed an improved patient management system with a software developer to support our recording of client access of services and also to provide further information about health needs, social and mental health challenges to drive our engagement with service users, our developer of this system is (www.north-51.com/LandingPage.aspx). North 51 HealthWare is part of the multi-million pound North 51 business and is a leading designer and developer of software for the healthcare sector. More than 130 trusts, public health teams, CCGs and healthcare companies. Each of their employees have at least 5 years' experience in software development or similar. The product we use is called Lifestyle Manager. Please see attached screenshots of this triage/patient management system.

For the MoreLife Camp website, OneLife Suffolk website and design work for both brands, we used Zeppo Creative. We have had a close working relationship with Zeppo for the last 4 years. The team have a vast amount of experience in design, copywriting and account management. Our contact here is Matt Ferres. A designer with over 15 years' experience. He has worked with clients like Camden, Leeds and Hull councils as well as the BBC and University of Leeds.

Our Programme Manager is part of a wider team of programme managers and coordinators who currently manage our contracts and relationship. Our Programme Manager for this particular project (Suffolk) is Ali Clements. She has nearly 10 years' experience of working with children and previously managed all children's weight loss and healthy living programmes in Suffolk before we won the OneLife Suffolk contract

9.2.4 Partnerships, cooperation, and networks

The last 9 months has seen a significant transformation in our plans and ideas about engaging with our service users. With some important staff changes we agreed to reflect on our plans and refocus our efforts.

We recently won a contract in Suffolk which gave us the opportunity to put our phase 1 developments into practice. We therefore worked with several partners to develop this work further.

Firstly with Suffolk County Council we established a network of members across Suffolk to help set up and shape our contract further. This involved public, private and voluntary sector organisations that are associated with the promotion of health and wellbeing.

This programme included commercial partnerships with two other organizations to deliver our contract, they included Quit 51, a smoking cessation partner, and health campaign specialists Healthier Futures. These two organisations oversaw the smoking cessation and health campaign

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dimensions of our contract whilst we looked after the weight management and overall healthy lifestyle promotion.

Specifically for the development of our digital tools we continued to engage with our colleagues at Leeds Beckett University. We were made aware of a patient portal system developed by the parent company of one of our Partners Quit 51, called North 51 and we worked with them to establish a more focused patient management system. Much of our insight to date had showed us that we could be more impactful if we are able to characterise service users/clients more accurately to provide tailor support and help for them.

We have continued to work with our current web developers but feel there are more effective and impactful ways to support clients, including engagement with other IT providers. We have had to build our internal capacity and capability to support this approach.

9.3 Implementation of the solution approach

9.3.1 Solution approach

In our efforts to solve the global obesity problem, MoreLife runs high quality and evidence-based programmes for adults, children and families on behalf of the NHS and local authorities. These focus on behaviour change, diet and physical activity. With funding continuing to be cut for services relating to obesity, and obesity levels continuing to rise, it is important that we offer more flexible support services for our clients that are not necessarily funded by the local authority or NHS.

One of our PhD students, Nicola Sides (Leeds Beckett University) has been studying the impact of communicating with our teenage clients via digital means and found that *all* service users benefit from some form of online support; whether it be an online programme or social media. Therefore, we decided to focus our project on upgrading our digital systems. This includes the patient management system, social media offerings and front-end websites (see section 2.2.4 for full details of these activities). This will allow us to support service users better on a digital front and also support future plans for offering online programmes. We are not able to offer these online programmes until we have a strong front-end website and supporting patient management system in place. The social media offerings will help us better communicate with our service users and other stakeholders.

We believe strongly that digital tools provide another form of communication with clients, however the evidence to date on impact is limited. Early attempts of our digital tools has been to translate our face to face programmes into online tools, they have shown us that whilst they were used by many they were not used by all. Therefore, we need to make our digital offerings more robust in order to engage service users.

The patient management system will allow us to store patient data safely and also ensure that clients are being referred to the correct programmes. For example, if a patient calls and is overweight, but is also an inactive smoker, we are able to refer them to a smoking cessation service and an activity service as well as a MoreLife weight management service in one single phone call or email. This allows people to take the steps towards becoming healthier with minimal effort and fuss. The management system also allows us to contact patients through various different forms i.e. text, social media, email, phone call etc. which helps us stay in touch with patients before, during and after their programme. Therefore, meaning we can offer far more flexible support.

The front-end websites for both MoreLife Camp and OneLife Suffolk (subsidiary offerings of MoreLife – one being a residential weight loss camp for kids and the other MoreLife programmes based in Suffolk), need creating/redeveloping so that resources and social media feeds can be added to them. Eventually, users will be able to log in and download resources such as worksheets, recipes, exercise tips etc. The websites also mean that we are visible online and people can contact us should they need to.

The social media feeds are the part of the project that will enable us to offer more flexible support. Users will be able to ask questions through Facebook, tweet us or have a conversation with their weight management practitioner and other group members through WhatsApp. Often people are not confident enough to pick up the phone or ask questions face-to-face so social media contact will offer options for these people. Through social media, we can also send out reminders to patients as well as motivational tips and tricks.

9.3.2 Target groups

This project aims to engage the population of overweight and obese individuals, providing support whilst encouraging effective behaviour change.

Throughout our 15 years' experience of working with overweight and obese individuals, we have gained a great understanding of individuals' needs. Many have expressed a need for a safe accessible place where they can face and address their challenges alongside others.

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This funding has provided ongoing testing of our digital plans to support overweight and obesity people. We have focused our efforts recently on the implementation of our insights to date on a new contract we won. This contract is to deliver health and wellbeing services within an integrated way to 10,000 people per year for 9 years. We have continued to engage with our client groups in other areas but we have focused our delivery in Suffolk.

MoreLife client groups are widespread and include:

- Children aged 2-18 years – who will benefit from our specialist (residential) and non-residential services with highly trained professionals (Dr's, Dieticians, Exercise Physiologists, Psychologists), our community interventions as well as our obesity prevention programmes which are led by our well trained health coaches.
- Families – our programmes for children 2-18 are family based and involve parents and careers which requires us to have support packages in place that are relevant for them.
- Adults - Aged 18 plus - We offer specialist services with highly trained professionals (Dr's, Dieticians, Exercise Physiologists, Psychologists), as well as community interventions and obesity prevention programmes which are led by our well trained health coaches.
- Programmes are particularly focused in areas of deprivation – typically 40% of our contract work is focused on the top 10% of the deprived communities of the areas that we serve. Therefore as outlined above we are disproportionately focusing our resources in what are typically called “hard to reach areas” to ensure that our work and therefore investment of public funds does not leads to increasing health inequalities.
- Our evidence shows that those that access our services particularly adults have a variety of social and psychological challenges. 80% of the adults that sign up to our Specialist Services have at least 1 clinical diagnosed mental health condition. We find approximately 40% of clients to these services are unemployed compared to local averages (8-12%). Aligned to the contract requirements many are in deprived communities therefore a number of clients are on social care benefits.

Given the widespread use of digital tools we want to be able to use these tools to continue to reach out to our service users who are attempting to implement healthier lifestyles. Our intention is to support:

- Greater awareness particularly in vulnerable groups, this requires a stronger online presence both in terms of our public facing website and via social media channels.
- Our analysis of patient data and engagement is highlighting trends in use of services and enables us to proactively contact clients to encourage them to participate either online, return to our face to face sessions when they have disengaged or take up additional sessions we are providing to catch up on what they might have missed.
- Refinement of our online support tools to ensure greater usability and engagement to support behaviour change.

9.3.3 Activities and work performed

In appendix 1 of this document you'll find a set of templates to describe your specific activities during

This project has continued to evolve throughout, the timelines have always felt tight but the stops to the project due to discussions of funders with Chest agencies has enabled us to continue to reflect and evolve our work.

Several factors have significantly influenced our plans over the last 9 months:

We have had some people changes at MoreLife that have forced us to reflect on this project as well as an overall review of our programmes and activities by our new operational leadership team.

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One of our PhD students has reached a point of analysis with her work that has contributed to our thinking with the next stage development of our digital approach. The research was focused on channels of communication for supporting children and their families post weight loss interventions. This work was very helpful in shaping our plans particularly about how service users are likely to use digital tools especially the most commonly used and free digital tools particularly social media tools.

Our new contract in Suffolk has also required us to implement our lessons learnt and the setup of a bespoke systems which was aligned to the overall objectives of our initial plan, but they provided additional financial and human resources to deliver the project at the standard we wanted to.

We recognised through our partnership with Quit 51 we have been able to access a web developer that has strengths in patient recording and management systems that enabled us to develop better a more individualised care plans for our service users. This is already helping us tailor services.

Colleagues within the university have continued to support our plans and keep us focused on pragmatic tools to maximise service users' experiences.

Our digital programme of work has refocused our efforts across three areas of work

1. **New front-end website.** Interviews with a variety of stakeholders, service users/local partners in Suffolk suggested that we needed a specific website for our programme. We therefore designed a new website for this new service. See: <http://onelifesuffolk.co.uk/> we have established a service user group that is helping us refine the programme. This piece of work was led by a design agency as feedback of our www.more-life.co.uk was that it was too child focused, despite the broad range of services we offer. This website is important for our recruitment process, it can be difficult for people to acknowledge they need lifestyle change support and so we need engaging marketing and communications approaches to reach as many people as possible.
2. **New patient management system** – Our previous patient system was a bespoke system designed for our needs, however it is becoming quickly outdated and new and cheaper systems are being developed all of the time. In addition, one of the insights particularly gained from our clinicians and our PhD student as part of this project was the need to utilise data from our clients more to drive our performance and practice. We have begun to do this but due to the type of patient management system we had, it was expensive to modify our system to add additional functions. Our partners Quit 51 have a parent company North 51 who have developed patient management systems to support interventions like ours. We have therefore worked with North 51 to evolve their patient management systems to meet our needs. This new systems is more user friendly and efficient for our staff which is saving resources and time. Through our research teams we are driving greater use of data to support individual behaviours. We have also agreed to support a PhD student at the university to undertake a project focused on using data to tailor interventions more effectively. All of this combined is already improving our practice and we expect these investments to continue to impact on our programme over the next few years. We are in the process of agreed migration of all of our patient data to this new system.
3. **Using common social media tools.** – Feedback from our PhD students project as well as feedback from service users in our programme evaluations was that whilst helpful the social networking tools we had on our in-house system were not as good as those they currently use, in addition, they want to be able to use Facebook, twitter, Instagram and WhatsApp functions to support their behaviour change tools. We have used SMS previously to good effect but the use of WhatsApp is now easier to establish groups that can be support with more specific messages, also through this digital tool we are able to engage in ongoing and more specific feedback. We reflected that trying to replicate social networking outside of standard networking tools was not what our clients wanted. Most social networking sites provide safe communication which was a major driver for our initial plans. We are now using:
 - a. Facebook
 - b. Instagram

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- c. Twitter
- d. Whats App

As part of our programme engagement we have trained our staff in the use of social media to support our service users. Whilst many of our staff use social media many didn't use all forms, so this has been great capability and capacity building. Staff have reported back that being able to support through these channels has been helpful to their engagement with service users.

Repeat for each work package:

Work Package Number : 1
Actual Starting month : Predicted / Actual End month : Feb to June
Work Package Objectives: Establishment of a new website for our service in Suffolk.
Description of work this period: Main achievements: Delivery of our new website and on-time. This website is already engaging service users with Detailed description of work performed to reach the achievements listed above: This work packaged involved our operations and marketing teams engaging with an external agency to set up and deliver our new website for the service launch in May. The insights gained to date as part of this work were critical in the brief we provided to the agency. This work involved a team effort from our central team as well as our local team in Suffolk which we had TUPE'd across from the previous provider as part of the programme takeover. This required a significant amount of work. However, we were able to draw all team members together to work with our agency to develop our new website.
Summarise any problems you have encountered, and how they have been overcome Bringing together a number of teams in a short space of time, as well as the challenges around the CHEST project at the time put stress on the project team. However we were clear on our direction and able to deliver on our objectives.
Description of planned activity for next reporting period The site will continue to evolve after this project, we have a plan in place to ensure monthly client reviews drive continual improvements.

Work Package Number : 2

<p>Actual Starting month :</p> <p>Predicted / Actual End month :</p> <p>Feb to June</p>
<p>Work Package Objectives:</p> <p>Establishment of a new patient management system for our service in Suffolk.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <p>Delivery of our new patient management system. This system is already supporting staff members to more effectively support client in Suffolk</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <p>This work package involved our operations and marketing teams engaging with our partners North 51 and Quit 51 to set up and deliver our new patient management system for the service launch in May. The basic system that North 51 developed met many of our needs requiring a small amount of design and development work to meet our needs. North 51 are a well-established digital agency working in the health and wellbeing sector primarily in Smoking cessation therefore the patient management system had many of the functions that we required. The significant number of KPI's on the contract required work to ensure the data reporting was undertaken in a way as to reduce administrative work. Our new operations team in Suffolk were involved in the project given their ongoing involvement in the contract and the importance of monitoring and evaluation of this contract.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>Bringing together a number of teams in a short space of time, as well as the challenges around the CHEST project at the time put stress on the project team. However we were clear on our direction.</p>
<p>Description of planned activity for next reporting period</p> <p>The patient management system will continue to evolve after this project, we have a plan in place to ensure monthly client and staff reviews to drive continual improvements.</p>

<p>Work Package Number : 3</p>
<p>Actual Starting month :</p> <p>Predicted / Actual End month :</p> <p>Feb to May</p>

<p>Work Package Objectives:</p> <p>Establishment of a new social media tools for our service in Suffolk</p>													
<p>Description of work this period:</p> <p>Main achievements:</p> <p>Set up and development of our new social media channels in Suffolk to attract and support service users, to develop new working relationships with partners across the region.</p> <p>Detailed description of work performed to reach the achievements listed above:</p> <p>This work package involved our operations and marketing teams engaging to develop a plan to set up our social media channels as well as make sure our staff were competent enough to use these channels. We set up the channels on Facebook, twitter, Instagram, we have also set up WhatsApp groups as part of our service management with clients. This required a significant amount of work. However, we were able to draw all team members together to work with our agency to support this work.</p> <p>These social media channels are already working well and we continue to grow our numbers on these sites.</p> <p>See below for figures to date</p> <table border="1"> <tr> <td>OneLife Suffolk Site 11/05/16 - 11/09/16</td> <td></td> </tr> <tr> <td>Individual Sessions</td> <td>7250</td> </tr> <tr> <td>Individual Users</td> <td>4896</td> </tr> <tr> <td>Page Views</td> <td>19706</td> </tr> <tr> <td>Avg. session duration</td> <td>02:13</td> </tr> <tr> <td>Bounce rate</td> <td>46.40%</td> </tr> </table>		OneLife Suffolk Site 11/05/16 - 11/09/16		Individual Sessions	7250	Individual Users	4896	Page Views	19706	Avg. session duration	02:13	Bounce rate	46.40%
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<p>Description of planned activity for next reporting period</p> <p>These digital tools will continue to evolve after this project, we have a plan in place to ensure monthly client reviews drive continual improvements.</p>													

9.3.4 Sustainability of the solution

Despite a change in our plans we believe the insight focused approach we have taken has led to a better a more sustainable approach. Our original plan to develop an in-house approach had failed to

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consider important information and insights from service users and partners. We believe our new approach to digital tools will enhance our practice significantly.

Working with a partner (North 51) that has a vested interest in supporting us to deliver services (as they benefit from improved performance) we are likely to see patient system improvements in a more cost effective way than previously. In addition, we have more freedom and flexibility in the development of reporting both individual level as well as group level data, which will improve our work with clients and healthcare commissioners. The use of social networking tools such as Facebook, Twitter, Instagram and WhatsApp are cost effective as they are free, they will continually develop, which we are able to benefit from. Finally our updated website is using a variety of images that we are using for our hard copy marketing and curriculum resources. We think this will enable us to more cost effectively utilise imagery for our website to continually refresh it and make it engaging.

These systems will be more cost effective therefore we are confident in the sustainability of these tools

The Suffolk contract we won and where we have trialled these plans is a 9 year contract, which is unusual in our sector. However, this gives us some time to continually develop, invest and evolve our offer.

Our investment in research into practice through our PhD programme of investment will also ensure that we are continually improving our plans to make them more impactful and cost effective. We believe the more we are engaged in the use of digital tools the more they will continue to impact and enhance on our services.

We believe our new approach will remain cost effective, however we also believe it will be vital to continue to win contracts in this area. As outlined in both this and the interim report, the healthcare system is changing fast in the UK and we believe this programme of work will lead to us winning more contracts. As outlined a number of competitors enter but leave the market quite quickly. We believe our ability to flourish in this market is due to our strong evidence based history but also our adaptability and focus on client impacts. We have been adaptable to the resources available and we believe we have evolved a more impactful approach to digital engagement and an overall better offer for both clients and healthcare commissioners. We believe this will be the only way to continue to be credible in this marketplace and win further contracts.

9.3.5 Risks

[...WP1 Overview and Deliverables: Agile website development

WP1 Risk: there is a risk that the development of the digital platform is held up. We believe this is a medium risk primarily due to the fact that the web developers work in an agile way that enables them to function in a non-linear way which makes them more effective in website development.

Medium. Developers have already built phase 1 of the members' website so have an excellent understanding of the code base / system. They have a team of developers to cover any unexpected eventualities.

WP1.1 Deliverables – Risk – programme changes – our ongoing work with clients has impacted on our initial plans significantly. Whilst these are risks to our programmes our team have been responsive to those lessons learnt. We have always had a flexible and evidence based approach to programme development

WP 1.2 Deliverables - Risk – Health care system changes – There have been significant changes over the last 5 years to the health and social care system, particularly due to the austerity measures in the UK. These have played a more significant impact on this project than previously anticipated, however our ability to respond to this changing environment has led to more appropriate development of tools to achieve our objectives.

WP 1.3 Programme interruptions – CHEST programme interruptions – There have clearly been a number of interruptions to this programme. Again our ability to respond to change as well as these interruptions enabling us to “take stock” and consider the importance of the healthcare systems

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changes we have faced and continue to face leading to a better set of project developments and outputs.

WP2 Overview and Deliverables: In-house testing phase:

WP2 Risk: Low. Experienced testers and contingency development time built into budget.

WP 2.1 Staffing challenges – We have had some significant staffing changes over the last 18 months which has had a variety of impacts on the business, and particularly this project. The programme manager who was initially assigned this project left due to personal reasons that were impacting on work. This was a blow to the organisation given her knowledge of the IT systems. However, this has forced us to review our plans, we recognised that a strong drive for our internal end to end system was this employee's leadership. However, we reflected and believe as far as this programme of work is concerned we believe we have developed a better solutions. Therefore this was a high risk element of the business we had not considered but it has worked out for the business.

WP3 Objectives and Deliverables: Testing groups:

WP3 Risk: - Low. HOOP already have a growing membership of over 6000 individuals. Additionally we are contracted to meet the stated numbers in Essex, Oxford and Stockton.

WP4 Objectives and Deliverables: Analysis and reporting

WP4 Risk: High. With changes to our team this has emerged as a challenge to the business. We have had a significant transfer of our senior management team and we have won several new contracts. This has had an impact on our ability to effectively analyse and report. This has been especially difficult given we have made significant changes to both our initial and interim plans.

9.3.6 User-based evaluation of the concept

As outlined above we recognised early on that our focus on further web development was questioned by experts in this area. We were unaware of the need to further consider the usability of our website and had relied on our system development agency to consider these factors on our behalf. Through links with Leeds Beckett University we recognised the need to undertake further user needs insights. We were able to engage with academics at the university and also deploy some of our team members with support from researchers to undertake further insights into our web systems, its functions, strengths, weaknesses and developments.

Our programme in Suffolk gave us the opportunity to further establish our plans. Our focus groups (n=10) provided rich information, the meeting with local stakeholders from the voluntary and community sector also gave us an insight into what works locally for local people within the wide range of groups we serve. The work of one of our PhD students also provided further information to guide our plans, here work was based on 8 focus groups, over 200 interviews with clients and their families.

The number of target groups we have engaged with is relatively similar to our initial plans, we have engaged with a variety of service user/groups from MoreLife. We have not engaged with the HOOP members as we felt we were not at the right stage for this and our plans in Suffolk seemed a better way to achieve our objectives. We did however, engage with Adults 18 and over including several over 50 year old groups. We also engaged with children and young people as well as their family members. We engaged with families in several sites around England.

We engaged with over 1000 service users to help us continue to develop our online support tools to help behaviour change. This is less than we had projected however we feel we have spent more time focused on quality engagement as we realised this was a gap in our work to date. Our work with groups in an intensive setting provided strong feedback from service users who were able to use the member site on a number of occasions, providing useful insights about the service user journey. In addition, the work we did with academics at Leeds Beckett University provided us with external and objective views of our service users' needs and especially the ability to consider how service users might like support.

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Women tend to engage in weight management programmes more than men, however we were able to engage a number of men in our programmes. We estimated approximately 55% of service users would be women and we believe that this is an appropriate estimate. We deliver a number of men only programmes as some men prefer such groups. We are keen to understand more about men's use of online tools to understand how the member's site might continue to be developed in the future.

We engaged with a broad range of service users from young people to older adults, approximately 20% of service users were younger people, the large majority of service users were from our services including services across the country.

We feel the above KPI's are below our expectations, however we feel that the changes we have made were for good reason and we believe this will ensure better and more efficient programme development.

The feedback we received from service users was invaluable as we believe it has provided a more robust digital support programme. But also it has influenced our use of marketing combined with our online tools. The use of social media is being valuable in raising awareness of our services with other in the local community as well as it is being used as a social media tool.

9.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 16.

Table 16: Snapshot of project "MoreLife Online"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To enable everyone to benefit from the high quality and evidence-based obesity reduction programmes (that are run on behalf of the NHS and local authorities), by upgrading the digital patient management system and online platform (front-end websites and social media) to effectively deliver safe, non-judgmental and accessible tools and information.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Created a new website for the project's dedicated programme: One Life Suffolk. ○ Developed an upgraded digitised patient management system to drive performance and practice. ○ Established a full range of social media channels for the One Life Suffolk programme, including Facebook, Twitter, Instagram and WhatsApp. <p>The project successfully delivered 3 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Organisation's main websites (http://www.more-life.co.uk/ and http://www.morelifecamp.com/) and a specific website for a key aspect of the project – One Life Suffolk: http://onelifesuffolk.co.uk/ ○ Organisation social media accounts: Facebook (1,560 likes) and Twitter (1,302 followers). ○ More Life Camp and One Life Suffolk social media: Facebook (399 and 244 likes respectively) and Twitter (167 and 299 followers respectively) ○ Prof. Paul Gately (MoreLife director) appeared on national TV on several occasions, including BBC Breakfast, ITV's Good Morning Britain, BBC News and ITV's 'Tonight' (a current affairs and documentary series).

Table 17 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (community building and empowerment) and secondary (impact on employment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

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Table 17: Mandatory KPIs for MoreLife Online

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation	Number of target groups involved in co-design	0	9	8
		Number of users involved in co-design (research groups, market research groups and platform testing)	0	3250	1850
		Ratio between men and women involved	0	60W/40M	55W/45M
		Ratio between young, adult and old people involved	0	30/40/30	20/40/40
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries	3	5	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1	5	5
KNOWLEDGE SHARING	Sharing through CHEST Website	Number of entries in project blog on CHEST website	0	3	0
		Number of comments on project blog entries on CHEST website	0	10	0
	Sharing through social media channels (MoreLife Camp)	MoreLife Camp Twitter followers	0	150	165
		MoreLife Camp Facebook likes	0	250	398
		MoreLife Camp Instagram followers	0	100	76
	Sharing through social media channels (OneLife Suffolk)	OneLife Suffolk Twitter followers	0	200	205
		OneLife Suffolk Facebook likes	0	250	205
		Measure of communications about the project on company website	0	3	1
		Measure of communications about the Project on Twitter	0	10	2

10 MountainWatch¹⁸

To boost social engagement for environmental monitoring by engaging the user in a societal challenge of producing high quality images, by identifying peaks in real time and overlaying their name onto the user generated photo. MountainWatch will thus present itself to the user as a “cool” augmented reality camera for mountain peak detection and mountain photo processing. Behind the curtain, it will act as an active crowdsourcing interface for massive environmental data collection.

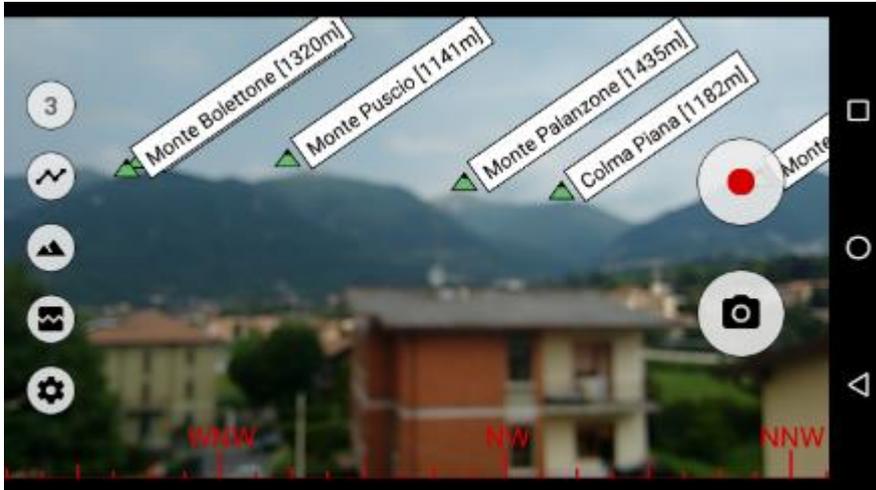


Figure 10: Screenshot of the MountainWatch app

10.1 The societal problem

10.1.1 Description of the problem

1. Which specific problem did you intent to solve?

MountainWatch addresses the problem of improving the capillary monitoring of mountain environment in a period of climate change, which is severely impacting the mountain ecosystem and the Alpine and sub-Alpine populations in Europe, due to reduced precipitation and water scarcity, coupled to extreme and sudden meteorological events that aggravate hydrogeological risk.

2. Who is affected by the problem? Please describe in detail who is affected by the problem and how so.

Climate change affects the European population globally. Its impact on water scarcity affects the sub-alpine urban population most intensely, due to high dependency of water supply from the river basins and catchments, which in turn are impacted severely by the irregularity of precipitation and reduction of permafrost. Climate change, interacting with hydrogeological risk and extreme meteorological events, also increases the probability of hazards. Finally, economic operators, e.g., in the winter tourism industry, are also negatively affected.

3. How has your perception of the problem changed during the reporting period (lessons learned)?

The problem has worsened. As an example, year 2015 has been recorded as the hottest year in Europe since the formal recording of meteorological data, In the US, the same year has determined the most substantial drought in the history of such states as California and Texas.

4. How has the social problem itself evolved over time? What is the current situation? How will the problem develop in the future if no action is taken?

Year 2016 has started with a similarly severe increase in average temperature and decrease in precipitation levels, which announces yet another reduction of the water stock permanently

¹⁸ Chapter contributors: Mathias Becker, Roman Fedorov, Piero Fraternali, Chiara Pasini

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available in the Alpine permafrost band. At the same time, ground monitoring infrastructures have not been updated, due to the need of high investments, which calls for novel instruments for the low-cost, high resolution, high accuracy monitoring of the dynamics of environmental events and condition in mountain regions, especially in the Alps.

5. What are the underlying causes of the problem? Please describe interdependencies of different causes.

The causes of mountain environmental problems are deeply rooted in the dynamics of anthropic activities at the global scale (industrialization, urbanization with consequent decrease of human residential population in mountain areas, degradation of mountain territory maintenance) and thus not addressable by any individual project. However, secondary causes, aggravating the problems, are the lack of capillary monitoring networks and the scarce awareness of the general public on the importance of also individual micro-contributions to environment monitoring and preservation. On these secondary factor, MountainWatch can have an impact, by fostering better ecological awareness through improved mountain environmental knowledge and the micro-collection of environmental relevant data.

10.1.2 Scale of the problem

Limiting the scope only to the Alpine region of Europe, the impact of MountainWatch is immense. The Alps are the highest and most extensive mountain range system that lies entirely in Europe covering approximately 1,200 kilometres across eight Alpine countries: Austria, France, Germany, Italy, Liechtenstein, Monaco, Slovenia, and Switzerland. The population of the Alpine region is 14 million spread across eight countries. The Alps are also one of the more popular tourist destinations in the world,. About 60-80 million people visit the Alps each year as tourists. Tourism activities in the Alps generate close to EUR 50 billion in annual turnover and provide 10-12% of the jobs (5,9). There are over 600 ski resorts and 10,000 ski installations in the Alps. France, Switzerland, Austria and Italy provide over 85% of Europe's skiing area. 19 % of the area faces increasing economic problems. For 18 % of the area, the economy, settlements and cultural heritage are breaking down as people leave. This is particularly the case in southern France, some parts of Italy (e.g. Piedmont) and Slovenia. Only tourism can reverse this trend, but the number of tourists visiting the Alps has either been constant or decreasing since the 1980s. In these areas forests move into grassland and the area becomes less attractive for tourism. There are four broad categories of climate change impacts that will affect tourism destinations, their competitiveness and sustainability: 1) Direct climatic impacts; 2) Indirect environmental change impacts. Changes in **water availability**, biodiversity loss, reduced landscape aesthetic, altered agricultural production (e.g., wine tourism), **increased natural hazards**, coastal erosion and inundation, damage to infrastructure and the increasing incidence of vector-borne diseases will all impact tourism to varying degrees. 3) Impacts of mitigation policies on tourist mobility. Policies that seek to reduce GHG emissions lead to an increase in transport costs and may foster environmental attitudes that lead tourists to change their travel patterns. 4) Indirect societal change impacts. Climate change is thought to pose a risk to future economic growth and to the political stability of some nations. Climate change is considered a national and international security risk that will steadily intensify, **particularly under greater warming scenarios**. Tourists, particularly international tourists, are averse to political instability and social unrest.

The abovementioned vulnerabilities demand for novel tools for the capillary observation of the health status of the mountain environment as well as novel approaches for engaging common people, both residents and tourists, in the active monitoring and protection of the Alpine regions. MountainWatch goes in this direction.

SOURCES

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http://ec.europa.eu/regional_policy/it/policy/cooperation/macro-regional-strategies/alpine/

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Chatré, Baptiste, et al. (2010). *The Alps: People and Pressures in the Mountains, the Facts at a Glance*. Permanent Secretariat of the Alpine Convention,
http://www.alpconv.org/en/publications/alpine/Documents/Vademecum_web.pdf

Fabrizio Bartaletti, "What Role Do the Alps Play within World Tourism?" University of Genova, Institute of Geography,
http://alpsknowhow.cipra.org/background_topics/alps_and_tourism/alps_and_tourism_chapter_introduction.html

10.1.3 Previous approaches to solving the problem

A growing body of research studies the potential of exploiting low cost, user generated content in environmental and ecological applications, with different content types, including text, images, videos, GPS tags, and cellular phone traces. Zhang et al.[zhang2012mining] predict snow cover and vegetation cover using geo-tagged Flickr photographs. They consider each photo as a signal that defines the presence or the absence of snow/vegetation at a specific geographical point in a given moment. The analysis is based on the tags associated with the photos and on the image visual features. Daume et al.[daume2014forest] propose an approach to improve forest monitoring with social media data. They analyze tweets to extract different ecosystem information typologies, trends, predictions and alerts. Social media content is also exploited for environmental disaster management: e.g. Schnebele et al.[schnebele2014road] study the aggregation of non-authoritative data (Twitter statuses, Youtube geo-located videos, and voluntarily collected aerial photographs) to evaluate flood damage; De Longueville et al.[de2009omg] report a study of fire propagation monitored through tweet distributions. None of the mentioned approaches evaluates the contribution of web content to the performance of environmental models.

An emerging environmental monitoring challenge addresses snow analysis in mountain regions, which enables studies on climate change. Traditionally, snow is monitored through manual measurement campaigns, permanent measurement stations, satellite photography, and, recently, also with terrestrial photography. Although several works monitor snow processes by means of short-range visual content analysis, to the best of our knowledge, all approaches rely on cameras designed and positioned ad hoc by researchers, and are not applicable to user-generated web content created in uncontrolled conditions. A complementary stream of works address the problem of mountain peak identification in public photographs (a key problem to retrieve snow information from user-generated photographs) [baboud2011Alignment,baatz2012large] and the problem of segmenting the portion of the photograph corresponding to a certain mountain in snow covered areas. All these works do not provide an environmental evaluation of the utility of the data extracted with the proposed techniques.

[baboud2011Alignment] Baboud, Lionel, et al. "Automatic photo-to-terrain alignment for the annotation of mountain pictures." *Computer Vision and Pattern Recognition (CVPR), 2011 IEEE Conference on*. IEEE, 2011.

[baatz2012large] Baatz, Georges, et al. "Large scale visual geo-localization of images in mountainous terrain." *Computer Vision—ECCV 2012*. Springer Berlin Heidelberg, 2012. 517-530.

On the commercial side, a number of mountain peak augmented reality mobile applications already exist on the market. Among the most popular ones, we can cite Peak.ar, Peak Search - Alps, Panorama Tatr, Peak Scanner and ShowMeHills AR mountain peaks. All the listed applications are based on the same logic: given the camera GPS position and the three axis orientation (determined by the built-in gyroscope and accelerometer), the mountain peak position on the device screen is estimated by projecting the physical position of the peak (with known GPS and altitude) on the camera screen. Mountain peaks estimated in this way are not suitable for the environmental analysis, due to insufficient quality and precision. Our tests with these applications revealed that

although the precision of the peak alignment could be sufficient for an entertainment purpose, it is not suitable for an automatic analysis for environmental purposes. In terms of quality, the mountain peaks near the photographer are always labelled, even when they are not visible. Collecting photos in this way would introduce a huge amount of noise into the dataset compromising its usability, while providing a not-so-satisfactory user's experience, due to the irrelevant peak labels introduced in the user generated photo.

10.2 Implementation of organizational structure

10.2.1 Maturity of the project

Pilot phase: a testing framework allows us to assess the performance of the steps of the mountain identification. Extensive test sessions have been conducted with both own and 3rd party data sets.

10.2.2 Organizational structure

An agile organization structure has been established:

- *Roman Fedorov (project leader, PHD candidate at Politecnico di Milano)*
- Prof Piero Fraternali (scientific advisor, faculty member at Politecnico di Milano)*
- *Eng Chiara Pasini (CTO, employed at Politecnico di Milano, research contract)*
- *Eng Jacopo Mossina (Chief engineer, employed at Politecnico di Milano, research contract)*
- Darian Frejberg (mobile developer, employed at Politecnico di Milano, research contract)*

In addition, freelance collaborators have been employed for the graphic design.

10.2.3 Key personnel

Roman Fedorov: PhD Candidate in Information Technology at Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB), Politecnico di Milano, Italy. His research interests include Web Applications, Human Computation, and Social Media Analysis with a particular focus on environmental-related problems. He has participated in several international and national projects, including the position of WP Leader in the PROACTIVE project and Scientific Director in MountainWatch project. He is pursuing the 3rd year of his PHD at Politecnico di Milano, where he studies innovative approaches for the monitoring of the environment based on low cost, crowdsourced tools. In MountainWatch he is the proposal's authors and project lead; he supervises algorithm development, data collection, experimental validation, and business development. He has authored and validated the main algorithm for image processing at the base of the MountainWatch project. He is author of scientific publications on image processing for mountain peak recognition. His ambition is to startup and to lead a business venture based on the result of MountainWatch.

Piero Fraternali: Full professor and Deputy Director at the Dipartimento di Elettronica Informazione e Bioingegneria of Politecnico di Milano. His main research interests concern methodologies and tools for WEB/SOA application development, and Multimedia Information Retrieval. He is author of several articles on International Journals and Conference Proceedings, and a number of books. He is coauthor of OMG's IFML (<http://www.omg.org/spec/IFML/>) and co-founder of WebRatio (<http://www.webratio.com>), a start-up focused on the commercialization of a tool suite for the Model-Driven Development of Web/mobile cloud-powered applications. He brings to the project software engineering, team building skills, links with business incubators, business angels, private equity and venture capital. His motivation is to promote yet another successful startup on the result of MountainWatch.

Chiara Pasini: holds a MSc. in Computer Science Engineering from Politecnico di Milano. She is responsible of the integration of components and the publication of services in SaaS mode in cloud architectures. She has multi-year experience in technical management of large projects, with specific background in the technical management of EC-funded projects. She has played the role of software development coordinator in such projects as FP7 CUBRIK, FP7 SmartH2O, ERC Grant SeCo. She has

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team building and coaching skills. Her motivation is to join and a successful startup and make MountainWatch scale using the most appropriate technologies.

Jacopo Mossina: obtained a MSc. In Computer Science and Engineering degree from Politecnico di Milano in 2015. He eventually started to work as research fellow at Politecnico di Milano. He works on design, development, testing, optimization and maintenance of mobile applications conceived in the context of large projects. He took the lead in mobile application development in FP7 SmartH2O and MountainWatch. His skill set comprises adaptability, problem solving and managing multiple priorities.

Darian Frajberg holds a MSc. in Computer Science from Universidad Nacional de La Plata, Argentina. He is currently working as a Research Fellow at Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB), Politecnico di Milano, Italy. His research interests include evolutionary software architecture design and development, software engineering and methodologies for Web Application development. He is responsible for the design and development of the architecture, Computer Vision and testing framework of MountainWatch project. He is a cohesive team worker, who has strong analytical, troubleshooting and interpersonal skills.

10.2.4 Partnerships, cooperations, and networks

At this stage, MountainWatch is in the development and testing phase, so that partnerships are envisioned but not fully established yet. Before taking contact, we want to have a fully functional demo in place, already published in the Google Play store. The following entities are the most relevant partners envisioned, as already mentioned in the proposal:

- International Climbing and Mountaineering Federation (UIAA) has a global presence on five continents with 80 member associations in 50 countries representing about 2.5 million people. The partnership has the goal of promoting the app to mountain lovers, through a dissemination agreement with the institution and an advertising campaign channelled by their social media accounts.
- The Club Alpino Italiano (CAI) alone, the major Italian alpine associations, counted 320.000 members in December 2011. A contact is already in place between Politecnico di Milano (through Prof Maria Brovelli and Prof Cesare Alippi) and the CAI. We plan to field test the app with the local chapters of CAI (in Lombardy, especially in the provinces of Brescia, Como and Lecco); after this phase, we will disclose the MountainWatch concepts to the CAI President and Steering Committee to obtain the official endorsement of the institution at the national level, as a vehicle for dissemination to all CAI members.
- Similar contacts will be pursued in other Alpine European countries, starting from France, Switzerland and Austria, where academic contacts with research groups working on mountain environment problems have already been established. These groups will facilitate the connection with other national Alpine Clubs.
- Other communication channels include environment-oriented media companies, such as LifeGate (www.lifegate.it), a national level, very popular media company, which has already well established links with Politecnico di Milano.
- The media relationship office of Politecnico di Milano has also very good connections with all the leading Italian television companies; we will exploit this connections to pursue the objective of obtaining a presentation of MountainWatch in one of the mainstream “green” Italian TV programmes, which have an extremely broad audience.
- In addition to the partners already mentioned in the proposal, contact have been taken with Region Lombardy, especially with the ARPA environmental agency, to showcase the preliminary results of the evaluation of the scientific utility of the data sets collected in the project. Specifically, we plan to involve the ARPA agency in the evaluation of now information extracted from user-generated content for the forecast of the availability of water in the Alpine lakes. This initiative will

permit us to further disseminate the mobile app, with the help of institutional communication channels.

10.3 Implementation of the solution approach

10.3.1 Solution approach

The solution we are pursuing is an original method to put to work and assess the environmental utility of information derived from public web content, specifically from mountain images contributed by users, to support decision-making in a snow dominated mountain context, e.g., the prediction of water availability from snow coverage in the mountain peaks.

Content acquisition and processing rely on both an automatic system for crawling geo-located images from heterogeneous sources at scale and a mobile app, under development, for letting users post their photos directly to our system; after image acquisition, the proposed approach elaborates content by assessing the presence of mountains in each photo, identifying individual peaks, and extracting a snow mask from the portion of the image denoting an identified mountain.

The technical innovation of the proposed method resides in an image processing algorithm that aligns the picture viewed by the user to a synthesized rendered view of the terrain that should be seen from the user's point of view, generated by a (publicly available) Digital Elevation Model. This alignment allows the application not only to estimate precisely where a mountain peak is located on the image, but also to detect whether the peak is visible or not (due to clouds, rain, obstacles etc.). This innovation greatly improves the user experience by positioning the peaks labels much more precisely and eliminating invisible peaks, and also makes the photo and its metadata usable for mountain environmental analysis.

The experimental assessment of the utility of the acquired knowledge for solving environmental problems can be applied to any water management scenario where snow information is a potentially determinant input to the system operation and where performance can be evaluated quantitatively. To this end, we are using a water management model for the regulation of Lake Como, and have evaluated the impact of adding snow-related data extracted from web content as input to the lake regulation policy. The ability to predict future water availability from snow volumes in the catchment mountains is key for implementing an optimal water management strategy.

10.3.2 Target groups

As anticipated in the proposal, the application's main target group includes professional and amateur mountaineers, but also the common people who love to spend the day outdoors and take pictures of the trip with a nice mountain backdrop. As reported, more than 120M people visit the Alps for tourism every year and 14M people live by the Alps permanently.

Users of MountainWatch obtain the immediate advantage of having the app recognize and label the peaks in view automatically for them, while at the same time getting the gratification of contributing high quality annotated content to what will become the largest repository of Alpine images.

The main virality factor is the high popularity and frequency of mountain trips among trekkers and hikers, and consequently the predictable high volumes of photographs that can be generated, as well as the very high enthusiasm and passion among both professionals and amateurs about mountain knowledge acquisition.

Especially amateur mountaineers are generally incapable of identifying all the mountain peaks in the range they are visiting and would probably love an app that helps them acquire a deeper understanding of the region they are exploring. A similar effect is achieved, for example, by the many sky observation apps available in mainstream app stores, which count millions of downloads and have engaged also common people in sky watching.

10.3.3 Activities and work performed

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Work Package Number : 1 Market analysis and requirement specifications
Actual Starting month : M1 Predicted / Actual End month : M3/3
Activity already terminated in the first reporting period.
Work Package Number: 2 App Design
Actual Starting month: M2 Predicted / Actual End month : M4/4
Activity already terminated in the first reporting period.
Work Package Number: 3 App Implementation
Actual Starting month : M3 Predicted / Actual End month : M8 (ongoing)
<p>Work Package Objectives:</p> <p>Overview: this activity will transform the design into a solid implementation, using the development platform chosen in WP2. The companion web site will also be developed, as well as the backend storage system and the APIs for data extraction from the back-end.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • App user interface refined • Advanced prototype developed and tested with users. • Implementation of the heuristics finalized. • Code optimize for sub-second performance of image to terrain alignment. • Caching functionality added. • GUI finalized. <p>Detailed description of work performed to reach the achievements listed above:</p> <p>This activity has produced an industrial-strength implementation, using the development platform chosen in WP2. Dramatic optimizations have been applied to: 1) the alignment of DEM panorama and camera view; 2) saving time of photos and photo sequences; 3) download time of DEM data. The skyline extraction algorithm has been re-trained with 4000+ manually annotated photos, attaining 95% accuracy in the identification of the skyline. The app is now able to follow in real time the image pointed at by the camera, superimposing peaks to the view with high precision in real time and in almost any outdoor condition.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>Algorithms developed for the web version have been completely re-designed and re-implemented. A sophisticated Convolutionary Neural Network approach has been used to extract the skyline. Multiple alignment and peak display methods have been implemented and contrasted (Sensor based, Global, Local).</p>
Work Package Number WP4 App Field Testing
Actual Starting month : M6 Predicted / Actual End month : M10

<p>Work Package Objectives:</p> <p>This phase will engage representatives of all the stakeholder classes (professional and amateur hikers and trekkers, civil and environment protection officers, common people) in trials with the developed app, retrofitting the implementation with the feedback collected from these groups</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Testing framework optimize to collect more data and playback outdoor activities accurately in the lab tests • Outdoor testing campaigns performed with representatives of the users: 65000 annotated frames collected • Accuracy of skyline extractor evaluated on own data set and on a 3rd party data set (Venturi mountain images data set). Details are reported in deliverable D4 <p>Detailed description of work performed to reach the achievements listed above:</p> <p>This phase has engaged representatives of selected stakeholder classes (amateur hikers and trekkers, business advisors, common people) in outdoor usage sessions with the developed app, retrofitting the implementation with the feedback collected from these groups. Each tester was given a trial copy of the app, capable of recording with high fidelity all the technical parameters during a usage session, in real-time. To achieve this fundamental result, which enables accuracy verification in real conditions, we have optimized the implementation of the framework for the internal evaluation of the accuracy of the image registration and peak labelling algorithms. The framework is finally able to collect frames at the speed of the real user experience, label them, and report the performance, and also playback in the lab the real user experience exactly as occurring in the field.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>Problems encountered refer primarily to testing the skyline extraction algorithms and understanding areas of weakness and of potential improvement. Two distinct approaches have been developed for registering the camera image to the virtual panorama for the entire duration of the usage session, which have demanded a very challenging optimization of the testing framework and of the accuracy evaluation framework. Massive crowdsourcing was requested to manually annotate the image skyline pixels for improving the accuracy of the CNN classifier.</p>
<p>Work Package Number : WP5 Business Plan Preparation</p>
<p>Actual Starting month : M8 Predicted / Actual End month : M10</p>
<p>Work Package Objectives:</p> <p>After the feedbacks, a business plan will be prepared for the post-project sustainability. The options for starting up a company will be considered, and the expertise and connections of Politecnico di Milano in the launch of spin-off companies will be exploited. Specifically, the proposer has direct and indirect connection with incubators, such as PoliHub (http://www.polihub.it/) and the ComoNext Science park (http://www.comonext.it/), and venture capital firms, such as H-Farm Ventures (http://www.h-farm.it/)</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Definition of the go to market strategy and business plan. • Planning of the post project engineering • Planning of the post project financial management of activities

Detailed description of work performed to reach the achievements listed above:

After the testing of the application and the feedback with users, a business plan has been prepared for the post-project sustainability. Positive feedback has been gathered from the demo with a business advisor, which has helped in the construction of the business plan. The BP is described in deliverable D5, which has the following structure:

1. INTRODUCTION
2. OVERVIEW
 - 2.1 THE PRODUCT AND SERVICE
 - 2.1.1 The need
 - 2.1.2 Product/service definition
 - 2.1.3 Functionality data sheet
 - 2.1.4 Modules and Packaging
 - 2.2 THE MARKET
 - 2.2.1 Market size and trends
 - 2.2.2 Market readiness and timeliness of the offer
 - 2.3 COMPETITIVE ANALYSIS
 - 2.4 PEAKLENS COMPETITIVE ADVANTAGE
 - 2.4.1 PEST analysis
 - 2.4.2 SWOT Analysis
 - 2.5 MARKETING, COMMUNICATION AND SALES STRATEGY
 - 2.5.1 Business models
 - 2.5.2 Advertising and promotional strategy
 - 2.5.3 Social media strategy
 - 2.5.4 Sales strategy
 - 2.6 FINANCIALS
 - 2.6.1 Product Engineering plan
 - 2.6.2 Efforts and Costs
 - 2.6.3 Revenues
 - 2.6.4 Financial analysis and break even

10.3.4 Sustainability of the solution

Outline the next steps required to implement and deploy your proposed product, process or service

As stated in the proposal, the route to market requires the deployment of the app in mainstream app stores, its marketing and (hopefully viral) adoption. This can be pursued by a start-up or by licensing the software to a company already in the mobile game and app market.

After the development of the prototype, the next steps will include the final engineering and refinement of the app and companion web site. This will require the re-coding of the app in iOS, to be available also for Apple devices. The app will be then deployed at the main mobile online markets (Apple Store, Google Play). One of the possibilities for the distribution is the collaboration with the

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national and international alpine associations (e.g. CAI, UIAA) for the accreditation attainments and even the branding of the application.

A summarized business plan for the actions after the app deployment includes:

- Company start up (or licensing partner identification)
- Completion of the mobile app, porting to the IOS operating system
- Completion of the web presence
 - Deployment of the back-end on a scalable commercial cloud.
- Completion of the branding and visual identity
- Data acquisition (high definition digital terrain models) and definition of the sales policies
 - Product launch
 - Advertising

10.3.5 Risks

The project risks include:

- Difficulty in supporting multiple mobile OS and Android versions (mid - mitigation strategy: major focus on the completion and full testing of the Android version, subsequent differential development and maintenance of the IOS version)
- Difficulty in fulfilling non-functional requirements (e.g. latency, offline functioning, accuracy of peak recognition) (medium - mitigation strategy: source code optimization, offline loading of terrain models, use of advanced heuristics for mountain peak to terrain model alignment)
- Difficulty in contacting relevant stakeholders for advertising and endorsing (low - mitigation strategy: use existing contacts)
- Difficulty in engaging beta testers (low - mitigation strategy: use invitation program through partner associations and free license for beta testers)
- Difficulty in finding adequate funding (low - mitigation strategy: reduce development costs through coding and testing automation; use existing contacts and sponsorship/branding partnerships; contacts with business advisor has shown good attractive to investors)

10.3.6 User-based evaluation of the concept

The user-based evaluation has exploited a mix of quick prototyping and video prototyping. A quick functional prototype of the app has been constructed, which permitted a user to live the real experience of real time, augmented reality mountain peak identification and labelling. The quick prototype was manually installed on the user's phone and could be tested only in real outdoor conditions because it depended of the GPS position of the user, the compass reading, and the download of a coarse grain public domain digital terrain model from an open data service.

User testing of the prototype has been conducted in a number of outdoor missions, performed by a population of testers chosen among students, friends and their families (see the demographics in Table 1 above). Missions were scheduled in different Alpine and pre-Alpine region, including

- Como lake Prealps
- Livigno area
- Rocky mountains region (US)
- Sondrio province
- Bergamo province

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- All the testers expressed concern on the time to download the digital terrain model onto the mobile device (not optimized in the prototype)
- All the testers rated as “basic” the graphic quality of the GUI (only sketched in the prototype)
- All the testers rated as “basic” the graphic quality of the processed image including peak names overlaid on top of mountain ranges (only one predefined simple graphic style supported in the prototype)
- Some of the testers expressed concern on the number of bytes to be downloaded for the app to work, because they had a tariff plan with a cap on the amount of data transfer.
- Some of the testers experienced a degradation of accuracy in presence of clouds occluding the full view of the mountain range profile.
- Some of the testers considered the display of the peak labels in the camera view “bumpy” as the user moves the camera to aim and shoot (the algorithms in the prototype are not yet optimized for speed in the real time follow up of camera movements).

SUGGESTIONS

- One user suggested adding a zoom function to the app, to be able to point the camera to a specific subrange or peak of a mountain landscape.
- One user suggested adding more metadata to the image annotation: e.g., the distance of the peak from the user.
- One user suggested adding more metadata to the image annotation: e.g., not only mountain peak names but also names of villages, landmarks, points of interests, etc.

The video based prototyping has been realized by creating a video from the recording of a usage session of the quick prototype. The video is visible at the address <https://youtu.be/8D7zhPU93KA>.

The video has been used for involving in the design further users’ groups. It has been shown to:

- Over 100 university students of the Computer engineering courses of Politecnico di Milano, during the Open Day of the Master Programme.
- Over 200 high school students of the Coo district, during the Open Day of the Bachelor Programme in Computer engineering of the Politecnico di Milano.
- One Business Advisor, in a meeting focused on the assessment of the business value and exploitability of the project.
- Researchers from several universities (ETH, University of Colorado, University of Bern, University of Trento, Fondazione Bruno Kessler, etc), active in the fields of mountain image processing and environment studies from UGC.
- Operators from the Region Lombardy environmental agency (ARPA), who publishes the snow bulletin used for management and planning water resource usage in the Region.



Figure 11: Home page of the mobile app

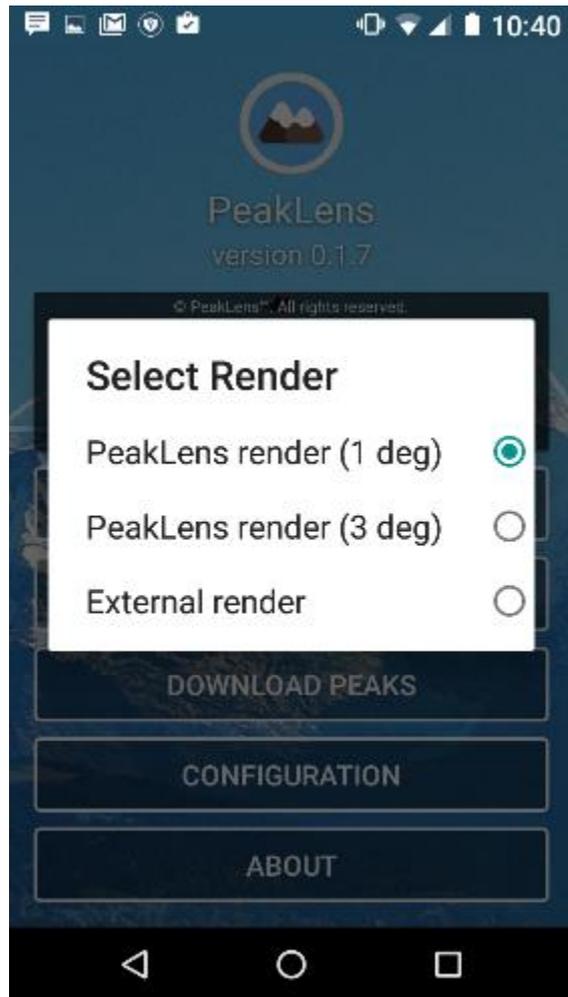


Figure 12: setting page for configuring the render service providing the DEM data

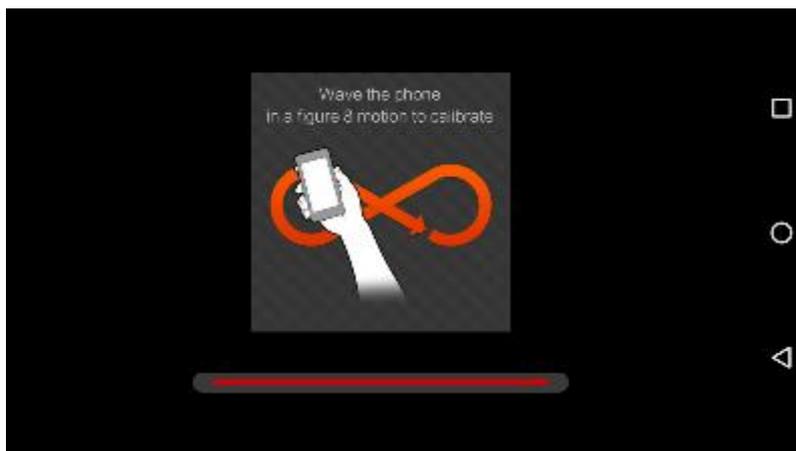


Figure 13: splash screen for initializing the compass sensor and improve sensor data precision

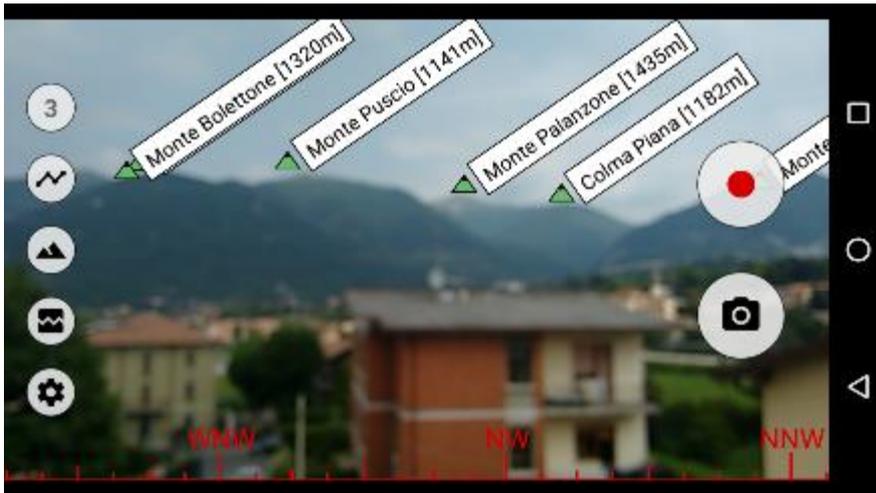


Figure 14: real-time peak identification and alignment, with cloud sky



Figure 15: real-time skyline extraction peak identification and alignment, after strong tilt of the phone

10.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 18.

Table 18: Snapshot of project "Mountain Watch"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To use an image processing algorithm that aligns the user's images of mountains to synthesized rendered views of the terrain in order to identify precisely where a mountain peak is located on the image, and also to detect whether the peak is visible or not (due to clouds, rain, obstacles, etc.), thereby enhancing the user's experience.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Completed a competitor and market analysis. ○ Defined the requirements of the architecture, platform front-end and back-end, and selected appropriate third party libraries. ○ Imported image processing algorithms to Android, developed back-end and app user interface for prototype "0". ○ Refined app user interface, implemented heuristics and optimised coding for advanced 	<ul style="list-style-type: none"> ○ Dedicated website adapted from a previous project (SnowWatch): http://snowwatch.polimi.it/map.php ○ Demonstration videos made available on Roman Federov's YouTube channel: https://youtu.be/8D7zhPU93KA ○ 4 publications accepted (to 3 journals and Salento AVR Conference 2016) and another submitted (to the ACM Multimedia Conference

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	<p>prototype.</p> <ul style="list-style-type: none"> ○ Undertook lab and outdoor testing or prototypes. ○ Defined a market strategy and business plan including post-project activities. <p>The project successfully delivered 6 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<p>2016)</p> <ul style="list-style-type: none"> ○ Organised 1 event: the 1st International Workshop on the Social Web for Environmental and Ecological Monitoring (SWEEM 2016) ○ 58 interactions in the project's section on the CHEST Community Forum.
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Table 19 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on environment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 19: Mandatory KPIs for MountainWatch

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	10	5 University students, environmental scientists, PA operators (ARPA), friend mountaineers, business advisor
		Number of users involved in co-design process	0	100	~40
		Ratio between men and women involved	50%	50%	50%
		Ratio between young, adult and old people involved	N/A	50-40-10	75-25-0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	5/6 = strongly agree. Publication of open data set of objective environment (174k automatically classified mountain user-generated photographs, 30M images from public webcams framing mountain slopes) information usable by researchers and people to assess impact of climate change on mountain environment (e.g., presence of snow, status of glaciers) over long time series (2 years) and with full coverage of the Alpine region		
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1	1	1 (Web site with open data set)
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	NA	2	3
		Number of comments / replies on project blog entries on CHEST website	NA	10	11

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	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, etc.)	0	500	300
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	100 tweets with x 10 retweets	70 tweets with x 10 retweets

11 Open Language Learning Platform on Serlo¹⁹

The project has already built a free openly licensed language learning platform, that combines modern e-learning tools and interfaces and the Wikipedia-principles of openness. The project builds on the successful open learning platform www.serlo.org which is used by 200.000 students a month to learn mathematics. The platform will offer grammar explanations, diverse exercises, a vocabulary training tool and a matching tool for international study groups. The software will be Open Source and we use open licenses for the content (Open Educational Resources).



Figure 16: Screenshot of the Serlo open language app

11.1 The societal problem

11.1.1 Description of the problem

In our initial Social Impact Plan we identified two main problems to whose solutions we wanted to contribute to with our project.

The first of those problems is that many European citizens are lacking foreign language skills and therefore cannot fully realize the potential and the possibilities the EU is offering. The benefits of being able to communicate in a foreign language are widely recognized - on a personal level as well as on a larger, societal scale. A survey by the "Special Eurobarometer 386" (2012) states:

"There is a broad consensus among Europeans that everyone in the EU should be able to speak at least one foreign language. More than four in five of Europeans (84%) agree, and more than two in five (44%) 'totally agree' with this view."

But education in general and foreign language acquisition in particular are often dependent on socioeconomic factors - the resulting competitive disadvantages can lead to a feeling of marginalization, which can pose long-term problems for social stability.

The second problem became even more relevant over the last years' developments. As more and more refugees and immigrants come to Europe in search of safety and a good life, the challenge to integrate them successfully into their host countries' societies grows even more important. The first and most important step to integration is communication; however, many refugees and immigrants are not able to communicate sufficiently in the language of their host country. Thus neither is their economic potential realized nor are they able to live a self-determined life without dependency on social benefits.

Even though these are both still the problems we want to address and to whose solution we believe the creation of a free and open language platform can contribute to, we had to reassess the

¹⁹ Chapter contributors: Mathias Becker, Simon Köhl, Ronnit Wilmersdörffer

immediate importance of the different targets. Due to the current development of the inflow of refugees in Europe, we chose to focus on the insufficient language skills of refugees as the problem that the first tools of our project should address. The large number of Syrian refugees and the small prospect of a timely end of the civil war in their country of origin leaves the EU member states with an enormous influx of people who will need to be accommodated on a long-term basis and therefore integrated into the societies of the respective host countries.

We believe, along with the Organisation for Economic Co-operation and Development (OECD) and many others that the acquisition of the local language is an irrefutable necessity: "Enabling refugees to become language -proficient (...) will be critical for their successful integration as well as for a positive economic impact of these flows in destination countries." (OECD Migration Policy Debates No. 7 September 2015).

It is obvious that people who flee from war-torn countries, have been persecuted and discriminated against and/or who face torture or death in their country of origin rarely have had sufficient opportunities to acquire effectual foreign language skills to master the requirements of daily life in a foreign country. One has to focus therefore on the reasons which inhibit the development of language proficiency after migrants and refugees have arrived in the country which will accommodate them when examining the underlying causes of this issue.

The lack of language proficiency among many migrants who are already living in Europe suggests that existing programs aiming to teach the local language have not been sufficient.

In many cases, Government-funded language courses are only offered after certain bureaucratic requirements are fulfilled or after some form of residency permission has been granted, which means that many refugees only receive language training well after their arrival.

Also, many refugees are not literate in the Latin alphabet and some are not literate at all which makes the acquisition of language in a formal setting next to impossible; even more can be considered functionally illiterate - though they possess the rudimental literacy skills, they are faced with considerable difficulties in daily life. This means also that traditional learning materials targeted at foreign language speakers with prior extensive formal education can not be readily used for teaching; special materials and tools are required to teach efficiently, which are far less prevalent and developed as their counterparts.

Because of these reasons, many refugees cannot interact easily with people in their host societies and are limited to their own social network consisting of other refugees speaking the same language. This can further inhibit language acquisition, because it might de-emphasise the necessity to learn the host country's language.

11.1.2 Scale of the problem

Although the problems illustrated before may seem to primarily concern the personal lives and the economic well-being of distinct people, we do believe that their solution can actually benefit the European Union as a whole. Especially in times of recent political and societal challenges, it has become evident that there is a deficit in actual identification with the EU as a union of values, and a reduction to its economic benefits on the parts of national governments representing their respecting people. At this very instant, the lack of solidarity amongst nations within the EU is illustrated painfully by the current pushing and pulling over refugees seeking asylum in Europe. This issue is an immediate stress test for the true worth of the Union, as well as the applicability of the European values of liberalism and humanism within the individual member states.

While every citizen of a member state of the European Union is theoretically allowed to work and live anywhere within its boundaries, 46% of European citizens are unable to follow a conversation in any foreign language and only 25% of European citizens are able to speak two foreign languages (TNS Opinion & Social 2012, p. 12), severely limiting their use of this invaluable opportunity.

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Eurostat estimates the percentage of Europeans who do not speak a foreign languages at all at 32.7% for those with upper secondary and post-secondary non--tertiary education attainments (equivalent to ISCED (International Standard Classification of Education) levels 3 and 4) and at 61.1% for those with only pre-primary, primary or lower secondary education (ISCED levels 0-2) (Eurostat 2011, updated 2015).

Also, numbers of new asylum applications have been rising from year to year: in 2014 there were more than 626.5 thousand applications for asylum registered in the EU, for the twelve months between Q3 of 2014 and Q3 of 2015 the number of Asylum applications approached almost one million according to EUROSTAT.

The refugee crisis is polarizing the populace of many EU member states; and while a societal consensus about the need for successful integration exists, questions about the possibility of achieving this on a wide scale is dividing European societies and the EU as a whole. If integration efforts are unsuccessful, European society will face severe consequences in the form of rising unemployment rates, increasing costs for social welfare and formation of parallel societies within each country, as well as risking the further rise of xenophobic tendencies within the general population. However, if this issue is properly addressed, the influx of qualified or motivated personnel constitute significant economic possibilities for the European Union.

11.1.3 Previous approaches to solving the problem

Many different programs are in place that try to remedy existing language insufficiencies; next to a plethora of different language schools, which are largely profit-oriented and therefore remain exclusive to those who can afford them or secure governmental funding via employment agencies, there are also (aside from various offers in tertiary education (e.g. university courses)) different non-profit programs that attempt to improve foreign language proficiency in Europe, for example the Erasmus+ programs targeted at citizens of all educational levels. But since we do not attempt to replace actual/traditional language instructions but rather to extend and facilitate it, we won't go deeper into this.

As part of the application for CHEST Call 3, we focussed our research on those solutions with a similar approach to the one our project will take. In a first step, we focused on for--profit and non-profit online language learning tools which are completely free of charge - we believe this to be integral to every successful approach. Unfortunately, free for--profit solutions like Duolingo or Livemocha do not use open licences -- their content and software belongs to companies and not to the public. This results in the fact that the application of these tools is limited to a self--study context, as it is illegal to use and adapt those materials for traditional teaching. While the use of proprietary licences is vital to their business model, we believe them to be a primary inhibitor for participation, accessibility, efficient use and a missed opportunity for quality improvement.

While free of charge tools for literacy training do exist (like iwdl.de, run by the German adult education centre VHS, or the BBC Skillswise website) most of those offers target learners who already have fundamental reading and writing skills and basic knowledge of the language taught; online learning tools that assume minimal or non-existent literacy are almost exclusively designed for children. Additionally, most of the tools we reviewed feature endemically poor usability, are not optimized for mobile devices and/or offer only a very limited amount of exercise types.

11.2 Implementation of organizational structure

11.2.1 Maturity of the project

The german--based online learning platform Serlo is a well established tool, used by over 300.000 students every month. A working prototype for language-specific features has been developed, tested and is being partially implemented; meanwhile the development of the final version with basic features is in progress.

11.2.2 Organizational structure

The free and openly licensed learning platform Serlo is maintained, supported and expanded by a team of 50 volunteers and freelancers. The language platform project has over its course developed into an department of its own, with an ad hoc team organised in the subdivisions project management, didactics and development.

Each division consists of one freelancer or employee attached to the project as well as several volunteers with varying levels of engagement and is supported by Serlo's core team in their varying areas of expertise. In its initial stage, the project was spear-headed by a team of two permanent employees with extensive background in e-Learning and language teaching who carried out initial research and the conception of a suitable curriculum, exercise types and modalities for the prototype. This subdivision is now reduced to just one permanent employee, while one previous staff remains in an advisory function and three more volunteers with didactical backgrounds have joined the team.

While the prototype was designed and programmed in a hybrid volunteering/freelance mode by the development department's UX-designer, the final version is now being implemented by a team of three volunteering software development with the support of Serlo's technical development core team. Maintenance of the prototype during testing and continuous improvements to the user interface and user experience design are carried out by the same UX-designer on a freelance basis.

A previous member of the Serlo management and fundraising team has taken over the project management of the language platform on a freelance basis and is now in charge of external communication, networking, team development, distribution and securing sustainable additional project funding. She is supported by Serlo's managing director and a pro-bono external advisor.

A volunteering professional accountant is responsible for proper bookkeeping.

11.2.3 Key personnel

Simon Köhl -- *(Managing Director)*

Simon Köhl studied political science, economics and philosophy at the Ludwig--Maximilians--University in Munich. He founded the open learning platform Serlo six years ago while still attending secondary school. Since then Serlo has grown into the largest organization in the German field of Open Educational Resources (OER) with fifty team members and 300.000 unique users each month. At Serlo, Simon is responsible for the overall strategy, collective impact partnerships, fundraising and team building.

Together with Serlo CTO Aeneas Rekkas and former Telekom AG CTO Thomas Aidan Curran, Simon Köhl co-founded the Ory GmbH, where he develops cloud--based Micro Web Services for the use in individual and scalable education applications.

He also co-founded the "Bündnis freie Bildung" together with Wikimedia Germany, Creative Commons Germany and the Open Knowledge Foundation and is considered one of the leading figures of the German OER movement.

Simon Köhl has been funded as a Ashoka PEP fellow and was honored for social entrepreneurship by the Robert Bosch Foundation for his work with Serlo.

Thomas Aidan Curran -- *(Advisor & Product Development)*

Thomas Aidan Curran is an experienced software and internet technologist, founder, executive and board member. With a focus on innovation and software development he aims to create and bring new ideas into products. Presently he is an advisor to numerous software and internet companies.

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From 2009 to 2012, he held positions including DT Fellow, and Chief Technology Officer, Products and Innovation at the Deutsche Telekom AG, a global telecommunications provider operating in circa 50 countries.

Previously Thomas was founder and CEO of Telemos AG, Munich Germany. In 2006 he was technology advisor to the chancellor of the New York City Department of Education. In 2003 Thomas became a founder and director of the Digital Media Project, which created the first open-source DRM system.

In 2003, Thomas left Bertelsmann AG, where as CTO he led strategic initiatives in new media and digital content distribution. He was responsible for the conglomerate's global technology strategy, including a two--year IT reorganization.

In 1997, Thomas founded Component Software, which developed the leading e--business integration platform software (BAPI) for customers including SAP, SAS, Baan, IBM, and Siebel.

From 1992 to 1997, he worked at SAP AG as technology strategist and product manager. Earlier, he founded a software development company that made a code management tool for Windows programming teams.

Thomas has authored numerous books, articles and publications, including "SAP R/3 Business Blueprint: Understanding Enterprise Supply Chain Management" and "SAP R/3 Reporting and e-Business Intelligence," and he is the series editor for Prentice Hall's "Enterprise Software."

Thomas graduated from the Wharton School, University of Pennsylvania, and subsequently held teaching and research positions at the Wharton Analysis Center, the International Science Center (Berlin), Berlin University of the Arts, and Technical University Berlin.

Ronnit Wilmersdörffer - *(Project Manager Language Learning Department)*

Ronnit obtained a business focussed Bachelor's degree from the International School of Management in Munich in 2015. During her final semester at ISM she joined Serlo as a member of the management team and the board. In June 2016, she took over the management of the Language Learning Department on a freelance basis.

Ronnit is also co-founder of a tech start-up, for which she acts as managing director. The incidental use of the same technologies in both projects has already proven a useful source of knowledge transfer for the language learning project.

Volunteering as a tutor at SchlaUSchule, a project enabling minor refugees to obtain a German school leaving certificate, Ronnit also has some experience with working in refugee education.

Tullia Santin - *(previously Head of Language Learning, now Advisor)*

Tullia Santin is an experienced conceptual developer of language learning materials for different languages, learning levels and media. From 2008 to 2015, she worked for the Langenscheidt publishing house where she was responsible for developing text books, grammars and digital learning material for German as a foreign language and other languages. From 2012 to 2014, she was head of the product development team.

Since 2013 Tullia Santin has been teaching German as a foreign language on a voluntary basis to refugees and other migrants. She has deep knowledge of the needs of this specific target group. During her extensional studies of Educational Media at the University of Duisburg/Essen, she gained deep insight into the requirements of modern e-learning-tools.

In 1996, Tullia Santin completed her studies of German and Modern Greek Philology as well as Economics at Ruhr-Universität Bochum. She also holds a Ph.D. of Freie Universität Berlin.

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While Head of the Language Learning Department at Serlo since November 2015 she was responsible for the conceptualization and the development of e-learning-material for German as a foreign language in its initial phase.

Andreas Fischnaller - (Head of Didactics Department)

Andreas Fischnaller is a doctoral candidate at the Institute of Nordic philology at the Ludwigs-Maximilians-Universität in Munich. After finishing his Master's degree in Nordic philology, German as a foreign language and educational science in 2011 he contributed to a research project examining runes in Germanic languages at the Akademie der Wissenschaften zu Göttingen. This research has enabled him to develop a deep understanding of alphabetical systems and graphemics.

Andreas has been teaching Swedish at LMU since 2014 and started teaching German as a foreign language in 2015 for both public and private institutions, including the Technical University of Munich. He is also qualified as a teacher for the official national curriculum for integration of migrants and refugees.

He started working on Serlo's language platform in November 2015 alongside Dr. Tullia Santin, whom he has since relieved as head of the didactics subdivision. His private interest in web technologies and web development also enable him to communicate efficiently with the development department.

11.2.4 Partnerships, cooperations, and networks

ORY GmbH

ORY is a Munich-based tech start-up building cloud native solutions for digital businesses, ranging from collaborative on-page content editing to security-focused open source software. ORY believes openness to be a key strategy for state of the art security, fast paced product improvement and - ultimately - a company's success. Their ambitious projects have a remarkable impact on the open source development community and help SMEs as well as large enterprises achieve their goals faster and more reliably. Ory has committed personnel to assist with the development of Serlo ABC on a pro-bono basis. This helps us deal with volunteer staff fluctuations as it adds a stable component and additional expertise to the development process. This arrangement has been fixed in a memorandum of agreement (see appendix).

BIBB

The National Agency for Education in Europe at the Bundesinstitut für berufliche Bildung (National Institute for Professional Education) is in charge of furthering the European Agenda for Adult Education on a national level by staging events and publishing information material for relevant actors in politics and society. The current agenda focusses heavily on digital learning and adult literacy. In this context, the Serlo's language learning platform with its current literacy focus is of high interest to the agency. Verbal agreements have been met about the contribution of an article by Serlo about its project in the next edition of the agency's information brochure, which is currently work in progress. There is also a possibility of the project being featured at the agency's next major event; this, however, is pending confirmation.

Tür an Tür - Digital Factory gGmbH (Integreat)

The Tür an Tür - Digital Factory gGmbH operates a template software which allows individual administrative districts to cluster their local offers for refugee aid and support in a single smartphone app called Integreat. Integreat is available in a number of frequently spoken languages amongst the largest national groups of asylum seekers and aims to provide them with a centralised overview of local support offers. The agreed cooperation comprises the inclusion of Serlo's language learning platform in the standard version of the Integreat app, to which locally specific components can be added by the respective administrative districts. This agreement has been implemented on the basis of a verbal agreement, but has been reaffirmed by a written memorandum of agreement since (see appendix).

InitiativGruppe - Interkulturelle Begegnung und Bildung e.V.

The InitiativGruppe is a non-profit organisation for intercultural communication, education and integration based in Munich. Part of their activities comprise the offering of language and literacy courses for refugees. Serlo has an ongoing cooperation with the InitiativGruppe München with regards to user testing of the prototype. Tests are being carried out as required by the development process in the context of the agency's literacy courses. This cooperation is based on a verbal agreement.

Malteser Hilfsdienst e.V.

The Malteser Hilfsdienst is one of the major ecclesiastic charitable organisations in Germany. Amongst many other activities it operates 255 first arrival facilities for refugees across the country. A verbal agreement has been met with the Malteser Hilfsdienst to establish a bespoke testing class at the ICC first arrival facility in Berlin, allowing Serlo to test the language learning prototype intensely on students of a wide range of socio-demographic backgrounds. A future cooperation with regard to the communication and distribution of the language learning offer to the guests of all their facilities has also been agreed upon. The implementation of the test class is currently delayed by logistical issues at the facility concerned.

SchlaU-Schule

The "SchlaU-Schule" is a school for young refugees in Munich which was founded in 2000 by the Trägerkreis junge Flüchtlinge e. V. and has since then established its own educational concept tailored to their target group. The subjects and classes are built analogous to the Bavarian "Mittelschule", but with individual and intensive aid for young refugees. Our cooperation with the "SchlaU-Schule" provides valuable insights into our target group, allows to test our assumptions and content and lets us benefit from its teachers' longtime experiences, especially in teaching German as a foreign language and literacy in the Latin Alphabet. We are also granted access to their literacy classes for the purpose of user testing. The cooperation is based on verbal agreements.

GermanNow!

GermanNow! is a Berlin-based social organisation offering free German language lessons for migrants and refugees. The organisation is coordinating more than 1000 volunteers in Berlin who look to help and support integration efforts. The project aims also to provide a direct contact for refugees concerns and needs and also offer direct support beyond the teaching of language skills.

Focus of teaching is on obtaining basic, conversational German skills. In a similar way to the "SchlaU-Schule", GermanNow! acts as a valuable contact to our target groups as well as fulfilling a multiplier role for future dissemination of our activities. The cooperation is based on verbal agreements.

Willkommen in München e.V.

The Munich-based website www.willkommen-in-muenchen.de is a central hub for volunteers and organisations alike who want to aid to refugees and support their integration by interconnecting various different initiatives and associations, as well as offering a starting point and volunteering opportunities for anyone who wants to contribute. Operated by the "Caritasverband der Erzdiözese München und Freising e.V.", the largest social service organisation in Bavaria, in cooperation with the Department of Social Services of the municipal government of Munich, their extensive network offers us a great opportunity to communicate our approach, to recruit volunteers and to research one of our target groups. This cooperation is based on verbal agreements.

11.3 Implementation of the solution approach

11.3.1 Solution approach

Our vision is free education supported by an open and independent community, where many different people create scientifically sound and easy to understand learning materials and where

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everything created is open to everybody and free of charge. Open education is therefore part of a diverse networking society of self--determined individuals who enjoy learning and share a strong sense of community.

This vision rings especially true when one considers language proficiency as a primary factor that determines to which extent someone can partake in society and utilize other offers and opportunities for self--realization, personal and economic development.

We want to contribute to the continued transformation to a cohesive European society where everyone can freely learn according to their potential.

The impact for our target groups we strive to achieve is threefold:

- We want to help offer everyone the possibility to learn languages according to their potential and independent of socioeconomic factors.
- We want to contribute to strengthening the European identity through an increase in international communication on a grassroots level.
- We want to help to lay the foundation for a successful integration of refugees into their respective host societies.

We believe that all of these objectives can be furthered by providing unlimited and flexible access to free language learning materials. The lowering of economic and social hurdles for acquiring foreign-language skills will be essential to providing quality language education for everyone. Within the European context this helps to provide the ability to communicate across national borders. In consequence, all citizens of the European Union are enabled to engage with citizens of other member states and thus develop a common identity and cohesion. The difficulties faced by individual states regarding the integration of large numbers of refugees can be alleviated through our approach by assisting refugees and volunteers alike in efforts to learn or teach the local language.

To achieve this, we are developing a web--based, open learning platform which will host relevant learning content. The platform will feature different types of didactical content as well as exercise and assessment tools.

Naturally, a necessary requirement for successful language learning for adults and older children is the ability to read and write in the corresponding writing system. Since the ability to write in the Latin Alphabet, which is a central requirement for successful integration, cannot be taken for granted when addressing asylum seekers. Successful language training for refugees must therefore address illiteracy as its primary concern.

Since using modern digital devices relies heavily on the literacy of the user, we inferred that our approach could only be of use to those that had already acquired the necessary literacy skills to use them. While this seems to hold true for usage of larger devices like personal computers, our initial assumptions were disproven regarding the use of modern mobile devices like smartphones, which are widespread among refugees, including among those who can be considered illiterate.

This led to a reconsideration of our approach - as a first step, we will provide a web-based application, optimized for smartphones, that will teach users letter recognition, reading and writing skills, basic communication techniques and corresponding and additional vocabulary. While this first application is primarily targeted towards illiterate people with little or no knowledge of German, the developed exercise types can easily be adapted to encompass vocabulary of other languages, more advanced language courses and can also be used in courses targeting functional illiteracy of native speakers.

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This approach benefits learners in multiple ways:

- Traditional courses can be complemented with free, high quality learning materials, which also provide direct feedback and assessment to the user
- Content can be explored with respect to the individual pace of the learner and already known concepts can be repeated as necessary
- No additional material and tools are required to learn this way, the portable nature of the devices allow for straightforward, regular repetition regardless of many circumstances
- The use of contemporary digital devices for educational tasks can reinforce and complement already existing abilities and knowledge about using those devices.
- The use of smartphone technology allows for an intuitive, non-verbal user guidance, enabling students to use the tool independently and unassisted.

11.3.2 Target group

During research and concepting for our initial Social Impact Plan we identified four target groups that will benefit directly from our general approach. These are, as stated in our Social Impact Plan:

1. **European citizens whose access to foreign language education is limited by socioeconomic factors**

This group is consist of European citizens who have either

- a. insufficient economic means to develop foreign language skills
- b. no or only limited access to secondary and tertiary education

Estimating the size of this group proves difficult, but according to the “Special Eurobarometer 386” (2012), 25% of European citizens cite the cost of language courses as a reason that impacts their decision to study additional languages negatively.

Primary goals of this group include the realization of personal and economic advancement goals, improvement of their standard of living, self--realization and increasing their value on the job market.

Our program directly addresses their need for added chances of (better) employment and the desire for personal development by offering free opportunities to develop valuable foreign language skills.

By contributing to these goals, we are indirectly contributing to economic advancement goals, a resulting improval of their standard of living and therefore chances for self--realization.

We will reach out to this target group by means of Search Engine Optimization efforts and direct communication with schools and other educational organisations.

2. **Refugees with no or little proficiency in the language of their host country**

This group consists of refugees who are not able to communicate freely in the language of their host country.

The size of this target group is impossible to estimate at this moment; according to estimates published by the OECD, the number of asylum applications in 2015 alone could well approach one million. According to the 2014 Global Trends report by the UNHCR, there are approximately 1.5 million recognised refugees living in the 28 Member States of the European Union plus Norway and Switzerland.

In addition, Detailed data for overall qualifications and language skills of asylum seekers in particular is unfortunately not available, but we are assuming that only a fraction of those seeking asylum in Europe have sufficient means to communicate freely in their host country.

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Primary goals for this group include the integration into European society and rebuilding their existence.

We are directly addressing this need for integration by offering accessible language learning opportunities and in consequence improve possibilities to apply learned skills and qualifications, acquire new ones and increase chance of employment in the long term. We will reach out to this target group by cooperating with and informing shelters, accommodations, social organisations and responsible authorities.

3. Everyone who wants to improve their existing or acquire new foreign language skills

This group consists of everyone who wants to acquire new language skills for any reason at all and is not part of one of the target groups detailed above.

While the broad definition and diverse goals and needs of this target group will not allow us to tailor our platform specifically towards them, the access of language learning tools for everyone is an essential part of our efforts. Our SEO efforts will allow members of this target group to find and access our platform easily.

4. Education enthusiasts, teachers, native speakers and social organisations who want to empower fellow European citizens or support integration efforts.

This target group consists of

- a. individuals that enjoy teaching and/or want to help shape the form of education
- b. university students looking to become teachers
- c. language and school teachers looking for a place to find, share and discuss learning materials and tools
- d. social organisations dedicated to language teaching or integration efforts that are looking for free and accessible learning materials
- e. native speakers that are looking to volunteer to support integration offers.

These individuals and organisations are possible community members, content creators and providers of feedback for the improvement of technology and didactical content.

Goals and concerns of this group include the furthering of integration efforts, offering genuine assistance to those in need, promoting educational justice, proving or improving their own competence in teaching, finding and communicating with like-minded individuals and groups and easily finding learning materials applicable to their specific teaching context.

We address all of these goals by providing and investing in a platform that will offer opportunities to fulfill each individual goal.

We will reach this target group by means of social media campaigns and communication with universities, umbrella associations, foundations, teachers' unions and associations.

We will also rely on the multiplier function of partners and active community members.

Adapting our approach further due to recent political and social developments, our own research and dialogue with educators and institutions that teach "German as a foreign language" to refugees, the first tool we are developing is targeted at a specific sub-group of target group 2, namely

Illiterate Refugees staying in German-speaking countries with no or little proficiency in German

This target group consists of refugees who lack the basic reading and writing skills in the Latin Alphabet that would allow them to integrate successfully into the society of their respective host country.

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Since qualifications, language skills and literacy rates of asylum-seekers are not systematically recorded, it is only possible to provide extremely rough estimates for the change of size of the target group, as no reliable data about the total number of recognized refugees and accepted asylum seekers is available. Further difficulties arise when considering current political discourse and possible changes in dealing with asylum applications and missing data on the number of refugees with access to the necessary digital technologies.

To illustrate the continuing growth of the target group, we estimated the growth of this target in the period from Q3 2014 to Q3 2015, drawing from data provided by EUROSTAT and the German Federal Office for Migration and Refugees, as detailed below. This estimate is, for various reasons (such as the high workload the responsible government agencies are facing due to the large number of migrants, estimated by the German Ministry of the Interior as 1.1 Million²⁰ over the course of 2015 in Germany alone, and the resulting delay in processing and recording applications).

Under the assumptions, that

- a. the positive decision rate on asylum applications of close to 50% (Asylum quarterly report, EUROSTAT 2015) remains similar
- b. the categorization of accepted asylum applicants as “not-educated” as defined by the German Federal Office for Migration and Refugees in its analysis of the qualification structure of recognized refugees and accepted asylum seekers (BAMF 2016) also implies illiteracy
- c. the rate of “not-educated” refugees hailing from Afghanistan, Eritrea, Iraq, Iran, Sri Lanka and Syria, recorded as 12.9 % in the same study, is roughly similar to the rate among all refugees granted right of residency

the 353.860 asylum applications recorded in Germany from Q3 2014 to Q3 2015 (EUROSTAT 2015) led to an increase of people in the target group in Germany alone of approximately 23.000 people.

Alternatively, applying the worldwide average literacy rate as recorded by the UNESCO Institute of Statistics (UIS) of 85% to the projected number of accepted asylum applicants would lead to a slightly higher estimate (approx. 26.000 people) of the increase of the target group during the same time span.

To reach this target group efficiently, we rely on the multiplier function of a subset of target group 4, in particular volunteering or permanently employed educators that teach literacy courses for migrants and refugees or teach in institutions that offer such literacy courses as well as institutions and organisations that offer literacy courses targeted at migrants and refugees. To achieve this, we are regularly communicating and discussing our progress and concept with members of foundations, schools and social organisations that are dedicated to or involved in these efforts.

11.3.3 Activities and work performed

Work Package Number : 1 (completed last period)
Actual Starting month : 2015-10 Predicted/Actual End month : 2016-01 / 2016-01

²⁰ This number is derived from entries into the EASY system, a software tool to record migrants and distribute them among member states of the Federal Republic of Germany. According to the German Ministry of the Interior, these numbers include migrants who continue to travel into other European countries and might be error-prone in other ways.

Work Package Objectives: Research and Concepting

Main achievements:

- Recruitment of Dr. Tullia Santin and Andreas Fischnaller as high level project management team
- Research and evaluation of other open online language learning platforms
- First analysis of target group
- Articulation of product vision
- Creation of story board
- Development of a comprehensive pedagogical concept
- Creation of wireframes
- Design of mock-ups, User Interface concept and User Experience concept
- Planning of software architecture
- Creation of a network of several potential partners and donors
- Development of budget scenarios and timetables for follow-up financing
- Negotiation of follow-up financing of Serlo language learning with potential donors

Detailed description of work performed to reach the achievements listed above:

You can find details to the achievements above in our project summary for partners and donors, which is attached to this report. The summary is written in German.

In addition to the project summary, we created scenarios and timetables for further funding, which you can find attached as well.

Summarise any problems you have encountered, and how they have been overcome:

The main difficulty we encountered was to decide which level of previously acquired language skill our platform should require. During initial concepting, we assumed our first tools and content should focus on learners with language skills between A2 and B2 - the target group would match with those of our math project, and we would be able to use several already existing functionalities of serlo.org. First planning sessions with external experts and teachers revealed a substantial need for educational tools and materials for alphabetization - illiteracy seems to be a common inhibitor of integration and timely acquisition of language skills, and, despite our intuitive assumptions, many refugees with little or no literacy skills are actually using digital devices like smart phones.

As can be inferred from this broadening of our target group, every tool developed needed to possess extremely intuitive interfaces and functionalities, which excluded the use of our currently existing maths platform. -

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At the end of these workshops and discussions, we decided to start at the very beginning of language learning and to build a new application from the scratch, aiming to fully meet the needs of our target group. This decision making process and its results were really exciting for us - we are confident that we can offer an innovative solution to an important problem in the centre of current political discourse.

Description of planned activity for next reporting period:

none - WP is completed

Work Package Number : 2

Actual Starting month : 2016-01

Predicted/Actual End month : 2016-06 / 2016-06

Work Package Objectives: Prototyping

Description of work this period:

Main achievements:

- Inclusion of more curricula
- Implementation of 8 more exercise types
- Implementation of speech action elements and a sample repetition chapter
- Improvements to the user experience of the exercises
- Implementation of first adaptive elements, e. g. repetition of exercises based on previous performance of the user
- Extensive user testing and adjustments to usability and design

Detailed description of work performed to reach the achievements listed above:

The goal of this WP is to create a prototype that offers users and potential supporters a first realistic look and feel of our future learning platform. We have since created a comprehensive prototype featuring 12 different exercise formats, three letter introductions, one speech action and one repetition chapter.

Extensive user tests carried out upon the completion of the prototype have led to valuable insights about usability and user experience design, which have since been implemented.

Summarise any problems you have encountered, and how they have been overcome:

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The main challenge any tool designed for people with deficient literacy skills is to help learners understand how to use the application and how the different exercise types work, without being able to use written text for explanation. We have been continuously working on this issue and implementing improvements to the user guidance through design improvements, animated example exercises and short video clips demonstrating the task to be performed as well as improvements to the immediate feedback on user input that enables users to gain an understanding of the exercise requirements by trial and error.

Description of planned activity for next reporting period: none - WP is completed

Work Package Number : 3

Actual Starting month : 2016-08

Predicted/Actual End month : 2016-12

Work Package Objectives: Beta-Version

Description of work this period:

Main achievements:

- Building of cooperations for development and distribution
- Recruitment of development team
- Requirement analysis
- Research for possible frameworks
- Decision on a final framework
- Proposals for basic architecture
- Decision on final architecture
- Creation of wireframes and templates
- Extension of curriculum, creation of content
- Completion of final CHEST-report

Detailed description of work performed to reach the achievements listed above:

The goal of this WP is to create a beta version that can be deployed to users as a minimum viable product comprising the entire literacy and speech action curriculum up to an A1 language proficiency level.

Creation of the didactical contents is meanwhile progressing and currently at a stage of roughly 50 percent of the envisioned total. This means a gradual deployment of additional contents on the

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prototype for continuous testing and preliminary use is possible at this stage.

Summarise any problems you have encountered, and how they have been overcome:

- So far, there have been no major issues in the development process.
- A problem we are currently facing is the delay in implementing a testing class for content testing. This delay is due to an internal problem at the partner facility. We are currently in the process of building new partnerships for the same purpose, as this may turn out faster than waiting for our current partner facility to resolve its issues.

Activities for upcoming period:

- Testing of didactical contents (not previously possible due to schooling cycles)
- Continuous testing of learning progress with a bespoke testing class
- Continuous deployment of contents to prototype for testing and preliminary use
- Completion of course materials
- Completion of beta version

We are currently on schedule with our project planning.

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

None so far.

Detail any publications, publicity or other dissemination activity.

Social media has been used heavily for the recruitment of further volunteering team members since the last reporting period, resulting in an additional three team members.

Serlo's Facebook page in particular has been used to present new releases on the prototype, communicate cooperations with partners and raise awareness for the project in general.

Participating in the Refugees in Munich OpenTransferCamp in April has enabled us to establish ties with Integreat, a partner that will be invaluable to us in terms of dissemination and further networking.

Two team members participated in a symposium on the subject of early language schooling for

refugees in Dresden in August 2016, where the project was presented in a disc space. This resulted in a meeting with the Deputy Commissioner for Integration and Equality of Saxony who may help disseminate the learning software across all first arrival facilities in Saxony.

Participating in the follow-up session of the Digital Refugee Summit has also given us access to a member of the Ministry of Interior Affairs in charge of refugee initiatives who will be contacted when the software is ready for dissemination to all first arrival facilities on a national level. The Malteser Hilfsdienst is also a valuable partner for reaching a substantial number of refugees in need of our language learning offer.

A contribution in an information brochure of the National Agency for Adult Education with a print run of 4000 has been handed in for review and is due to be published in November.

At future events, such as the upcoming Intercultural Week in Munich at the end of September the project will be represented with information materials for participants to take away to assist dissemination. For the same purpose we are also in touch with a number of young refugees who are offering their support in spreading the offer amongst their peer groups. The management has furthermore procured a list of all accredited German course providers who will be contacted when the beta version is ready for deployment.

A publicity strategy has been conceived and is currently being prepared for implementation. This includes celebrity contributions, a TED-Talk, and a crowdfunding campaign.

11.3.4 Sustainability of the solution

Serlo, as prototyped within the project work packages, will use the results of the CHEST program by integrating the language learning functionalities in its e-learning platform starting with German as a foreign language. After successful implementation in the German Serlo, the features are going to become standard in the other language tenants, namely the English and Spanish tenant (already started), as well as the tenants for all other European countries (launch in the upcoming three years). The growing user base of 300.000 users per month, long term relations to funding partners such as the Hans Sauer Foundation, access to pro bono expertise in several fields, as well as Serlo's network and standing as a leading OER organisation in Germany ensures the general advancement of the platform on a long perspective.

Serlo's community approach, similar to the one essential to the success of the Wikipedia, is relatively independent from financial funding. Even without significant follow-up financing, there is a high potential of growth of the language learning platform because Serlo relies primarily on volunteer work and a community dedicated to our cause.

Though we will not be commercialising our content in any way, including advertising - we believe this to be integral for widespread acceptance and social impact - achieving long-term financial stability remains one of our top priorities.

Regarding future developments of tools for language learning on Serlo, we are currently undertaking extensive fundraising efforts to secure additional funding which would allow us to continue our project long-term. We have already been able to secure one corporate sponsor and have secured funding from two prominent foundations in Germany last quarter; in addition, a number of publishers invested in "German as a foreign language" materials have expressed interest in

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supporting our project. Though we have been asked for confidentiality regarding our negotiations, we are confident in our ability to secure funding during the CHEST funding period that would allow us to extend the project duration well into 2017. A crowdfunding campaign will raise both additional funds and public awareness for the project.

Long-term, we plan to transition from funding based on applications for innovation grants and foundations to a model primarily financed by small to medium private donations and membership fees to our supporting organisation, similar to the model Wikimedia associations all over the world use - we believe this approach to be the most stable and sustainable. We are currently in the concept phase of a prototype project that aims to provide valuable insights into donation patterns and possibilities within our target groups and their social environment, e.g. families and supporting organisations of schools.

11.3.5 Risks

The following risks are rated

- a. regarding to the degree of probability at which they will occur on a scale from 1 (very unlikely to occur) to 5 (very likely to occur)
- b. regarding to the degree of influence they will have on the success of the project on a scale from 1 (minor influence) to 5 (project threatening).

Both scores will be then added to receive a final rating for the risk described.

1. Loss of key personnel

Probability: 4
Influence: 5
Threat score: 9

We are trying to offset likely consequences by distributing knowledge within our organisation, providing internal training to our team members and continuing efforts to allocate responsibilities evenly. Furthermore, we design work processes, record keeping and pools of source material in ways that will allow for swift hand-over of responsibilities between staff. The involvement of external pro-bono partners adds another safe storage component for project expertise and experience.

2. Loss of office rooms we receive on the basis of our cooperation with the student body of the Ludwig-Maximilians-University Munich

Probability: 3
Influence: 4
Threat score: 7

We try to prevent this risk from materializing by maintaining our cordial relationship with the property owner and the associated administration offices. We are also establishing ties with other non-profit organisations willing to share their premises with us should need arise.

3. Loss of our status as a recognized social non profit organisation

Probability: 1
Influence: 5
Threat score: 6

Professional accounting methods and the review of our tax declaration by professional tax consultants are in place to prevent this risk from materializing.

11.3.6 User-based evaluation of the concept

Community Building / User involvement in prototype evaluation / test usage :

One user group of the application are teachers who can use it as an additional tool to equip their students taking alphabetisation classes. Teaching professionals for German as a foreign language have been heavily involved in the conception of the application from the very beginning. The exercise types chosen as foundation elements of the learning tool have been tested, validated and successfully applied by teaching professionals in their analogue form. In addition to this, we also carried out user tests with refugee literacy course students at 3 different institutions in Munich. We surveyed 5 literacy course teachers (volunteering and professional, target group three, four females and one male) in unstructured open feedback sessions. Reception by this target group was consistently very positive, and estimated viability as complimentary course material was high.

We also observed a total of 20 participants from target group two during the use of the prototype (eight female, 12 male).. Due to language barriers, a survey of their impressions beyond a general good/bad rating was not possible. Nearly consistently the reception of the learning software was very positive. Issues we did encounter were frustration due to technical bugs of the prototype and a lack of media competency by one older participant. We found the latter problem could be overcome by using the programme communally with a younger participant, however it did show the limitations of the age range the learning platform is suitable for in an independent self-study context.

We did not survey members of target groups one and three due to the specifications of the current prototype whose content is specialised to the needs of illiterate German-as-a-foreign-language students. This, however, can easily be readjusted at a later point in time when focus shifts towards generic language learning or generic literacy.

We have also not yet been able to test the prototype with illiterates who have not yet encountered any of the letters introduced in the prototype due to school year cycles. Upon the completion of the prototype all literacy courses had already progressed to Module 2 or 3 status, meaning advanced levels of the courses. Now, however, a new school year has begun and we will be visiting Module 1 literacy courses to conduct more testing with complete illiterates.

11.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 19.

Table 20: Snapshot of project "Open language learning platform on Serlo"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop a web-based, open learning platform that will host free language learning materials, in order to lower the economic and social hurdles for acquiring foreign language skills lay the foundation for a successful integration of refugees into their respective host societies.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Researched and evaluated other open language learning platforms, analysed target group and established partner networks ○ Created storyboard and wireframes, designed mock-ups, UI and User Experience, developed a comprehensive pedagogical concept. ○ Implemented curricula, exercise types and adaptive elements during prototyping. ○ Conducted extensive user-testing to identify improvements to design and usability. 	<ul style="list-style-type: none"> ○ Organisation's website with dedicated project section (https://de.serlo.org/abc) with access to the prototype: https://abc.serlo.org/ ○ Serlo's social media accounts: Facebook (798 likes) and Twitter (238 followers) ○ Participated in Refugees in Munich OpenTransferCamp, resulting in partnership with Integreat. ○ Participated in a symposium on early language schooling for refugees, resulting in a meeting with a senior Saxony region official. ○ Participated in the follow-up session of the Digital Refugee

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	<ul style="list-style-type: none"> Development of beta-version with extended curricula and content. <p>The project successfully delivered 4 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<p>Summit, resulting in contact with the Ministry of Interior Affairs member in charge of refugee initiatives.</p> <ul style="list-style-type: none"> Contributed to the brochure of the National Agency for Adult Education.
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Table 21 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on education and human capital) and secondary (impact on ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 21: Mandatory KPIs for Serlo

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	4	2
		Number of users involved in co-design process	0	25	25
		Ratio between men and women involved	n/a	1:1	13:12
		Ratio between young, adult and old people involved	n/a	3:4:1	3:17:1
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	5	5	5
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	1	1
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	3	0
		Number of comments / replies on project blog entries on CHEST website	0	20	0
	Sharing through social media channels	Followers on Twitter & Likes on Facebook	620	773	1500
		Posts on Facebook regarding CHEST and associated development	2	2	4

12 Payeze²¹

The Payeze project develops an innovative mobile payment solution, which will offer digitally and financially marginalised across Europe a risk free way to engage in digital e-commerce. For businesses, the solution offers an improved engagement mechanism and payments collection system outside the banking networks at low costs.

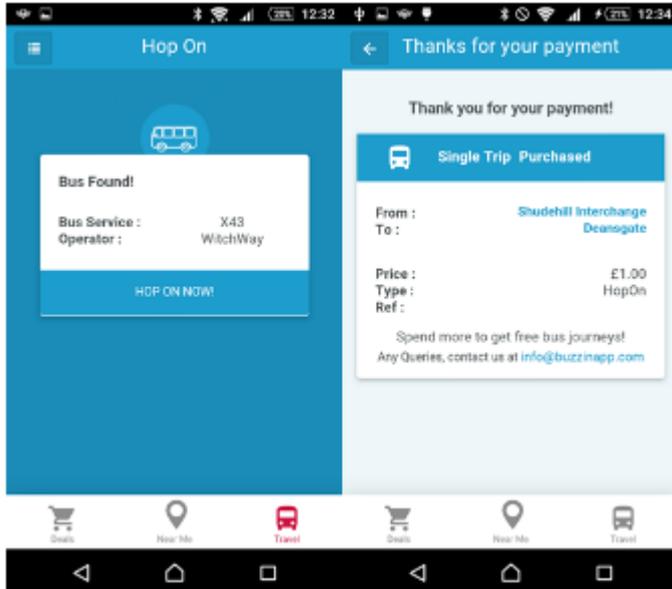


Figure 17: Screenshots of the Payeze app

12.1 The societal problem

12.1.1 Description of the problem

1. *Which specific problem did you intent to solve? The social problem should be described as specifically as possible. If several problems can be identified, they should be prioritized based on importance.*
 - With European countries becoming digital and emoney-dependent, tools such as a credit card, debit cards and online banking have become prerequisites for day to day living. Lack of access to these services presents a serious obstacle to economic and social integration of a person, thus, financial exclusion carries a serious risk of social exclusionand deprivation.
2. *Who is affected by the problem? Please describe in detail who is affected by the problem and how so.*
 - The Euro barometer reports that 7% of the population in the EU15 and 34% in EU10 are financially excluded (EC, 2008). Table 1 in the appendix shows 17% of the EU and 19% of the UK population are at risk of exclusion (EC, 2008).
 - People with low levels of income, less education, ethnic minorities or migrant backgrounds, and very old (over 65) or very young (18–25) are more likely to be financially excluded (EC, 2008).
 - It is estimated that 12.1 million bank users incur penalties every year in the UK (PwC, 2012), 8% of the population remains unbanked and 31% of the population holds only a Basic Bank Account (BBA) (Accent,2012) , without debit cards to use in shops and online.

²¹ Chapter contributors: Mathias Becker, Zulf Choudhary, Richard Harvey

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- 3. *How has your perception of the problem changed during the reporting period (lessons learned)?*
 - During this period mobile payment solutions using NFC like Apple pay & those from the banks like PAYM, Pingit etc have entered the market, but they still require users to add their credit card or debit card to make use of mobile payment mechanism. So, still the problems persist in the market in-terms of financial/digital exclusion & higher transaction costs for the businesses and so is the need for alternatives.
-
- 4. *How has the social problem itself evolved over time? What is the current situation? How will the problem develop in the future if no action is taken?*
 - SMEs face rising payment collection costs, with UK businesses incurring £798 million on card based methods (Appendix A1.1). Moreover, Deal marketing websites charge 15% - 40% of the revenue earned and are not affordable. Thus, these businesses are motivated to seek alternate payment collection systems (PwC, 2012) and use technology including Mobile and Web to increase sales and stay competitive, in a shifting retail landscape (Financial Times, 2012).
-
- 5. *What are the underlying causes of the problem? Please describe interdependencies of different causes.*
 - Need for an alternative payment solution that doesn't use banking networks with cards like visa or master-card solutions. Though the appetite for alternative payment mechanisms including mobile payment is increasing, there is no open IT infrastructure outside the banks that can be made use of by local businesses, social enterprises. This leads to monopoly of banking networks which in-turn leads to SMEs having to pay high transaction charges & lower end of the consumer market being denied access to online & offline digital payments.

12.1.2 Scale of the problem

1. *How many people are affected by the problem? Please describe the European dimension of the problem. Depending on the type of problem you are dealing with, it may be useful to provide additional information concerning the scale of the problem (e.g. size of the area, percentage or number of people affected in the case of environmental protection activities).*
 - Among the EU15 countries Greece (28%) and Italy (16%) have the highest levels of financial exclusion (EC, 2008). Across the EU as a whole, almost 12% of people lived in households which reported not having a bank account (EC, 2008). This proportion varies with over 80% of people in Bulgaria not having access to an account, 75% in Romania and over 70% in Greece (EC, 2010).
2. *Has the scale of the problem changed during the reporting period? If possible, please also provide estimates for the likely future development.*
 - The facts for the UK are: 51% being Smartphone users, 39 million are prepaid customers (Ofcom, 2013) who look for flexibility. With people using internet to look for deals increasing to 33% (Shoppervista report, 2012), businesses are urged to find ways to add value beyond price (A2.1). In the UK, Payze could serve the 31% of the population who just hold a basic bank account without cards and 8% of the population who are unbanked (Accent, 2012). Target business users could be those receptive to alternate payment methods which has doubled in

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the last 2 years (British Retail Consortium, 2013), accounting for £3.3 billion of sales turnover, 5% of all transactions (Appendix A1.3). Sparta conducted a survey among 500 participants showing 3/4th would use mobile devices to pay for friends, goods, utilities and transport, a 20-25 times increase compared to current levels of usage. This echoes with the results of the Vocalink report (2013) on mobile usage - attitudes and payments research.

3. *What social consequences have already occurred, and what costs have been incurred by society as a result? What do you expect to be the consequences and costs if the problem remains unsolved?*

- Widespread socialisation of the platform will have great socio-economic benefits first in UK and then across Europe. It is planned to target at-least 20% amongst the population of Salford of 233,900 (Census, July, 2012) with potential impact of at-least 5000 users during the project period with SCU (Salford Credit Union) having 4000 members (2013) being the first target users. For external organisations, including social housing providers, credit unions Payeze services will be of immense help in engaging with the socially and financially excluded sections. Payeze helps SMEs increase footfall and sales, enable their expansion thus creating employment in the community. It will also help to keep the money within the local economy. Two years since launch Bristol Pound is now accepted at 650 businesses (Bristol Post, 2014), in-line with this the project will engage with 200 businesses during the project and impacting 650 businesses during the first year after the project. Potentially, even 10% market adoption would save £80 million of the £798 million that businesses lose in payment collection costs every year (Appendix A1.1) which will go back into the economy. Anonymised data will be made available on public domain; so that relevant authorities can obtain an understanding of this market.

12.1.3 Previous approaches to solving the problem

Since 2008, successive EU governments have spent over £1.2 billion on the Horizon project (<http://www.publications.parliament.uk/pa/cm199900/cmselect/cmtrdind/50/5004.htm>) a Bank and Post office based consortium) to simplify payments to the poor and those of benefits. The only success was the development of Post Office payment cards with limited functionality and appeal. In the mobile payments market, solutions by banks include Barclays Pingit and Paym. Paypal, uses email-id to transfer money, but users need to have bank accounts with cards. There is no similar platform as Payeze, as banks always seen these consumer segments not a profitable proposition. While others followed suit, no other lower cost infrastructure exists to transfer funds. Then there is the successful M-PESA from East Africa, by the mobile network operators, but in the UK the O2 Wallet system linked with customer's card details failed. In parallel there are alternative currencies e.g. the Brixton Pound in the UK or Chiemgauer in Germany. However, these currencies valid only within the region, pose limits to wide spread adoption.

As the account sign-ups, top-up and withdrawals will be in-store, the systems and infrastructure needs to be simple and highly responsive. Innovative technologies like beacons-based payment will be deployed. It is convenient and secure compared to NFC as it does not require NFC-readers, which is one of the key barriers for 3rd party payment providers to penetrate the market.

The novelty lies in the way payment technologies and localised mobile engagement applications are integrated at extremely low cost of operation. The platform uses an open APIs approach to co-design processes to develop and deploy new feature with proposals coming from consumers and business partners. The platform interfaces with key stakeholders within the local ecosystem to develop payment functionalities and thereby deliver added value services to consumers.

12.2 Implementation of organizational structure

12.2.1 Maturity of the project

- *Idea/seed phase:* Opening up of Wallet& payment APIs & changing backend system.
- *Pilot phase:* Mobile payment solution for transport and retail trialling through Buzzin app, Payeze payment backend platform, web-based CMS for businesses to manage the transactions. Trials of payment solution started (July 2016) with 2 transport operators in 2 two routes, namely, X43 service buses in Manchester and a route in Leeds. 50 retail businesses.

12.2.2 Organizational structure

The project has been managed through a set number of work packages (WP) as listed below

- **WP1** - Project Management & Reporting; *Tasks-* Detailed project planning & procedures & final report and Final social impact plan;
Staff involved - 1 management & 1 commercial (permanent);
Milestone - Project Completion Final report & Final Social Impact plan (MS5)
- **WP2**- Research & Advanced Prototype Design; *Tasks-* Technical Research on state of art, Market research, Identification of partners for collaboration amongst the Manchester cluster (Transport operators, phone shops etc.),
Staff -1 management , 2 commercial , 3 technical & 1 designer (permanent); UI/UX expert (freelancer)
Milestone - Initial Design specifications & APIs documentation complete (MS1)
- **WP3** - Development of Software applications; *Tasks* - Technical specifications development, Mobile payment functionality deployment, Accounting and auditing process and procedures documentation
Staff - 1 management staff , 3 technical & 1 design staff (permanent); UI/UX expert (freelancer) *Milestone-* Release updated mobile app on apple and play store(MS2)
- **WP4**– Pilot running & monitoring; *Tasks* - Pilot running with agents, businesses and social enterprises signed-up, and direct feedbacks and reporting
Staff involved - 3 commercial & 1 management (permanent); 10 Volunteers for testing
Milestone - Interim Progress report and updated social impact plan (MS3)
- **WP5**– Business case evaluation & sustainability planning; *Tasks* - Existing business cases evaluation, Further business case analysis, Analysis and choosing of business models
Staff involved - 1 management & 1 commercial staff (permanent)
Milestone - Chosen business model & sustainability plan (MS4)

12.2.3 Key personnel

- **Zulf Choudhary, (Project Manager) MD** with 25 years in banking. Developed debt-equity swap deals through Libra Bank and Swiss Banking Corporation for Ingersoll Rand and worked in Venezuela and Chile during the Latin American debt crisis. Negotiated and delivered humanitarian aid worth over £1.5 million to Bosnia and an expert in financial exclusion issues. He will be the driving force behind the project being responsible for making the partnerships with private sector businesses, which is quite vital for the success of the project. He successfully ran DATES project for Sheffield and Walsall council, created innovative software for testing new developments in smartcard and mobile applications with Credit Unions. He has delivered similar successful projects including EU Pay, trialed with Sheffield MBC to bring digital payments to the socially excluded, BBC BLAST Stringsta, as a provider of interactive platforms using GPS, Mobile and multimedia content, AIDCUK, providing the Government flagship showcasing new technologies in Authentication Identification, Data Capture Centre in Halifax, with integration ERP software support.

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- **Richard Harvey (Commercial officer)** the Chairman, director to a number of VC-led technology companies. Richard would act as the financial coordinator & compliance manager for the project, handling the accounting and coordinate with external parties for the execution & management of this project. With his connections in financial services, social enterprises, TfGM and local authorities, he will bring his relationship building and management capabilities for this project.
- **Vijay N, MSc, B.Eng., (Marketing Manager)** with 6+ years of experience in software solutions, marketing services, online retail & project management. Expertise in generating business, client acquisition, branding, marketing, market research and team management. Skilled in digital marketing platforms and initiatives. Analytical, problem solving and leadership qualities inherited by building brands in conjunction with operational requirements. Skilled in interactions with different stakeholders across units and implementing benchmarking practices. As part of CROSS project (€5.8 million), established partnership with IVO, national volunteering group, for Do-it system (600,000 volunteers) and mobile app for search, application, work validation, feedback and value measurement of volunteering. Developed a comprehensive marketing strategy for CRM & Digital solutions business; built product offerings, developed process flows, marketing campaigns and sales material/collaterals. Skilled at executing digital marketing campaigns for leading Manchester based wholesalers and retailers, building successful e-commerce website with upto 10,000 customers. Also ran successful sales campaigns for N-power and Telefonica O2, with a team of sales people.
- **Li Yao (Technical Director) PhD, CTO** Li Yao Ph.D., is the CTO, is an expert on e-commerce and security and data automation. He has a PhD in Computing from the University of Manchester, and a Masters in e-commerce systems. He is an expert in smart cards and JAVA, having written exclusively on Smartcards and authentication, and has worked in a NHS funded online access control project as a designer and developer. He last worked in Barclays Corporate Bank in the payment division, where he specialised in payment transactions and data support. Currently, leading activities with Digital China (A Government owned large technology firm), China-Britain business council and Bank of China on SME mobility including e-commerce sales from China to UK and vice-versa.
- **Jade Kinder (Designer)**, BA (Hons) Digital Media Production, experienced content making, using a wide range of software, concept planning, filming, 2D animation and carrying out digital marketing activities. Her projects include with BBC in their Children's department Cbeebies in August 2014; also she has been involved in creation of a Stop Motion Animation for their CBBC Channel Star Gazing TV programme. She is adept at using creative software including Adobe Software especially Photoshop, Illustrator, After Effects, Premiere Pro, Flash and Dreamweaver. She has been involved in content creation for e-commerce sites and involved in search engine marketing activities mainly for retail clients in UK.
- **Brendan Ingham (Web developer)**, , skilled in PHP, HTML 5, CSS, JavaScript, has previously designed variety of e-commerce websites, multiple content management systems. He is an expert on Big-commerce, Woocommerce and Shopify e-commerce platforms, in developing digital marketing plug-ins for clients along with their e-commerce sites. He is also skilled at Sitefinity – Content management platform currently on developing 'Progress software' global partner portal which will provide a personalised content experience for partners based on their location, language, type of partner, skill background and more importantly their lead score coming from lead generation tools like Marketo & salesforce.

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- **Neetu Agarwal B.Tech. , (Mobile App developer)**, skilled in Android, Java, MySQL, SQLite, Eclipse, JSON web service and Dreamweaver applications. Responsible for developing Enterprise class & Consumer driven native Android and cross platform applications using PhoneGap, jQuery Mobile, Javascript, CSS & HTML and Java. Also responsible for integrating these applications to backend systems using REST and SOAP based API. Responsible in End to End mobile development, from conceptualizing, prototyping, technical design and delivering app. Recently developed DO-IT mobile android app, Tabsview phonegap based app.
- **Jenni Wardell, (UI/UX designer)**, skilled in software like Adobe CS6, Maya, 3ds Max, Painter 12, front-end development using HTML, CSS3, HTML5, Jquery, Javascript. She has extensive experience with projects including designing the community engagement platform and app for Manchester community central as part of CROSS, EU project, along with Manchester City Council. Worked with Progress software, global PaaS provider and their client to design prototypes using rapid development tools. Engaged on multi-year strategy to create a next-generation search and discovery system to serve audiences online, globally, as well as expose all content that has ever been published by the BBC to the world in an easily navigable API which can handle complex queries and interact with all other systems/APIs within the BBC.

12.2.4 Partnerships, cooperation, and networks

Partner- Transdev (Lancashire buses)& Yorkshire Tiger Bus operators

- *Subject and goal of the partnership* – to trial out smart ticketing using Beacons technology on their buses
- *Contractual basis of the partnership* – Verbal & MOU
- *Strategic significance of the partnership* – access to users who could earn Buzzin-coins and get rewarded for using public transport.

Partner- Do-it trust

- *Subject and goal of the partnership* - provide a virtual currency based rewards for volunteers using their app
- *Contractual basis of the partnership* – MOU
- *Strategic significance of the partnership* – Access to huge number of volunteers (600,000 in UK) and volunteer sector organisations. Buzzin-coins API could be integrated into the Do-it app and volunteers can gain reward vouchers based on number of hours they volunteer.

Partner- Local businesses in Manchester

- *Subject and goal of the partnership* - Test alternative payment solutions outside the banking networks for making payments for offers in local retail outlets on the whole.
- *Contractual basis of the partnership* – Written agreements
- *Strategic significance of the partnership* – Ability to demonstrate cost savings for SMEs and ease of use, this will open up the markets enabling Sparta to target local shops in other areas within Greater Manchester.

12.3 Implementation of the solution approach

12.3.1 Solution approach

The project aims to conduct experiments using innovative socio-economic models helping to develop more sustainable and inclusive solutions. Sparta is proposing a community based mobile payment service that removes the cost and penalty or hidden fee issues imposed by banks. Sparta would be developing a disruptive payment platform, which enables local financial ecosystems to be set-up outside the banking networks. The platform is built with basic functions including free P2P (Peer-to-peer) payments and payments to local businesses for goods, free posting of offers to customers and

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a flat transaction fee for payments collection to businesses. The platform enables co-creation of user defined functions like payments for bills, rent, charities, salaries and others based on the needs of the local financial ecosystem involving consumers, businesses, social housing providers, social enterprises and public sector organisations. Thus customised payment services could start operating in a local region serving the needs of different stakeholders in the ecosystem. The platform provides a complete bottom-up approach compared to traditional banking where the features and services remain fixed, driven by investor interests. The platform is scalable for implementation across Europe. An advanced prototype of the final solution would be developed and tested, applying to various scenarios and sectors within Greater Manchester, UK, so that the best route to market can be chosen for implementation in other cities.

This project will use collaborative innovators, users and communities to co-create knowledge and solutions exploiting the network effect of the Internet. Sparta in collaboration with User groups, Salford Credit union, Transport operators, Local businesses and Social enterprises like Manchester Community Central will develop an advanced prototype of the Payeze platform. The platform uses an 'Elevator mechanism' for this, enabling voting and feedback to help evaluate ideas on new features which will then be implemented within the service. The initial version of the mobile app allows users to sign-up; top-up their account through the credit union and shops; send money to friends and family. The offers section provides deals from local businesses which users could pay for in-store, online and mobile. This version of the app will be further developed during this project and released on app stores. The Payeze payment service for Manchester region would start to develop with different players in the ecosystem. Evaluation will be through field trials and based on quantitative and qualitative surveys; various routes to market will be investigated.

12.3.2 Target groups

Direct Target groups

Volunteers- Volunteers working for organisations within GMCVO (Greater Manchester Voluntary Organisations) and Do-it trust. They have a user base of over 30,000 volunteers. Reaching these groups through the do-it app which they use for volunteering.

Public transport users- Those who use smart ticketing apps to move around the city in buses and trams. 2 bus operators to be targeted. They have user base of over 100,000 per month. Promote the use of Buzzin app for smart ticketing and gain rewards through Buzzin-coins.

Local businesses- retail, food & drink businesses within Greater Manchester who will provide the vouchers as rewards that can be bought using Buzzin-coins. Around 30 Businesses to be targeted. Ease of use and minimum changes to their processes & costs of switching/using new payment methods are the main concerns of businesses. Due to recent relationships built with local transport operators, the app developed would be trailed with 2 bus operators. For them, seamless and ease of use and payment process, we have decided to use Beacons technology to detect the device and process the payment for travel.

Indirect Target groups

Low income groups

People with low levels of income, less education, ethnic minorities or migrant backgrounds, and very old (over 65) or very young (18–25)

Local people within the region

Living within Greater Manchester looking for alternate methods of payments and social rewards
Safety & privacy is one of the key concerns of the user group for using mobile payment systems and alternative banking systems to store their cash & use it for transactions. The above concern will be addressed by clear branding and communication through animation & videos. Also the app will be made as customer focused and simple to use.

Influencers & intermediaries*Local credit unions**Voluntary sector organisations**Manchester City council***12.3.3 Activities and work performed**

Work Package Number : WP2
Actual Starting month : Sept 2016 Predicted / Actual End month : May 2016
Work Package Objectives: To Research & design the Advanced Prototype
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> Initial Design specifications for system & APIs documentation complete (MS1) <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> Technical Research on state of art including available currencies like Bristol pound (http://bristolpound.org/), available systems like Community weaver (https://democw3.timebanks.org/), ECHO (http://economyofhours.com/), V-coins (http://thevolunteers.co.uk/), Community reward providers including Recyclebank (https://www.recyclebank.com/), Green rewards (http://www.greenrewards.co.uk/) and Swagbucks (http://www.swagbucks.com/). Market research on user opinions, both secondary and primary research has been conducted. Over 20 businesses, 2 public transport operators and over 50 users have been engaged in market research. This has been analysed together with the secondary research conducted through online sources. Identification of partners for collaboration amongst the Manchester cluster, these included Transport operators, local businesses and voluntary sector. Do-it trust (http://doittrust.org/) from voluntary sector to serve as a supporting partner interested in how do-it app developed by Sparta for volunteering could be linked to a rewards system. Transport operators Transdev Witchway (http://www.lancashirebus.co.uk/) and Yorkshire Tiger (http://yorkshiretiger.co.uk/) agreed to pilot a new payment solution and offer rewards for users. 30 local businesses enrolled for the pilot - https://docs.google.com/spreadsheets/d/196ha_xTPSK1XU3CghUV_NPzhRXXqXQwVnke4Qw-WI-8/edit?usp=sharing Design of backend systems & security infrastructure was undertaken utilising the Telerik backend system that Sparta already have. The focus was to develop a mobile app that can be used for making payments for local businesses and for public transport. Users should also be able to receive offer rewards based on where they are as notifications on their phones which they can redeem at the businesses. Design of Buzzin-coins platform web application was undertaken considering wider utilisation of the local currency for people doing voluntary work through the Do-it app, people using public transport, people undertaking energy saving actions and other possibilities. The system has to be general enough for the APIs to be utilised by any other third party web and mobile applications. At the same time, for the purpose of pilot, it was decided to use it just for the eco-friendly transport usecase through Buzzin app.

Summarise any problems you have encountered, and how they have been overcome

- Since the start of the project, the Payeze backend engine has been evaluated and compared with the state of the art virtual currency solutions. Though the market for virtual currency exists due to the advancement of Apple pay and other mobile payment methods with bank cards, it was decided that a more novel approach to Payeze payments should be undertaken.
- It was decided to develop a more differentiated model of virtual currency whereby users can earn virtual currency only by carrying out community based socially and eco-friendly activities. Users can exchange these for various rewards from local businesses and retailers.
- Web service APIs specifications has been completed, so that it can be opened up to external applications. This also included a general function for converting various units of activity into Buzzincoins virtual currency, such as number of hours of voluntary work, number of miles traveled using community transport

Description of planned activity for next reporting period

Work Package Number : WP3

Actual Starting month : October 2015

Predicted / Actual End month : August 2016

Work Package Objectives: Development of Systems & Software applications

Description of work this period:

Main achievements:

- Released Buzzin mobile app on apple (<https://itunes.apple.com/us/app/buzzin/id1072505409>) and play store (<https://play.google.com/store/apps/details?id=com.sparta.buzzin>) (MS2)
- Enablement of wallet within the app to pay for travel and local businesses, this was done by integrating with an external payment gateway.
- Smart ticketing functionality development and implementation for public transport.
- Testing and field trials of Hop-on payment functionality
- Ability to send out Rewards for users for using public transport including free rides and offers from local businesses through the mobile app
- Payment functionality made live with process in place for refunds, dispute resolution
- Conversion mechanism and accounting process for Buzzincoins rewards established

Detailed description of work performed to reach the achievements listed above:

- Technical specifications were developed with overall system architecture encompassing the backend with database for storing details of different businesses & transport operators, consumer facing mobile app and web interface for users/businesses
- Payment infrastructure
- Business and customer web interfaces application deployment
- Mobile payment functionality deployment

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<ul style="list-style-type: none"> - Accounting and auditing process and procedures documentation - Open APIs development for web & mobile
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> - To integrate the API for public transport ticketing approval has been obtained. - Final approval to integrate with Do-it volunteering app to be done - Open APIs development for web & mobile is still in progress
<p>Description of planned activity for next reporting period</p>

<p>Work Package Number : WP4</p>
<p>Actual Starting month : January 2016 Predicted / Actual End month : August 2016</p>
<p>Work Package Objectives: Pilot running & monitoring</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Relationship with TfGM innovation team - 2 Operators, 2 routes (X43, 757) and 30 buses installed - 50 local businesses working - Stickers, posters designed and posted on shops, buses, https://drive.google.com/open?id=0B6Ctm89QHUDUMHg2eEx4aXQ2dW8 - 2 event partners Gay Pride (https://bigweekend.manchesterpride.com/) and Cityco (http://cityco.com/) <p>Partnering with Travelspirit (http://www.travelspirit.io/) community</p> <p>Detailed description of work performed to reach the achievements listed above: Sparta team has done field trials on the buses on X43 routes from February 2016 till June, 2016 and on 757 buses from May, 2016 till June, 2016. From August, 2016 hop-on feature of Buzzin app has been made available for general public on 757, Yorkshire Tiger buses. From 28th of August,2016 it has also been made live on X43 buses in Manchester.</p> <ul style="list-style-type: none"> - Public video for citizens and businesses about the app , https://www.youtube.com/watch?v=3aw9n7Nz8wY - Social media marketing to reach passengers, 1000 followers on Twitter, 35k impressions in last 90 days with 80 likes and 40 retweets; Facebook page has 39 likes, In the last month has 40k reach, 2400 people engaged and 16 likes. https://drive.google.com/open?id=0B4HrToq5uPeWbUlaMDExNE9HNDg https://drive.google.com/open?id=0B4HrToq5uPeWSXo1aENEYklyR3c https://drive.google.com/open?id=0B4HrToq5uPeWUkQ5T2V3ZTlwbIE - Promotion by presenting at local events, Travelspirit launch event in Manchester (28-06-2016) http://www.travelspirit.io/; https://drive.google.com/open?id=0B4HrToq5uPeWYmllRWNIvTJwbEO

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<ul style="list-style-type: none"> - Over 800 Hop-on journeys and 1200 transactions recorded in the system, 200 app downloads and 56 registered users, https://docs.google.com/document/d/1yVzwyFXPjM0kgSQd9kvs_PVMD1pox50BWGzt47aDQE/edit?usp=sharing ; https://drive.google.com/open?id=0B4HrToq5uPeWYXpnYVdKN3QxU3M https://drive.google.com/open?id=0B4HrToq5uPeWLTdvOE9rd203UHM - Over 10 events attended, more events in pipeline, Cityverve partner event (04/02/2016), Cloud Expo London (12,13-04-2016) , Travel spirit event (28-June,2016), Northern Powerhouse event (June,2016)
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> - For this type of system to work , it needs a large number of businesses participating and starting from a city. Hence, Sparta is utilising its existing relationships to build this network before starting the trials
<p>Description of planned activity for next reporting period</p> <p>System and service showcase, awareness events organised , Blogs, social media and direct feedbacks and reporting</p>

<p>Work Package Number : WP5</p>
<p>Actual Starting month : May 2016 Predicted / Actual End month : August 2016</p>
<p>Work Package Objectives: Business case evaluation & sustainability planning</p>
<p>Description of work this period: Main achievements: Chosen business model & sustainability plan (MS4) Detailed description of work performed to reach the achievements listed above: Commercialisation planning has been done from the beginning of the project and business models have been evaluated through piloting during the project and working with potential customers. Currently, Sparta has been working with 2 transport operators on one route each for the smart ticketing using Buzzin app. After the trial period finishes in August 2016, the plan is to arrive at a commercial agreement with the 2 transport operators and start operating on more routes in Manchester and Leeds. Sparta aims to limit the dependency on city council and transport authorities to commercialise the Buzzin app, but instead will be working with the relevant authorities to facilitate the adoption of Buzzin app and Buzzincoins reward system amongst the different operators. Sparta has already enrolled 50 businesses for providing marketing and advertising services with putting their offers & rewards into the app. These businesses have been given a trial period, beyond which they will be charged a fee to continue the service after September, 2016. More businesses would be targeted to participate in the Buzzin app with exclusive deals. This serves as the main attraction for consumers to download and use the app continuously.</p> <p>Business models chosen</p> <ul style="list-style-type: none"> - Businesses will be charged for advertising their offers into the app and for broadcasting the offers to passengers on public transport and visitors to the city. - For travel and other deal purchases made through the app a 10% commission on value of the purchase would be charged. This will be billed monthly.

<p>Key metrics to track</p> <ol style="list-style-type: none"> 1. Number of merchants and transport operators signed up 2. Number of customers that have downloaded the app. 3. Number of active users 4. Feedback from merchants 5. Feedback from customers <p>Sales forecasts and projections have been made with certain assumptions. The 2 revenue models have been represented which include selling tickets & deals through the app plus advertising revenue from businesses putting offers & rewards into the app. A detailed business plan has been made for the Buzzin app which will be presented to investors once the short term targets are reached and we have at-least 2000 users.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p>
<p>Description of planned activity for next reporting period</p>

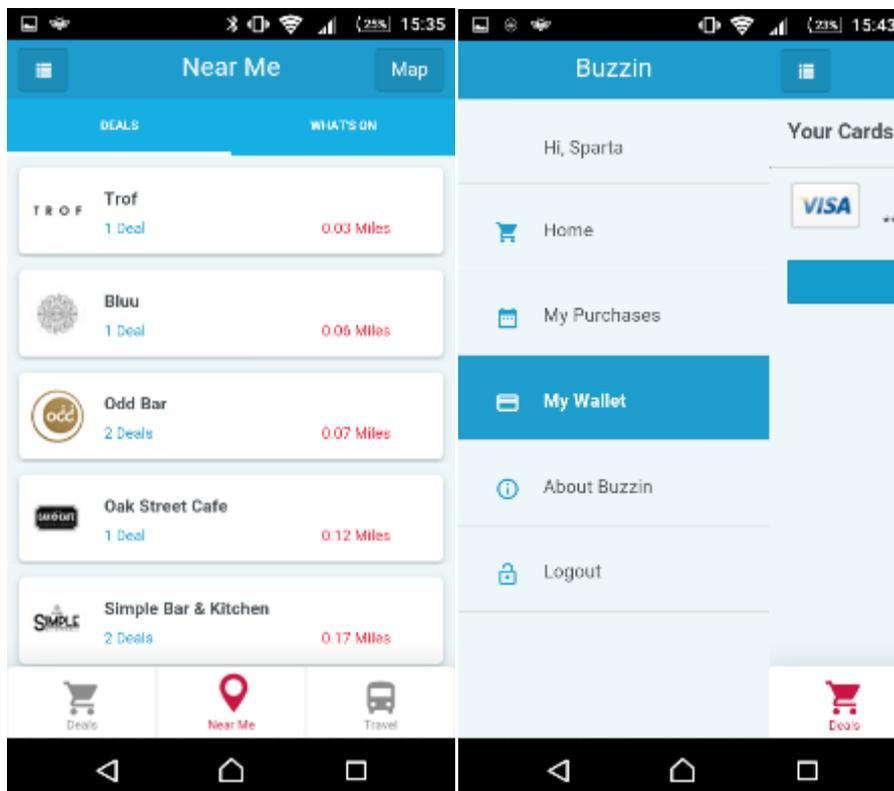
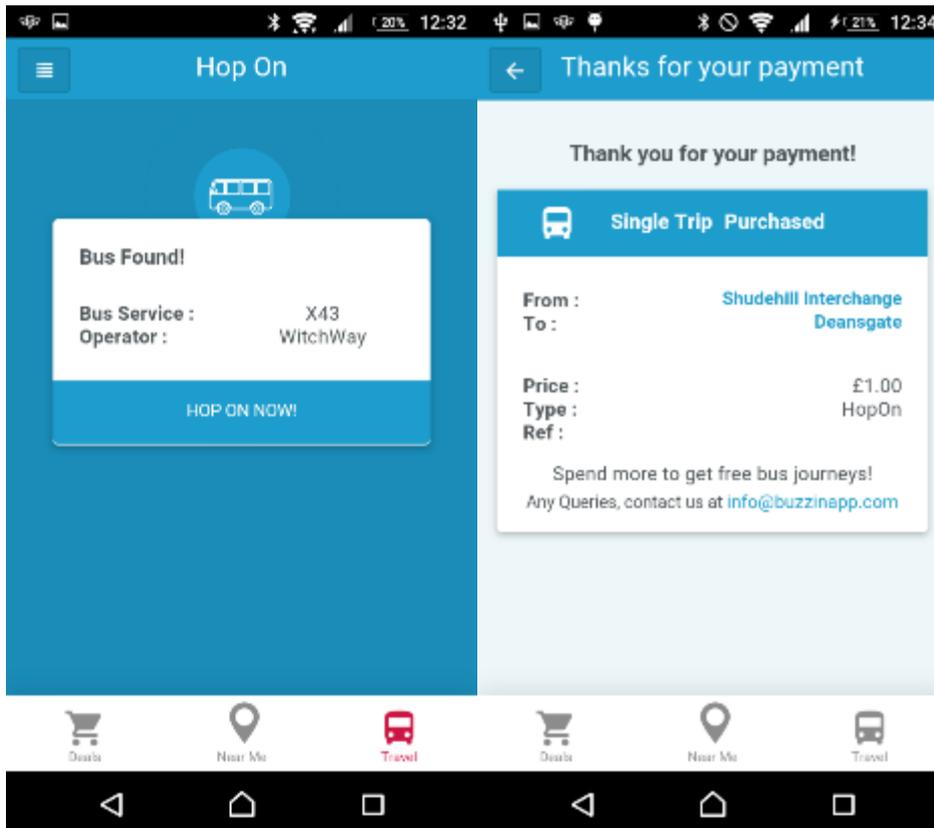
Project Management And Dissemination

<p>Summarise any management concerns and activities to recover the situation.</p>
<p>Payeze has been rebranded to Buzzin-coins but the objectives remain the same to build a virtual currency based ecosystem involving the local businesses, voluntary sector and public transport operators. This has resulted in slight delays as we had to revamp the Payeze backend by moving it to a more flexible and responsive system. Wallet functionality has been implemented within the Buzzin app with easy payment functionality for public transport. Users will also receive offers from local businesses.</p>

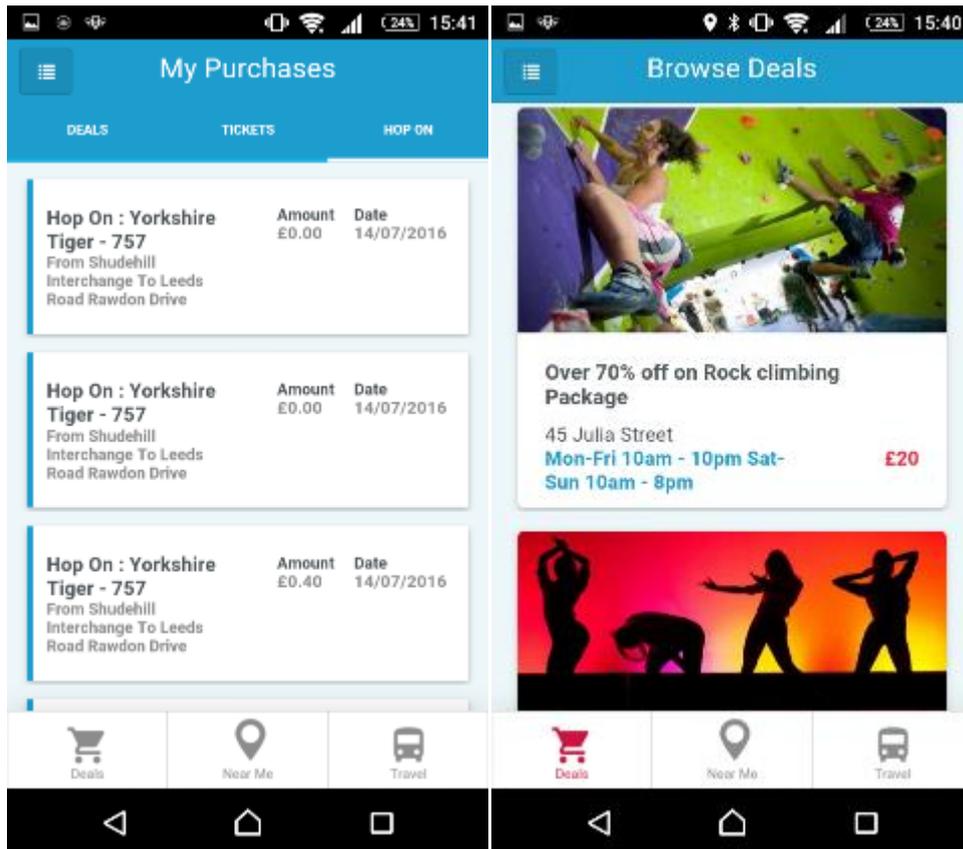
<p>Detail any publications, publicity or other dissemination activity.</p>
<p>https://www.manchesterdigital.com/press-release/buzzin-coins-virtual-currency-reward-system-sustainable-community-actions http://www.manchestereveningnews.co.uk/business/media/sparta-digital-buzzin-new-visitor-11228043?ptnr_rid=78091&http://www.manchestereveningnews.co.uk/business/media/sparta-digital-buzzin-new-visitor-11228043?ptnr_rid=78091&icid=EM_MEN_Nletter_Business_Media_smallteaser_Text_Story12-3icid=EM_MEN_Nletter_Business_Media_smallteaser_Text_Story12-3 http://www.prolificnorth.co.uk/2016/04/sparta-and-google-team-up-to-make-manchester-a-smart-city/ https://beta.finance.yahoo.com/news/sensoro-teams-ups-k11-sparta-150000674.html https://bdaily.co.uk/technology/14-04-2016/digital-startup-launches-new-app-for-manchester-visitors/ and mainly through promotions on social media, see following links twitter - @buzzinapp, @buzzin_coins Facebook – /buzzinapp.co.uk LinkedIn -https://www.linkedin.com/company/sparta-digital</p>

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App screenshots



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12.3.4 Sustainability of the solution

Buzzin app will be promoted to other transport operators and business sponsors, to continue providing rewards for people from local businesses and sponsors who want to promote the use of eco-friendly modes of transport. This could be expanded to other routes within existing operators like Yorkshire Tiger and Trasndev Blazefield in UK. Within the UK market Sparta is an approved supplier in G-cloud, Buzzincoins service along with Buzzin smart mobility solution will be made available on the Digital marketplace. For targeting the EU market, Buzzincoins APIs could be made available as a service on Cloud 28+ marketplace (<http://www.cloud28plus.eu/>) which Sparta is part of.

Beyond the CHEST funding period, Buzzincoins would be funded & developed further as part of a UK initiative from Innovate UK. This project is called Cityverve (<http://www.cityverve.org.uk/>), which is a 2 year IoT city demonstrator happening in Manchester covering areas including transport, Energy, healthcare and citizen engagement. Sparta has the role of delivering solutions for transport at the same time provides Buzzincoins as a local currency based rewards for engaging with citizens not only in transport but also other pilots. This would enable to grow the applications and user-base for Buzzincoins. Ways in which energy saving actions or other scenarios would use Buzzin app would be detailed and developed further during the Cityverve project. Through this we aim to build a strong case for investors and sponsors to invest into the Buzzincoins local currency.

12.3.5 Risks

S.No.	Risk	Impact	Mitigation action
1	Local currency not getting wider acceptance	High	Make sure it is aligned with other city initiatives and promote it to other apps/developers allowing open innovation
2	Regulations around conversion and	Medium	Due to our close work with Manchester City

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	giving reward currencies		council's city policy team, we have a clear process and structure to manage it.
3	Other local currencies emerging in the market	Low	The aim of this project was to develop and make available open APIs such that, the whole system can be made available for third parties. This would just help grow the network and develop new use cases
4	Lack of further investment	Medium	This would be addressed by connecting to other sustainable projects happening in UK, so it always has a strong presence and networks to provide a compelling case for investors.

12.3.6 User-based evaluation of the concept

To achieve a high impact in developing the Buzzin-coins solution, user-centred design involving all our target users was undertaken right from the project start. Scenario based testing method was designed and used during the project to evaluate the solution.

Following 4 scenarios were identified

1. Signing up to Buzzin-coins

Any user who downloads Buzzin app and creates an account, will be allocated a Buzzin-coins account. For creating an account in Buzzin app, basic details including first name, last name, email id will be needed. Account balance will be zero.

Scenario 1a – As a user I am able to download the Buzzin app

Scenario 1b – As a user I am able to sign-up for Buzzin-coins while creating an account in Buzzin app

Scenario 1c – As a user I am able to click on more info to get to know more about the Buzzin-coins services

Scenario 1d - As a user when i click on Buzzin-coins from the navigation pane , I can see my account balance

Learnings - there have been 250 downloads of the app, but only 70 registrations, we need to be part of a bigger initiative from the city to promote the virtual currency. This will be done as Sparta is part of Manchester's smart city project (<http://www.cityverve.org.uk/>), in which Buzzincoins will be promoted to different streams including transport, energy and healthcare.

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	20	100	50
		Ratio between men and women involved	1:1	1:1	1:1
		Ratio between young, adult and old people involved	2:1:1	2:1:1	2:1:1

2. Earning Buzzin coins through Volunteering

Scenario 2a – As a user of Do-it volunteering app, I am able to see Buzzin-coins account balance

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Scenario 2b – After completing a volunteering activity and recording the number of hours, he is able to earn equivalent Buzzin-coins

Scenario 2c - When the user logs into the Buzzin app, he can see that his Buzzin-coins account will be updated

Learnings – Getting users to record their volunteering hours is hard, Lot of users have been recorded on the Do-it mobile app -500 downloads, (https://play.google.com/store/apps/details?id=spartatec.co.uk.do_itapp_new) but number of people recording hours is very less. Hence rewards can be given like free uber rides on way back from volunteering, local offers and freebies.

3. Earning Buzzin-coins for using public transport

Scenario 3a – As a user of Buzzin app when I use Buzzin smart ticketing system for traveling on buses, bases on number of miles traveled; I can earn Buzzin-coins

Scenario 3b – When the user checks his Buzzin-coins account balance it shows the updated balance

Learnings - We were able to record number of journeys people have made on the 2 bus routes and able to send them rewards from local businesses. Need to expand on more bus operators and routes to reach more people and get rewards from big sponsors.

4. Spending Buzzin coins to get rewards

Scenario 4a - As a user I can browse through the deals and rewards

Scenario 4b - As a user I can log into Buzzin app and pay for these deal vouchers

Scenario 4c – As a user I can use these vouchers both online and within the shops

Learnings – People were able to receive offers as notifications as they walk nearby Bars, restaurants and event places in the city. Initially had a QR code that people can show to business owners for Deal redemption. But later on a smoother process with beacons installed in shops was utilized.

12.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 22.

Table 22: Snapshot of project "Payeze"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop a community based mobile payment service that removes the cost and penalties or hidden fee issues imposed by banks, with a disruptive payment platform that enables local financial ecosystems to be set-up outside the banking networks, including free P2P (Peer-to-peer) payments, payments to local businesses for goods, and posting of offers to customers, with a flat transaction	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Conducted technical and market research on current state-of-the-art and competition. ○ Identified and established partnerships for collaboration. ○ Designed the back-end and security infrastructure, as well as the platform web application. ○ Developed the Buzzin mobile app with smart ticketing and payment functionality, which was tested in field trials. ○ Conducted pilot trials with transport and event partners that was supported by an extensive promotional campaign. ○ Created a business model and sustainability plan. 	<ul style="list-style-type: none"> ○ Dedicated project website: http://buzzinapp.com/ ○ Project's social media accounts: Buzzin App (Twitter 1,159 followers and Facebook 148 likes), plus Buzzin Coins (Twitter 57 followers) ○ Attended over 10 events, including City Verve, Cloud Expo London, Travel Spirit, Northern Powerhouse. ○ Buzzin featured in several publications including Manchester Digital, Manchester Evening News (local newspaper), Prolific North, and Yahoo: https://beta.finance.yahoo.com/news/sensoro-teams-ups-k11-sparta-150000674.html

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fee for payments collection to businesses.	The project successfully delivered 16 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.	<ul style="list-style-type: none"> News article on CHEST website: http://www.chest-project.eu/buzzin-coins-virtual-currency-reward-system-sustainable-community-actions/
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Table 23 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on community building and empowerment) and secondary (impact on the economic value generated by the project) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 23: Mandatory KPIs for Payeze

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	20	100	50
		Ratio between men and women involved	1:1	1:1	1:1
		Ratio between young, adult and old people involved	2:1:1	2:1:1	2:1:1
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	3	6	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	5	4
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	5	2
		Number of comments / replies on project blog entries on CHEST forum	0	10	5
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	200	1136 (twitter)
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	50	135 (tweets)

13 Personal Health Record for the Self-Management of Elderly²²

This project, which has been defined in close collaboration with elderly, aims at developing a prototype of a personal health record (PHR) which gives the elderly the ownership of the content of the record. PHR will not replace the current records of the different care professionals. PHR will only store those files of the different care professionals which the elderly needs in supporting his/her self-management. This client driven approach is an innovative disruptive way of looking to the way electronic health records should be designed

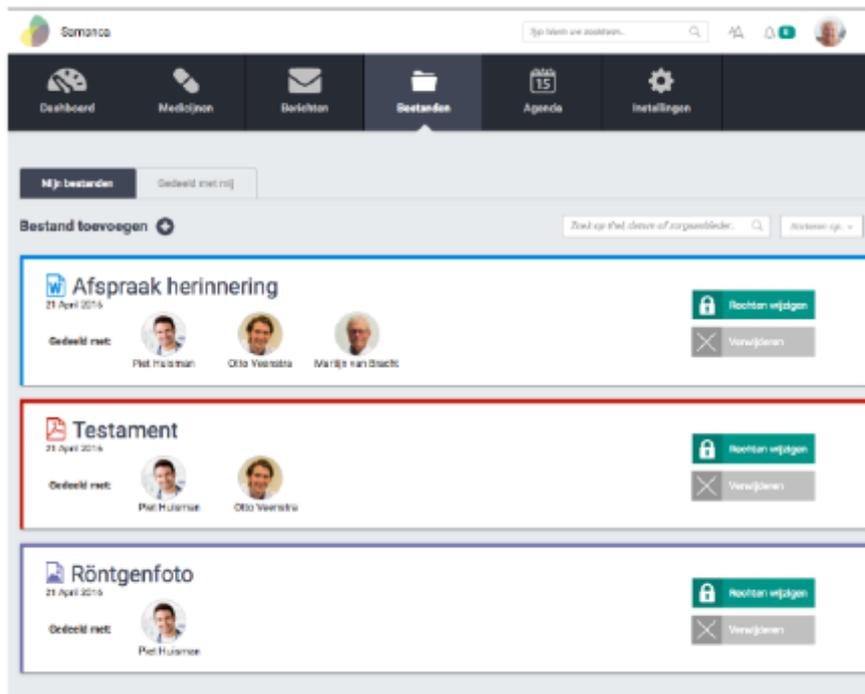


Figure 18: Screenshots of the Personal Health Record for Self-Management Elderly solution (file repository)

13.1 The societal problem

13.1.1 Description of the problem

Europe is facing severe societal challenges in the coming decades. Demographic change and the ageing of society will lead to an ongoing growth in healthcare expenditures and changing patterns in the demand for health care. The rising number of elderly people will need different support at home, and they will need different forms of healthcare. Especially as more than 50% of people aged 60 years and older suffer from multiple chronic conditions. A percentage which will further increase in the coming years. *The societal problem is that elderly are not able to exercise self-management.*

Promoting and supporting independent living and self-management of the elderly by innovative ICT solutions, is an important precondition in changing the healthcare system. The social need we want to address is that in order to manage yourself (self-management), you need information that makes sense to your specific conditions. Much data is gathered and a lot of meaningful information is fragmented in organization-owned silo's.

This project aims at developing a prototype of a personal health record (PHR) which gives the elderly the ownership of the content of the record. PHR will not replace the current records of the different care professionals. PHR will only store those files of the different care professionals which the elderly needs in supporting his/her self-management, like triage data, individual care and support plan. The autonomy of the current different care professionals is respected as these records are also used as administrative and reimbursement tools.

²² Chapter contributors: Mathias Becker, Folkert Ringnalda

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Based on the information stored in the PHR the elderly can actively understand and influence his/her own health status, prevent chronic conditions and can give informal care-givers access to the record in order to optimize needed informal care. It will support the self-management strategies used in Embrace like shared decision making, goal attainment, and action planning. This improved self-management will lead to improved quality of life and joy in living.

13.1.2 Scale of the problem

The target group for the PHR are the elderly (>65+). *In the Netherlands we have 3 million people older than 65 years (17.3% of the Dutch population).* And these numbers are growing (in 2050 one-out-of-four will be older than 65). The elderly is a diverse population ranging from persons only needing a low-intensity level of care and support to persons who suffer from multiple chronic conditions needing a high-intensity level of care and support.

Using the risk profiles of Kaiser Permanente, research shows that an average elderly population consists of 64% robust elderly, 16% are frail and 20% of the elderly population do have complex needs.

Expenditures elderly care are growing every year, among other things, by;

- robust elderly are consuming more professional care in order to stay robust!
- 90% of total healthcare costs spend in the last 10 years of life.

Government policies aiming on keeping elderly independent as long as possible. Self-management in combination with integrated care enables elderly people to stay independently. Prevention and integrated care are cost effective. Information is a key success factor for self-management.

The project will give the elderly the possibility to monitor his/her own health status, anticipate on changes in the health status and manage the formal and informal care needed. This will lead to an improved quality of life, decline of needed care and reduced health care costs.

During the reporting period an extensive research was conducted by the Dutch National Patient and Consumer Federation (NPCF) regarding the Personal Health Record. The results of this study confirm the above assumptions. More information (Dutch):

https://www.npcf.nl/images/PGDkader2020/Eindrapportage_PGD_Kader_2020_DEF_1.pdf

13.1.3 Previous approaches to solving the problem

Most EHR-suppliers have been developing client-portals. A client portal offers access to parts of the personal health record and facilitates communications between the patient and the healthcare professional. *However, these solutions are organization-oriented instead of client-oriented;*

Information is contained within organizational boundaries and lacks an integrated view on all available record information.

Information is mainly focused on *information interchange/exchange between healthcare professionals* about a patient (instead with the patient).

From the patients' perspective *the information is mainly data* (due to medical/professional jargon) – it's not always meaningful information for the patient.

Plans for a national electronic health record dating back to 2008. Many delays followed and the Senate voted against it. The project was definitively scrapped. Nevertheless, the National Switching Point (LSP) made a new start with the help of Health Insurers Netherlands. But the problem of low adoption still exists²³

²³ <http://www.nrc.nl/next/2016/06/06/gebrekkig-ict-systeem-apothekers-vormt-risico-1625581>

13.2 Implementation of organizational structure

13.2.1 Maturity of the project

Various user interfaces have been tested and one solution has been selected for developing a prototype. We have now reached the stage where the prototype can be developed into a working application.

13.2.2 Organizational structure

Bossers & Cnossen:

Development and testing prototype (3 fte, permanent employees; IT Developer (40% backend, 60% frontend), UI/UX designer, Technical Manager (scrum/projectmanager))

The University Medical Center Groningen (UMCG):

Implementation support & research (0,6 fte)

Hanze University of Applied Sciences:

Support conducting surveys (2 students)

Municipality Emmen:

Population elderly (as part of the Embrace project for integrated care)

Population Elderly people living independently and participating in the Embrace project: 1700 (currently, growing towards 2300) and 22 General Practitioners (GP's)

Survey (Delphi Study): 107 respondents (response rate 56%)

Advisory board: 14 elderly

13.2.3 Key personnel

Bossers & Cnossen:

Technical Management:

Drs. Folkert Ringnalda: co-Product Owner

Folkert studied Social Sciences at the Hanze University of Applied Sciences and Business Administration at the University of Groningen (RUG). In 1994 he was overwhelmed by the possibilities of the Internet and started his first Internet company (TFE – www.tfe.nl).

Since then he founded and invested in several companies like Web-IQ (www.web-ig.eu ,law enforcement), Kalooga (www.kalooga.com ,visual discovery for media companies) and Wowwww (www.wowwww.nl ,system integrator for Drupal). Folkert Joined Bossers & Cnossen (www.bnc.nl) in 2013 in order to push their portfolio of software products for Healthcare and Research forward. The idea of a personal held health record (Samanca) originated from the development of a professional Electronic Health Record (EHR) that Bossers & Cnossen started in 2010 for a specific research project regarding elderly.

Linkedin: <https://www.linkedin.com/in/folkertringnalda>

Robbert van der Veen – Scrum master

Robbert van der Veen studied Commercial Economics at Hanze University of Applied Sciences and followed several courses for projectmanagement and scrum. At Bossers & Cnossen he is a projectmanager who is responsible for managing the projects both internally as externally. During the last eight years most projects were concerning the development of information and communication functionality for elderly. In this period Robbert gained a lot of experience and insights in this area and the target groups.

Linkedin: <https://nl.linkedin.com/in/robbert-van-der-veen-58347ba>

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Anja de Groot - Lead Interface Design

Anja de Groot, studied Communication and Multimedia Design at Noordelijke Hogeschool Leeuwarden (NHL). She's a creative designer with 10+ years experience in UI/UX Design. Anja creates clean pixel perfect, user friendly interfaces for web and mobile applications. She's focussing on user problems and provide genuine solutions. For the last years she's been working on document sharing projects for care and municipalities. From wireframing, designing, prototyping, usability testing, and then retrying until we have a workable application.

Linkedin: <https://nl.linkedin.com/in/anjadegroot>

Ben Nierop - Lead Front-end Development

Ben Nierop, a bSc in Information Technology. 15+ years of experience in creating software and applications. Experience in creating user interfaces for mobile applications. Made applications for Apple iOS, Android, BlackBerry, Windows, Nokia, SymbianOS, Palm.... Training in creating architecture design and building platforms from scratch, from front to back-end. Specific skills include leading a development team, advanced prototyping and Java Enterprise architecture.

Linkedin: <https://nl.linkedin.com/in/ben-nierop-8b887713>

Roel Plieger - Lead Back-end Development & Architecture

Roel Plieger, studied Information Technology at the Hanze University of Applied Science Groningen. Roel is a software architect with over 20 years of experience in designing and programming software. His main skills are Java, Spring, AngularJS, Javascript, SQL, XML and Maven. Roel is responsible for the overall (technical) design of our web applications and how they work on our (virtual) hardware platforms. He also assists his co-developers if needed.

Linkedin: <https://nl.linkedin.com/in/roel-plieger-b584a112>

UMCG

Ronald Uittenbroek Msc - Research

Ronald Uittenbroek is a PhD student at the department of Health Sciences of the University Medical Center Groningen, University of Groningen, the Netherlands. He holds a Master degree in 'Health sciences' from Maastricht University. His PhD thesis, which he will finish in 2016, focusses on the effectiveness of Embrace on quality of care and service use and costs. Furthermore, he was closely involved in the development of Embrace's electronic patient records and the training of the professionals.

Linkedin: <https://nl.linkedin.com/in/ronald-uittenbroek-4820036>

Klaske Wynia, acting as well as co-Product Owner

Klaske Wynia PhD is assistant professor of the department of Health Sciences of the University Medical Centre Groningen (UMCG), university of Groningen, the Netherlands. At the moment she is program leader of Embrace, the integrated care model for elderly people living at home. She is experienced in developing and evaluating patient-centered and integrated care models for vulnerable populations. Bossers & Cnossen and UMCG developed the web based Electronic Elderly Record system for Embrace, a system that is now evolving towards a person held record system.

Linkedin: <https://nl.linkedin.com/in/klaske-wynia-9622b920>)

13.2.4 Partnerships, cooperation and networks

UMCG, department social health sciences > Embrace Program

Embrace is an Integrated Elderly Care Program: it is a redesign of the care delivery system into personalized, coherent, proactive and preventive care and support for elderly people of 75 years and older. Embrace is located in the GP-practice: close by the elderly people living at home or in a 'home for the elderly'. All patients (75+) belonging to this practice are eligible for Embrace care.

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More information: www.samenoud.nl/onderwijs-en-onderzoek/samenoud-in-english

Subject & goal of the partnership with UMCG/Embrace:

- Research (validation)
- Access to relevant target groups (Elderly living independently)
- Knowledge of integrated care elderly (and frailty)

General Practitioners Municipality Emmen;

GP M. Smilde-Koops

GP C.N.E. Baly

Subject & goal of the relationship with GP's:

- Access to relevant target groups (GP's are gatekeepers for elderly care)

Prof. dr. J. Slaets (Espria Academy and Leyden Academy)

- Thought Leadership
- Sparring partner for (inter-)national developments
- Access to relevant organizations and institutions in the field of public health for elderly and research

Joris Slaets joined Leyden Academy on Vitality and Ageing as executive director. He studied medicine in Leuven (Belgium), obtained his PhD at the Erasmus University in Rotterdam and is since 1999 Professor of Geriatric Medicine at University Medical Centre Groningen. Joris is one of the founders of the field of Geriatrics in Internal Medicine, for which he was the first trainer in Netherlands. He was one of the founding fathers of the current Internal Medicine training plan, of which he designed the competence 'Reflecting'.

Joris is one of the project leaders of the National Care for the Elderly Program in the Netherlands and scientific advisor to the Board of Directors of Espria. He was a member of several committees of the Dutch health council and care institute the Netherlands, and until the end of 2014 he served as vice-chairman of the Central Committee on Research Involving Human Subject. Joris put the concept of 'harmful care for older people' on the agenda and his ideas about well-being and happiness have become an integral part of policy. Important themes in his scientific work are strength and frailty, needs and desires, and demand patterns of older people in a community

More information: www.leydenacademy.nl and www.espria.nl (Dutch)

New partnership: Enovation with their application Zorgmail

At the start of the project we didn't encounter the fact that a partnership was needed with the supplier of a secure network for communications and data exchange (Stichting Gerrit). We've started the procedure for admission. In the mean while we had to come up with a work around. Therefore we started a partnership with a company that already has a license for this secure network and worked out a model for data exchange between applications (i.e. transferring data from health record application of a GP to an EHR-application on our infrastructure).

We expect to be compliant with using the secure network in October 2016.

13.3 Implementation of the solution approach

13.3.1 Solution approach – what we intend to achieve and where do we start?

By now most EHR's are health care organization designed management systems for filing documents from a regulatory and reimbursement viewpoint. Gradually these systems transform to more diagnose support systems. As the systems are designed with the purpose of supporting healthcare

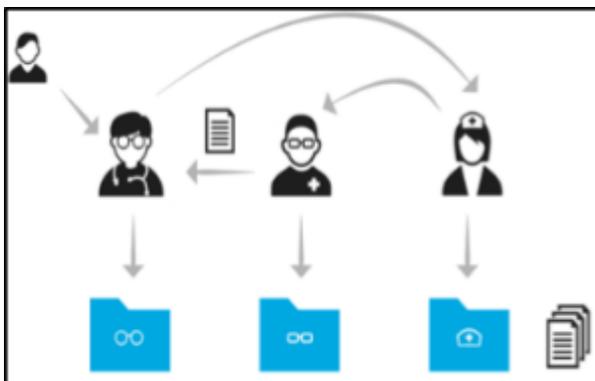
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organization in their day to day management, the majority of the information is not relevant for the client/patient. It is therefore not needed to develop a coordinating overall EHR crossing the boundaries of the different healthcare organizations. This will prevent never ending discussion about ownership, privacy, etc.

By only selecting those document and information together with the client relevant for improving his/her self-management and coordinating informal care, an optimal solution can be found in which as well the clients and the healthcare organization concerns are protected.

This project, which has been defined in close collaboration with elderly, aims at developing a prototype of a personal health record (PHR) which gives the elderly the ownership of the content of the record. PHR will not replace the current records of the different care professionals. PHR will only store those files of the different care professionals which the elderly needs in supporting his/her self-management. This client driven approach is an innovative disruptive way of looking to the way electronic health records should be designed.

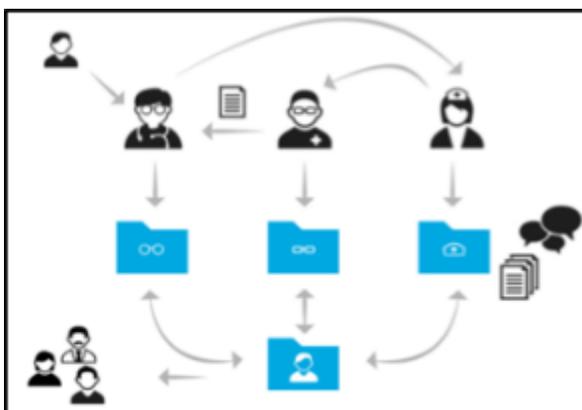
Old paradigm: traditional organization based EHR



A Doctor (f.e. General Practitioner) is capturing information from a patient. He saves the information in his own 'organization based information system (HIS). The information can only be shared with other healthcare providers through "paper exchange" which then each healthcare provider stores this information in its own HIS / ECD / EHR. The patient can only view data by submitting a request for inspection.

New paradigm: personal health record PHR

As every stakeholder in the care process has his/her own health record, the patient/client adds his own personal health record (PHR). This record communicates with various healthcare information systems (the HIS of the General Practitioner and the EHR of other care organizations). Both, the patient and the authorized formal and informal caregivers have instantly access to the PHR (as long as permitted by the patient/client). The PHR is a client-oriented addition to the existing paradigm.



Based on the information stored in the PHR the elderly can actively understand and influence his/her own health status, prevent chronic conditions and can give informal care-givers access to the record

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in order to optimize needed informal care. This will lead to improved self-management which will improve the quality of life and joy in living.

In the near future we'll add 'cognitive intelligence' to the PHR;

- automatically 'translate' professional data formats to relevant user understandable information (actionable information);

- benchmarking personal conditions with peer groups;

- generating advice and recommendations based on the comparison of personal information with research information and findings/experiences of peers.

Bossers & Cnossen is a IBM partner for their cognitive computing platform Watson.

13.3.2 Target groups

Target Group(s):	Size:	Concerns/goals:
Elderly people living independently within municipality Emmen and participating in the Embrace program.	1700 (currently) and growing towards 2300.	Multidisciplinary team uses a EHR for purposes of mutual adjustment and collaboration. This new personal health record (PHR) solves the information asymmetry and converts data to useful information (actionable).
Other frail groups (f.e. people with disabilities, chronic diseases etc.)		Be independent (Self-management).
Informal Caregivers	The Netherlands: 4.5 – 4.7 million	Information asymmetry Mutual Adjustment and collaboration between caregivers
GP's and Practices Specialist Geriatric Medicine	The Netherlands: GP's (10.000) and Specialists (80 – 100)	Less time for growing population (frail) elderly. Elderly people are living longer while the complexity of their health situation increases. This situation asks for more specialized and multidisciplinary knowledge.

13.3.3 Activities and work performed

Work Package Number : 1
Inception Phase
Actual Starting month : September 2015
Predicted / Actual End month : October 2015 / December 2015
Work Package Objectives: <ol style="list-style-type: none"> 1. Vision on the Product (prototype as Whole Minimal Product) 2. Key functionality (Use Case Model) 3. Identify and explore different solutions 4. Software Development Plan

5. Select tooling (development tools, framework, system architecture)

Description of work this period:

Main achievements:

Vision on the Product:

1. Identification, positioning, comparative advantages of the product.
2. Conducting Delphi Study

Use Case Models for key functionality:

1. Selecting and transferring information from EHR to the PHR by GP
2. Authentication/identification with DigiD (2FA)
3. PHR data management (mobile, QS module)
4. Secure Communication

Solutions:

1. Agile/Scrum development methodology
2. Compliance on exchange standards and content standards.
3. Elaborate existing framework versus developing 'from scratch'.

High Level Software Plan

1. Backend: Spring framework (Java)
2. Frontend: AngularJS
3. Integration: REST API's

Tooling

1. Infrastructure: Cloud platform IBM Softlayer
2. Development platform: IBM Bluemix
3. Managing the project: Atlassian Jira

Detailed description of work performed to reach the achievements listed above:

Vision on the Product:

Till the start of the project we've encountered skepticism about the need for a personal health record. However, a wide-ranging investigation carried out by the NPCF (Dutch Patient and Consumer Federation) revealed that 20% would make use of such a PHR.

Also, here and there health care institutions and health professionals are more positive about this new phenomenon. The PHR doesn't compete with current EHR's but is rather a client-centered complement. But there's still a lot of reticence in sharing 'written down' information with patients.

Delphi Study

We've conducted a Delphi Study (desk research, interviews), subsequently we have compiled a questionnaire based on the results of the Delphi Study. This questionnaire is conducted among 191 elderly living independently (with a response of 56%) within the municipality of Emmen. From this survey we've derived 20 main 'end user' functional requirements.

Use Case Models (Technical)

1. We've investigated several scenarios. The most likely scenario is a browser plugin; f.e. the GP opens an EHR record of a patient in the web browser, activates (clicks) on the browser plugin (this turns the web page into an editable page), selects/pastes content parts, makes annotations, and saves this directly in the PHR of the patient. A temporarily unique authentication key has been given to the GP.
2. With DigiD a Dutch citizen gets access to hundreds of Dutch government websites (including health care). There are strict policies for implementing and using DigiD procedures. An alternative for DigiD is the use of 2-factor-authentication solutions.
3. We've developed a high level use case for mobile use (read/write) of the PHR application.
4. Secure Communication between patient and care givers has been specified within the prototype. Several approaches have been tested with target group.

Solutions

1. A dedicated scrum/agile team has been established. Due to maternity leave the team wasn't complete until January 16. Common scrum procedures have been established (daily stand-up, scrum/Kanban board, retrospectives)
2. We've developed a proof-of-concept for using Zorgmail in order to transfer data from one EHR to another EHR. Zorgmail has a 90% coverage within primary/community care.
3. At first we wanted to elaborate on an existing framework and EHR platform. After about 6 weeks we concluded that this approach didn't fit; we were too much limited by the legacy. We'll continue using some components in the backend (f.e. authentication). We've started to build the prototype 'from scratch'.

Tooling

1. For the means of the prototype a 'lean' backend suits. Integration with other EHR applications have been tested separately. After the prototype phase we'll use Spring/Hibernate as Java framework.
2. The prototype will be built in HTML/JQuery. After the prototype phase the frontend will be built in AngularJS. AngularJS is device-independent (mobile use).
3. CHEST Project implemented within Atlassian Jira (common practise)

Summarization of problems we have encountered, and how they have been overcome:

Internal problems / solution:

- Capacity problems (GUI design).
 - o Shifting our attention towards more technical aspects/issues (integration and authentication).
- Tooling: the technology of AngularJS is promising but still in its infancy. (i.e. steep learning

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<p>curve)</p> <ul style="list-style-type: none"> ○ Building several click models in HTML/JQuery (instead of AngularJS) ○ Recruiting Frontend developer with proven AngularJS experience (longer term). ○ Current frontend developers have been taken courses.
<p>Description of planned activity for next reporting period</p>

<p>Work Package Number : 2</p> <p>Elaboration Phase</p>
<p>Actual Starting month : November 2015</p> <p>Predicted / Actual End month : November 2015 / February 2016</p>
<p>Work Package Objectives:</p> <ol style="list-style-type: none"> 1. Detailed insight critical requirements 2. Stable and robust software architecture 3. Proof of concept 4. Proven technology stack and system for bringing the product forward 5. Developing API for data exchange/interchange between HIS (main information system used by GP's) and PHR (Electronic Health Record Elderly)
<p><i>Description of work this period:</i></p> <p><i>Main achievements:</i></p> <p>Detailed insight critical requirements (1):</p> <ul style="list-style-type: none"> ● This is an ongoing (iterative) process. Critical requirements are related to User Interface Design (GUI) and Functionality. <ul style="list-style-type: none"> ○ GUI: use of contrast (high) and colors ○ Functionality: on the basis of an inquiry (Delphi Study) we arranged a top 10. And these requirements are subject for further specification. ● Developing Click-model. Testing Click Model by advisory board (14 elderly living independently). <p>Stable and robust software architecture (linked to WP1: High Level software plan) (2)</p> <ul style="list-style-type: none"> ● We've established a robust and stable backend by using Spring/Hibernate framework. The team has sufficient expertise of this framework. ● Regarding the frontend technology, we'll be using AngularJS in the near future. Building the HTML/JQuery click model will help identifying the main standard modules we want to use (when building the prototype – frontend application in AngularJS).

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<ul style="list-style-type: none">• We've specified REST-API for data exchange/interchange. <p>Proof of Concept (3)</p> <p>Developing API for data exchange/interchange between HIS (main information system used by GP's) and PHR (Electronic Health Record Elderly) (5)</p> <ul style="list-style-type: none">• Proof of concept was limited to the interchange/exchange of data between 'our application' and information systems used by GP's using Zorgmail. <p>Proven technology stack and system for bringing the product forward (4)</p> <ul style="list-style-type: none">• A development-street has been established (environment for respectively Development > Test > Acceptance > Production).
<p>Summarization of problems we have encountered, and how they have been overcome:</p> <ul style="list-style-type: none">• Proof of concept data exchange/interchange took significant more time, due to time-consuming registration and compliance process on a regional secure network (Stichting Gerrit). Most of the EHR applications of GP's and healthcare institutions are connected to this network for information exchange.<ul style="list-style-type: none">○ Effecting a connection with a by the network already authorized application and organization (ZorgMail of eNovation).
<p>Description of planned activity for next reporting period</p>

<p>Work Package Number: 3</p> <p>Construction Phase 1</p>
<p>Actual Starting month: December 2015</p> <p>Predicted / Actual End month : End February 2016 / May 2016</p>
<p>Work Package Objectives:</p> <ol style="list-style-type: none">1. Realizing One-page-profile (OPP). An OPP captures all the important information about a person on a single webpage under three simple headings: What people appreciate about me, What's important to me and how best to support me.2. Realizing a closed/secure communication platform (chat & messaging)3. Dashboard
<p><i>Description of work this period:</i></p> <p><i>Main achievements:</i></p> <p>Realizing One-page-profile (1):</p> <ul style="list-style-type: none">• We've developed a concept for the OPP. We developed a separate OPP page in order to capture EHR data and display this in a comprehensive way.

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Realizing a closed/secure communication platform (chat & messaging) (2):

- We've developed a concept/design for communication functionality (chat, messaging and repository). *But we did not realize a working communication functionality!!*

Dashboard (3)

- Dashboard shows most important information and offers access to all functionalities.

Instead of (2) we have specified another objective for this work package; developing a so-called Click Model in order to test the outcomes of the Delphi study (WP1)

<http://prototype.samanca.com>

Summarization of problems we have encountered, and how they have been overcome:

- Before the Delphi Study was carried out, we thought that communication would be the most important functionality of the PHR Elderly. But this functionality didn't even show up in the top 10!!
 - We designed a concept for further investigation. Maybe we have to look for another means of communication (video-chat?) in the near future.

We had to develop the OPP separate from the prototype and click model.

Description of planned activity for next (reporting) period:

- Realizing communication functionality as specified (e-mail like messaging, chat and integration with document repository).
- Integrate OPP with click model.
- Developing the envisaged prototype.

Work Package Number: 4

Construction Phase 2

Actual Starting month: may 2016

Predicted / Actual End month : End May 2016 / (Forecast: End June 2016)

Work Package Objectives:

1. Realizing communication functionality as specified (e-mail like messaging, chat and integration with document repository).
2. Integrate OPP with click model

Description of work this period:

Main achievements:

Communication functionality

- UI/UX and functional concept worked out in the prototype (after testing different approaches).

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<p>Integrating One-Page-Profile (OPP) with click model</p> <ul style="list-style-type: none">• We've developed an OPP separate from the prototype (because the OPP is using data from health records). (See screenshot)
<p>Developing the envisaged prototype</p> <ul style="list-style-type: none">• New Work Package
<p>Summarization of problems we have encountered, and how they have been overcome:</p> <ul style="list-style-type: none">• Based on the outcomes of Delphi Study we had to change/modify the current click model(s). We have presented the amended proposals to the consultative group and re-tested with the target group.<ul style="list-style-type: none">○ We have got focused on completing the prototype (based on what we did have), partly due to the fact that the scheduled end of CHEST is in sight.
<p>Description of planned activity for next reporting period</p>

Project Management and Dissemination

Management concerns:

There's a gap between what was aimed for and what has been realized. Due to (causes):

- Early capacity problems (due to sick-leave).
- Dependency of partner organization UMCG/Embrace Project; we had to adapt ourselves to the planning of activities within the Embrace project (planning interval of 3 to 6 months).
- Dependency of other organizations; the compliance process for access to the regional secure network (Stichting Gerrit, mentioned before) took a long time. At the latest moment we had to change our 'strategy' in order to gain experience in connecting with other applications.
- Testing with elderly people is time consuming and rather complex and fuzzy (to filter out socially desirable outcomes and contextual factors from what the elderly patient really wants). Longer periods of day-to-day observation is more suitable and will result in better more accurate outcomes.

Publications, publicity and other dissemination activity:

Dissemination activities were confined to the target group within de municipality of Emmen (1700 – 2300 elderly within the Embrace project). The current prototype (artifact of the project) will be presented on the next meeting with advisory board in October 2016. After that will present the prototype to the GP's (within the municipality of Emmen) and partners of the Embrace project.

We will develop the PHR as an 'add-on' to the currently used EHR application of the Embrace project. This means that every elderly will have access to his/her own health record.

Mr. R. Uittenbroek (researcher UMCG Samenoud/Embrace project) will publish an article (Dutch scientific publisher) in Q4 2016.

13.3.4 Sustainability of the solution

Q1: next level

We expect that the prototype will be successfully validated by the current target group (elderly participating in SamenOud/Embrace project).

In the next phase we'll expand the target group to other regions where Embrace projects are carried out. Professional caregivers (case managers, community workers, specialists, GP's etc.) use an EHR-application developed by B&C. Joint Decision making (i.e. shared decision making) is one of the pillars of the Embrace vision on integrated elderly care. We will add the elderly-centred PHR to this professional-centred EHR where information can be easily transferred from EHR to PHR (so that relevant information is available to the elderly).

The installed base of this EHR is 10.000 elderly.

Q2: plan for the sustainability of the project results

We've developed a plan for the development and exploitation of this PHR Elderly – called 'Samanca'. We're aiming for a self-management platform for different frail groups in society. This plan is developed in cooperation with UMCG and the Embrace project for integrated care.

Revenue projections are attached (attachment 1)

Q3: other sources of financing?

No, we've subscribed to an EFRO-tender but our application was rejected. We're now looking for additional funding with help of our partner UMCG.

13.3.5 Risks

B&C faces three main challenges regarding the development of the application:

1. Development of an interface which can exchange data with any given electronic health record system. EHR systems typically use non-identical data structures and the way they are implemented varies widely between health care organizations.

Development of a secure yet accessible PHR structure. PHR owners (elderly) must be able to share specific data with informal care-givers. Challenge is how to develop a layered structure in which roles and authentication/authorization can be managed in a secure and yet accessible manner.

The development of a user friendly interface, which is able to filter, translate (interprets) and present raw record data into user-friendly, understandable and relevant format.

2. Commercial challenge: People are not used to pay for a PHR.

A study/research, conducted in august 2015, shows that people are willing to pay between 8 – 20 euro (per year) for a PHR. Our commercial model is based on a yearly subscription of 15 euro.

3. Law enforcement/regulation: compliance to privacy laws and information security standards.

Certification ISO 27001/27002. Audit is postponed to November 2016 (predicted April 2016).

13.3.6 User-based evaluation of the concept

Within this CHEST project we use several methods for obtaining, analyzing and testing requirements. Retrospective we distinguish two iterations of the prototype (respectively A and B)

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Iteration:	Type:	Method:	Findings:
	User Analysis	Focus Groups of elderly 80 - 100 persons	Elderly people find it very hard to specify their needs and expectations regarding an EHR.
	User Analysis	Group discussions (GP's, Case Management) 15 - 20 persons	The medical profession is 'dominant' in discussions. So we decided to separate both groups (medical (GP's etc.) and para-medical (casemanagers, nurse practitioners).
	User Analysis	Brainstorming 5 - 8 persons	We did several brainstorming sessions with our partners Espria Academy and UMCG/Embrace Programme.
	User Analysis	Interviewing 20 persons	This method was useful for obtaining visions and opinions from experts in the field of elderly care. We did also interviewed competitors - other EHR software companies.
A	Concepting	Paper prototyping	'To see is to know' - we're using the concept of wireframing. With wireframes the end-user gets more insights in the functionality of the prototype/application (without developing it first). We strive to make a wireframe of every unique part of the prototype/application.
A	Concepting	Rapid prototyping	We use the term click-model; a simple straightforward HTML application that interacts with the user.
B	Concepting	Scenario Based Testing	From the test group individual elderly had difficulties performing specific tasks using the PHR. E.g. medication and document repository had to be re-designed.

13.3.6.1 Iteration A

From the desk research some key points have been identified, concerning the design of a web application for the elderly. The seven most important guidelines:

1. Write texts in an easily comprehensive manner
2. Text: Use at least font size 12
3. Let elderly customize the text size themselves
4. Use large buttons that does not require the precision to activate/navigate
5. Use different colors for visited links
6. The structure (navigation and content) of a website should be simple and straightforward
7. Organize/structure content in a standard format.

We've worked out three alternatives/variants of the UI/UX of the prototype.

Variant 1

Findings variant 1 of the Advisory Board:

Menu:

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The elderly really liked the menu. This is because of the large buttons, the good contrast and the fact that the menu is always present.

Dashboard:

The dashboard was generally well received. Criticisms: poor contrast and the text is too small in some places.

File Repository

The main problem with respect to the file repository was that the elderly had no idea how a file could be opened. They also had difficulty finding the delete button. The button to 'change rights' was visible enough. It was also not clear how file permissions could be modified, check boxes were not good and there was a no message/confirmation after the change.

Messages

Elderly had no difficulties in selecting a person (from the contact list) and sending a message.

Navigation

Elderly could easily navigate between the menu options.

Contrast

Within this variant, the elderly did struggle with the contrast. They were troubled with the light gray colors on a white background.

Variant 2

Findings variant 2 of the Advisory Board:

Menu:

Opinions varied different regarding the menu-bar. One elderly found the additional information useful and the other thought it was unnecessary (or was distracted by it). The elderly did indicate that they mainly focus on the title and icon.

File Repository:

It was immediate clear to the elderly how a file could be opened. However, deleting a file was problematic, because often the delete button couldn't be found. Most of the elderly understood how permission rights could be modified, like first variant. The only caveat was that they didn't always notice the check-boxes.

Messages:

It was for the elderly immediately clear how they could select a care provider. Within the chat feature elderly were looking for the input field, but because of the poor contrast this was a difficult.

Navigation

Navigating from one to another item wasn't a problem. But finding their way back was more difficult.

Contrast

Elderly did encounter problems because of the light-grey tints in combination with a white background.

Findings variant 3 of the Advisory Board:

Menu

The menu was well understood by the elderly. The only problem was sometimes the contrast. So it was difficult for some to read white text on a light orange background.

Files

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Elderly said that the files are well organized and it was immediately obvious how a file could be opened. Changing right permissions and delete the file was the same as in variant 2.

Messages

Also this variant was well understood. However, again there were a number of problems with the contrast. Mainly white on light orange and white on a light gray background and vice versa. Elderly had difficulty reading text and some input fields could not be found.

Navigation

Navigating to different items went smoothly. The problem arose when a specific assignment/task was given (like navigating to files from messages: elderly couldn't find the path back and forth).

Contrast

The issues with contrast continued with this variant. Difficulties reading white text on a colored background may as well as grey text on white background.

First Conclusion (Iteration A)

Visual aspects UI/UX applications for elderly

From the use of desk research a list of guidelines can be created for designing UI/UX for the elderly. It is noteworthy that multiple sources indicate that readability is very important for the elderly. The application must be easy to use and the content should be presented in a recognizable way. Furthermore, everything must be set up slightly larger, so for example; buttons do not need the precision to be activated. The use of structural 'pointers' enhances the orientation with the application; this eliminates the need for search within the application and the ability to complete tasks faster.

Visual preferences

By comparing the different variants of the application, various preferences of the elderly have emerged. Regarding the menu they found it important that it is always present and that it doesn't disappear when navigating to another page. In addition, they give preference to large buttons with a title and an icon.

Testing also revealed that contrast it is very important to the elderly. The combination of bright colors on a white background and dark colors on a black background were perceived as bad. It is therefore advisable to provide a clear contrast between content and background.

Among the elderly is also a great need for recognition within an application. They are used to the "logout" button at the top right of the screen, they expect to find it in other application at the same place as well.

Visual preferences regarding PHR

Based on desk and field research some visual conditions can be formulated. The first thing that can be concluded is that elderly attach great importance to contrast. By using a good contrast you increase the readability within an application. In addition, the menu will always have to be in the picture and it must be spacious, so that older people can easily navigate between different items.

The content should be presented in a simple way. It is important to minimize the use of technical terms and only show the elements to which the elderly need. This allows elderly people at a glance to see what they look for and they do not have to read the whole page. To make it as easy as possible for the elderly, it is important to use a fixed layout. Recognition within an application can make it easier to perform tasks. Finally, it is important to design everything ample within the application. Elderly people often suffer from trembling hands, it is difficult for them to click precisely on something.

13.3.6.2 Iteration B

The findings/conclusions of Iteration A have prompted modifying the prototype. In several interactive sessions we modified the prototype. Within these interactive sessions participants were asked to perform certain tasks. We've registered their behavior and asked them to speak out their thoughts while performing tasks.

This information concluded to a definitive UI/UX for the prototype;

URL: prototype.samanca.com

(click on 'Log in met uw Digid' button and press Enter on your keyboard)

13.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 24.

Table 24: Snapshot of project "Personal Health Record for Self-Management Elderly"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop a workable prototype of a personal health record (PHR) – managed and owned by the elderly themselves, as well as compliant with the needs and expectations of elderly people and their formal and informal care givers, but without replacing necessary electronic healthcare records (EHRs) of professionals.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Established a product vision and use case models for functionality (including conducting a Delphi Study), identified a high level software plan, solutions and tools. ○ Detailed critical requirements and established a robust and stable back-end software architecture. ○ Developed proof of concept API for data exchange/interchange. ○ Established a concept one page profile (OPP) and dashboard. ○ Integrated the OPP with the click-model prototype with UI/UX communication functionality. <p>The project successfully delivered 5 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated prototype website*: http://prototype.samanca.com/#null ○ Stakeholder engagement activities with approximately 2,000 people (from the target group) in Emmen. ○ 99 interactions in the project's section on the CHEST Community Forum. <p>*A full website and social media accounts will be established for use as the project moves forwards. *The current prototype will be presented at the next meeting with advisory board in October 2016, then it will be presented to GP's in Emmen and partners of the Embrace project. *Mr. R. Uittenbroek (researcher UMCG Samenoud/Embrace project) will publish an article (Dutch scientific publisher) in Q4 of 2016.</p>

Table 25 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 25: Mandatory KPIs for Personal Health Record for Self-Management Elderly

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation /	Number of target groups involved in co-design process	2	2	2

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	test usage	Number of users involved in co-design process	12	12	12
		Ratio between men and women involved	50/50	50/50	50/50
		Ratio between young, adult and old people involved	0/0/1	0/0/1	0/0/1
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	2	4	2
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1	3	0
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	-	-	3
		Number of comments / replies on project blog entries on CHEST forum	-	-	-
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	-	-	10
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	0	4

14 Provenance Coin²⁴

This project explores the use of the Blockchain (a public, digital ledger to implement decentralized exchange networks) in product supply chains to foster transparency. The projects builds on existing design work to prototype and test this application to demonstrate the open tracking of materials, components and products to enable informed purchases.



Figure 19: Screenshots of the Provenance Coin prototype being used after buying a product

14.1 The societal problem

14.1.1 Description of the problem

Our relationship with the material world around us is broken. Raw materials travel through exploitative supply chains, handbags get forged, valuable items from bikes to art masterpieces get stolen or disappear, the maker behind your kitchen table is invisible and the valuable materials in the objects you no longer want often get wasted. How can we stop this disconnection between people and their possessions? How can we enable goods to change hands in a way that helps business with fair practices flourish? Behind everything there is a story. A journey of people, places, materials, and uses. For almost every product, this story is valuable yet intangible and difficult-to-verify.

Up and down the world's supply chains companies miss access to information about the origins of their material as well as component purchases. In addition, the lack of market driven motivation to seek knowledge and act causes devastating effects for the environment and society. This behaviour fuels suicidal work life, loss of jobs, slavery, war, unsafe working conditions, exploitative systems, child labour to name but a few of the societal challenges caused by the status-quo maintaining artificial externalities in the creation of products.

Workers It is hard to overstate how many individuals around the world are victims of current consumer industry: There 3.5 million garment workers in Bangladesh alone. Supply chains handling anything from fabric to fish are laden with bad management, unjust practices and negligence. In many developing countries, working within these supply chains (at factories, plants, farms, etc) can be one of the only sources of income for many. With regards to modern slavery or bonded servitude, those workers clearly have no choice in where they work or what they do.

Consumers Many consumers have little to no knowledge about the dealings of supply chains, or the situations of the workers who made the product. Without transparency or a reliable source of information, buyers still choose based on price and brand. A report in the U.S. found that 40% of

²⁴ Chapter contributors: Mathias Becker, Afra Quintanas, Harini Manivannan

adults were will to pay more for a product if ethical and responsible manufacturing processes we guaranteed.

Companies The issue of a lack of visibility within tangled supply chains puts companies at a disadvantage: There is a growing market for products with a transparent history. Companies also risk bad practices become world news, greatly affecting consumers' trust with brands .

Environmental and social problems at a fundamental level are caused by a lack of information - that's why we work with information technology.

14.1.2 Scale of the problem

Based on our research, the majority of businesses (in particular smaller ones) still struggle to leverage product supply chain data since information is locked up in data silos or out-dated or rely heavily on galvanising data from consumers or volunteers which is risky and difficult. Particularly researching on the food sector figures

Highly ethical consumers make up 19% of the UK population (12,528,200 people) and over 30% of consumers claim to be very concerned about these issues, yet they struggle to act on them with their purchasing decisions²⁵. Provenance's vision is for every physical product to come with a seamless digital 'passport' that empowers authenticity and traceability. Preventing the selling of stolen or fake goods and creating an auditable account for the journey behind all physical products - the Provenance B2B software service, powered by the blockchain, could help prevent the current \$250 billion loss to counterfeits and enable businesses comply to several pieces of key legislation in product traceability - and more, importantly, this new dimension could radically change how we buy things.

Today's systems for handling the identification and attributes of material products are not fit for the complexity of reality and needs of customers and regulators - they are siloed, closed and lack interoperability. We have identified a huge market opportunity in the food & beverage industry in the UK (a £76b industry) to benefit from a Proof-of-Provenance Tag ("PoPTag") - a *seamless* digital product passport that powers secure authenticity and traceability. Food and beverage stocks are frequently managed with pen and paper, with rubber stamps to prove authenticity. More "up-to-date" methods include centralised databases require expensive systems to enable data interoperability between different actors along the chain. To check compliance, ad-hoc audits monitor snapshots, yet are ineffective and inefficient. To gain consumer trust and meet compliance regulation an interoperable end-to-end (e2e) data layer is needed.

Market size

We are developing PoPTags initially (years 1-2 of commercialisation) for a market of UK based food and beverage manufacturers, brands and retailers, in partnership with UK based voluntary certifications. Food and drink is the largest manufacturing sector in the UK with a turnover of £76 billion. The UK food supply chain distributes over 6.3 billion cases of products each year. 8,000 UK food and beverage manufacturers, brands and retailers who could use our system to prove compliance and authenticity. (<https://www.gov.uk/browse/business/food>). Sales in "ethical" food and drink, including organic, fair-trade, free range and freedom foods rose to £7.7 billion in 2012, 8.5% of all household food sales that year, companies in this sector our our initial target.

Market example: UK meat industry

"50,000 tonnes of meat sold as beef found to contain horse DNA." *BBC, April 2013* Counterfeit goods of all types have had a detrimental effect on the global economy for some time. For the UK economy alone is estimated and could be costing £30bn and 14,800 jobs²⁶ – excluding health implications of

²⁵ Market report 2014 on Ethical consumers

²⁶ Anti counterfeiting Forum_ <http://www.anticounterfeitingforum.org.uk/counterfeiting.aspx>

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counterfeited and mislabelled consumables for consumers e.g. allergen information. Cattle meat is the second most valuable food product in the UK

(source: http://faostat3.fao.org/browse/rankings/commodities_by_country/E) and the net value added to British economy by a thriving English red meat sector has been calculated at nearly £1.7 billion with more than 55,000 people directly employed in beef farming in England (source: the recent EBLEX/BPEX Real Value of English Red Meat report). Yet the sector is in a deep crisis following the BSE crisis that completely cut exports and the implementation of CAP reform in 2005 removed direct livestock production subsidies that previously formed part of the total income of the livestock enterprise and tended to disguise the real financial position of many farms. (source: http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2013/05/p_cp_eblex_balancing_the_market_final_220512.pdf)

When non-cash costs are included in total production costs, producers' losses amounted on average to £445.48 per animal (source: EBLEX Business Pointers 2011). Overall, UK producers have lost the power to control farmgate prices to even meet their expenses. This is due to the high centralization of abattoirs (>1000 companies in 1985, 202 companies in 2010) and market dominance of supermarkets (1985 21,000 butcher shops accounted for 68% market share, 8% in 2010). (source: UK Beef Retail Sales 1985/2010; AHDB/Eblex/Kantar Worldpanel); Producer and consumer are entirely disconnected. The retailers in power source from cheap, overseas sources when supplies are squeezed. The market is at a turning point and organizations like the Soil Association are introducing new routes to market like Producer Groups, Farmer's Markets, and Community Buying groups ([http://](http://www.soilassociation.org/farmersgrowers/market/routestomarket)

www.soilassociation.org/farmersgrowers/market/routestomarket). for producers to claim the premium they need.

We believe that there is now the unique opportunity to create a digital real-time and open transaction network as we plan with project 'Provenance Coin' that is beneficial to all stakeholders in the supply chain and beyond.

14.1.3 Previous approaches to solving the problem

Current solutions for managing the flow of information within supply chains (e.g. the bar code systems for identifying products and supply chain management software) rely on highly centralised solutions and governance entrusted to closed third parties that do not enable actors to access information outside their own company. This has led to a concentration of power and lack of shared interest: digitization so far has widely led to ever more powerful corporates that leverage gathered (proprietary) data to squeeze out small scale suppliers and decrease costs. Existing alternatives are Advertising and digital marketing + PR, Certification and testing through third parties, Centralised software for (mainly) internal only supply chains mapping and tracing. e.g.: *Sourcemap*, *Historic Futures*, *Traceone*. Inhouse developed track and trace tech: *Baacode from Icebreaker*, *Footprint chronicles from Patagonia*. Audit reports and CSR reports

With existing systems end-to-end transparency is near impossible to achieve. It requires pooling of information in data silos, which has technological, economical, and organizational limitations:

- Pooling creates single point of weakness and failure, single bottleneck, as well as potential biases and selective disclosure
- Need for disclosure of critical business information causing loss of competitive advantage
- Highly opaque future project costs and "tragedies of the commons" render joint initiatives impractical
- Lack of technical expertise in NGOs or third parties commissioned as neutral operators

14.2 Implementation of organizational structure

14.2.1 Maturity of the project

We have started development of our technology on the blockchain to intelligently track assets with Proof-of-Provenance Tags (aka “PoPTag”).

We run two case studies over January 2016 where we test our developments. Two case studies: One an edible and one a valuable product

- End-to-end item tracking of Smoked Haddock process from Cornwall to London
- Luxury bag tracking from Kent to Buckinghamshire and London
- Functional requirements for development of a full scale prototype based on research, initial prototyping and testing
- Learnt a huge amount from initial prototyping and now ready to take development to the next level, and incorporate simple multiplications for items and mass, material details and confirm attributes of owners.

We are now running pilots to test further solutions

14.2.2 Organizational structure

Project Provenance Ltd (Provenance) is a UK registered business. We are social enterprise - with our social mission baked into our articles of association. We are a small team - Jessi Baker (CEO), Jutta Steiner (COO), Luke Harvey (UI development), Ian Kynnersley (Product lead), Jenny Eltsova (Operations), Natalia Yockelle (UX development), Afra Quintanas (Project Management) . We are working closely with Switzerland based foundation Ethereum and their for profit (CIC) arm EthDev to realise this project. We currently have two freelance developers, two freelance designers who are working on the project too. CEO Jessi Baker is the project lead and will head up main operations and business development.

14.2.3 Key personnel

Jessi Baker is a UX designer & technologist with a business strategy and product engineering background. Jessi has always been interested in how things are made and through her studies in Manufacturing Engineering at Cambridge University, she developed a deep understanding of the origins and journeys of the consumer products we buy - making ‘product supply chain information’ her core area of expertise. She has experience designing and prototyping technology products and systems for global brands including Adidas, Intel, American Apparel, British Airways and Will-I-am. A double Master’s at the Royal College of Art and Imperial was focused purely around Product Supply Chain Transparency - a topic she has written two Distinction awarded dissertations on and worked in across supply chain and marketing perspectives. Jessi founded Provenance with the support of the Open Data Institute.

Dr. Jutta Steiner worked for consulting company McKinsey in their Berlin Office. Trained as an applied mathematician with expertise in computational engineering through her PhD in the field of advanced materials, she helped clients on engagements in business technology and sustainability, in particular the promotion of the Circular Economy. She joined Jessi at Provenance in summer 2014 on a parttime basis due to an overlapping passion for Dapps and their potential for physical things. Excited about the future of blockchain technologies, she joined open source Ethereum project part-time where she has been heading the security audit since fall 2014 making her one of the world’s experts in blockchain technology.

Luke Harvey is a web developer and IT consultant, who specialises in front-end web development and building professional websites and web applications. Luke will be leading our frontend development, working closely with Jessi on user experience agile testing. He holds a degree from the University of Bath and was previously on the UK Civil Service Technology in Business Fast Stream. He has worked in product for Spiggot a San Francisco based collective decision making startup, giving

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him a strong insight into building SaaS for business. Luke has helped establish the UK office of Spigit, a cloud-based innovation management tool for enterprise, and managed customers such as Cisco and PwC. He has an excellent working knowledge of front-end tools and techniques, and has experience of delivering complex projects and managing demanding customers.

Ian Kynnersley is a technical strategist. He has over 15 year experience in server side, Ruby and javascript development. Previously Ian was a Product Lead at Sidekick Studios where among other things he explored (and prototyped) the future of insurance, created a pilot mobile fundraising platform and conceived and built a collaboration service to help marginalised young people get the education they deserve. Ian is providing hands on experienced guidance and support as we develop Provenance to the next level.

Afra Quintanas is a consultant and project manager. She has over 10 years experience in project management of various projects on the creative industries from advertising to social enterprise, tech start-ups and B2B events. Afra is Co-Founder at Unlimited Meanwhile Ltd social enterprise heading up the business innovation to successfully scale the company internationally and through technology. She lately designed and launch a mobile App based on the shared economy to unlock commercial property and bring live back to our high-streets. Thinking behind design and people-centered processes worked to understand particular business needs and opportunities. She has a background on MSc in Project Management and an MA in Creative and Innovation Entrepreneurship at Goldsmith College, University of London.

Rhodri Davies is an experienced backend developer working in Ruby and Javascript. He will be working with Luke, Ian and Joris to create concept level prototypes for agile concept testing and evolution of the concept. Previously he has worked building web and mobile products for Time Our and music startup PingTune.

Advisors:

Mara Balestrini Human Computer Interaction (HCI) expert and technology strategist. Track record of successful independent technology interventions for community engagement as well as co-leading an innovation strategy firm. Computer Science PhD candidate University College London (funded by Intel).

Dr. Christopher Brewster is a Senior Lecturer in Information Technology in the Operations and Information Management Group, Aston Business School, Aston University, Birmingham. His main current research focus is linked data and open data in the agrifood supply chain, with a particular interest in how data integration in the supply chain can mitigate against food crises, lack of sustainability and food waste. He has a PhD in Computer Science from the University of Sheffield. He was a principal investigator on the SmartAgriFood project (<http://www.smartagrifood.eu>) and the Fispace project (<http://www.fispace.eu>).

Nick Jacobs is a Brussels-based specialist in agri-food, trade and development policy. Coordinator of IPES-Food, the International Panel of Experts on Sustainable Food Systems, having worked previously as communications and research assistant to the UN Special Rapporteur on the right to food, and as a journalist at Agra Europe.

14.2.4 Partnerships, cooperations, and networks

We do work with the following key organisations:

Ethereum: The development of our core technology, the architecture of the decentralised application and the system design of blockchain database, will employ and expand the open source platform Ethereum. Our Ethereum supply chain module will make it easy for businesses to be integrated and added to – a protocol open to all. Ethereum is also the name of a very young software foundation that pushes the development of this technology for the greater good. Financing of fast development was secured through an innovative crowd sale of early usage rights. The main

blockchain launched in 2015. We are collaborating closely with the Ethereum development team on the definition of the open protocol.

Standards, Certification bodies and retailers: After identifying the need for new systems in the certification industry, we began pursuing partnerships with an array of different standard and certification bodies. We have been in talks with ISEAL Alliance (members include Fairtrade, Rainforest Alliance and Forestry Stewardship Council) and are working towards forming an official partnership. We are also working with the Soil Association, the largest organic certifier in Europe, Marine Stewardship Council, a global standard and certifier for fishing businesses, as well as the International Pole and Line Foundation, an organisation promoting sustainable fishing practices and better livelihoods for global fishermen. We lately started working together with Marine Conservation Society - UK Charity for protection of fish -, Child Labour Free a Social enterprise in the UK, and IHRB - Institute of Human Rights and business also from the UK. We are continuing working with Lily Cole and Impossible and we gained a new partnership (verbal agreement so far) with online retailer Brothers we stand. We work with those and other retailers to test and refine our e-commerce plug-in.

14.3 Implementation of the solution approach

14.3.1 Solution approach

Our objective is to build a prototype blockchain application to demonstrate the mechanics of an open registrar for access to: 1) product identifiers, 2) asset tracking and 3) related product information (e.g. certifications, contracts and audit details) to be used by a network of businesses along a supply chain. We aim to demonstrate the technology for 1) a network of small independent wood suppliers and furniture makers, 2) cotton growers and t-shirt manufacturers (with help from the Soil Association) and 3) a simple food example.

We are now ready to integrate our work together and prototype the full system for product supply chain traceability in real world systems - where items transform (manufacture) and claims need full verification (e.g. certified organic). Our market research suggested the renaming and focusing of the initially suggested "Product Passport" to a Proof-of-Provenance Tag (or "PoPTag" for short): A digital/physical product that links allows a secure digital history to any respective physical item. PoPTags allows information to flow freely with goods without the need for intermediaries, to which until now, data had to be entrusted. We employ the unique features of recent blockchain technology so that control and ownership can fully lie in the hand of users. For the first time, customers all along a chain of custody will have access to authentic data about the journey and attributes of an item.

As an example, we have identified large demand in the food and beverage industry:

1. **Lowering the cost of compliance.** Through our market research with certifications we have identified a large existing market to aid compliance to *voluntary* standards e.g. Fairtrade with a market of €4.8 billion in 2012 (15% growth). These organisations rely on a unwieldy paper trail and commission hugely expensive audits (e.g. cost of maintaining a chain of custody system can cost over €100 mil/yr³) to ensure integrity of their marqueto ensure integrity of their marque's use. Standard-compliant production across all commodity sectors grew an average of 41% in 2012, significantly outpacing the 2% growth in conventional commodity markets. We have already formed a partnership with ISEAL to gain access and have been working closely with three standards over the past months. Pressing upcoming *regulatory* standards will drive further demand that are also well served by our solution, e.g. Regulation No 1169/2011, that states that EU food products need to come with verified identity and provenance of all ingredients by December 2016 and the UK Modern Slavery Act⁶ which affects over 12,260 UK companies.

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2. **Preventing losses from fake claims.** As an extension to compliance, counterfeiting is a large and growing concern: The value of material counterfeiting is estimated by the OECD to be in the region of \$250 billion per year. Product authenticity is becoming ever more important as online sales increase and counterfeits surge. The UK counterfeit market is thought to bring in more than £1.3 billion per year, most of which funds organised crime. “There was a time when counterfeit products were sold on street corners and in bus stations and back alleys. But it is now much more prevalent to find counterfeit products on legitimate retailers' shelves”. There are numerous health implications associated with the sale of counterfeit consumables.
3. **A new form of competitive advantage.** Market research through Touchpoints has identified 9,874,000 ABC1 Shoppers in the UK alone who self-identify as ethical shoppers, and primarily shop online. In 2011, UK ethical market had a value at £50 bil, rising 39% from 2007-2011 with projected sales growth of 40% between 2012-2016, reaching a value of £76 bil. Competition based on open knowledge rather than just brand and price is increasingly important. More open systems for information flow within supply chain networks are a key factor to empower a new era of more conscientious, trusting consumers. Fish suppliers John West for example started including codes on their tuna cans to enable backtracking to the fisher; the initiative added £17m to the brand's sales. Shoppers are willing to pay more for value - authentic products proven with open origins. PoPTags can bring this advantage to the 6,100 SME food and beverage producers in the UK.

In summary, the foundation of addressing the major social problems listed above is the provision of a universally trusted system for the open tracking of objects (materials, components) through the network. Data sharing will be voluntary, so will naturally aid businesses that have a vested interest to take steps towards transparency on their good practices. However, the system could be applied to any supply chain and across any number of levels of transparency.

14.3.2 Target groups

1) Our primary market: Creators and producers of materials, ingredients and products

Provenance is focused on serving (mainly initially SME Independent) creators of products. Makers will be varying degrees of vertically integrated (meaning they may just design the product or they may go from cropping the tree to selling the desk) and may often not sell their finished products directly. Our work proving the concept for Provenance powered by the blockchain will allow us to work with larger brands and as we are product focused rather than brand focused it is possible for brands to just share the story behind one product initially e.g. Burberry clothing is all made in China (which they may not wish to promote), but their trench coat is made in the north of England, so may wish to just provenance the trench. As we create digital certificates of authentication we aim to get larger art, wine and luxury brands interested as this has a huge potential for fraud prevention.

2) Retailers and sellers of products. Provenance information can be added to the point of sale or discovery meaning retailers and curators of things very much benefit. As a business we are already in discussions with several retailers that are very keen for Provenance information to be featured in their e-commerce sites, for example: Planet Organic, Waitrose, Liberty's. We will be working to gather all the makers that sell through these retailers on provenance and use their content to showcase the potential to these retailers of using our API in their sites or even in store. There are some others that are interested in the concept of telling stories and forming communities around physical things - such as museums and art galleries another potential client. An indirect client that's important to note here is developers and digital agencies tasked with creating and maintaining the digital ecosystem of many retailers and makers and could be a great method of engaging businesses with provenance and working with our API. The developments of the Provenance Dapp will allow us to link Provenance to physical things and could become an

3) Certifiers and auditors. Provenance on the blockchain gives providers of certifications and auditors a new level of trust and authority. Currently certifications are represented by jpegs in websites - we

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aim to make them verified and with a chain of custody attached in their digital form. However, we believe partnering with certifiers and auditors will be more powerful than making them our clients.

Reaching the market

Short-term exploitation of key results with SMEs and makers (Year 1-2)

The thorough understanding of the functional and technical requirements will allow us to rapidly take our PoC through to full prototype. Part of the project will be to assess suitable identifiers for material items, for example barcodes or serial numbers or internal business references, and how we attach the digital passport to the physical item. We have already carried out some research into tags (RFID/NFC, bluetooth, etc) that could form part of our “package” for businesses.

Update: We have identified certifiers (and auditors that work with certifiers) of supply chains as key allies to reaching product making businesses. Digitising the awarding of certifications and the transmission of that value down the chain of custody of a product and material we have identified as a key first prototyping stage - benefiting the integrity of certifications and product making and selling businesses. We have already formed strong links with ISEAL - allowing us access to several certifying bodies and agencies.

14.3.3 Activities and work performed

Work Package Number :
WP1 Setting scope, design strategy work and reports
Actual Starting month : September 2015
Predicted / Actual End month : April 2016
Work Package Objectives: This is the planning phase that gets extended to project management and monitoring It also includes to have meetings and interviews with potential partners and the launch of an article (whitepaper) Overall management of project and reporting Includes 1) from the application
Description of work this period <ul style="list-style-type: none">• Completed a whitepaper• An example of how to use the blockchain/smart contracts for tracking materials/products with certifications along a chain of custody and supply chain Read it here (https://www.provenance.org/whitepaper)• Planning our supply chain case studies in the UK managing:• End-to-end item tracking of Smoked Haddock process from Cornwall to London• Luxury bag tracking from Kent to Buckinghamshire and London• Formalization of partnerships and further conversations with potential clients for this system.• Risk management and project reporting as well as project planning and monitoring

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Summarise any problems you have encountered, and how they have been overcome <ul style="list-style-type: none">• Contrary to our original plan of visiting and testing in an international supply chain, we have opted for two local pilots instead
Description of planned activity for next reporting period <ul style="list-style-type: none">- Refined understanding of user benefits and experience- Monitoring and reporting

Work Package Number : WP2 Developing and testing
Actual Starting month : September 2015 Predicted / Actual End month : April 2016
Work Package Objectives: <ul style="list-style-type: none">- Technical development of Frontend and Back-end (Design Phase)
Description of work this period <ul style="list-style-type: none">• Finished full working prototype of blockchain for tracking the provenance of physical products with supporting web application. Testing and final planning for the last pilots.• Set of design requirements and firm bond formed with our stakeholders, information architecture design and access management. Customer facing screen design for a prototype of blockchain. See attached a fully working prototype screenshots and a description of the work that lead to its development• Working prototype for registration, item issuing and tracking on Ethereum <p>Includes 2), 3) and 4) from the application</p>
Summarise any problems you have encountered, and how they have been overcome <ul style="list-style-type: none">- No major variables or problems
Description of planned activity for next reporting period <ul style="list-style-type: none">• Supply chain research on fishing sector and on fashion retailers to gather feedback for future tech developments (Third set)• Technical plans for the future• Refining if possible and when necessary: Item tracking on provenance.org adding an item, transferring item ownership between collaborators on the same story

Work Package Number : WP3 Pilot with partners and R&D
Actual Starting month : September 2015 Predicted / Actual End month : April 2016
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> • Deep understanding of users’ needs and workflows • Understanding of implementation options on the blockchain, esp. cost of transactions • Completed detailed user journeys and needs matrices for all stakeholders • Identified clear market needs • Deploying an initial version of the ‘Provenace Coin’ technology with the stakeholders across one supply chain on February. <p>Outputs on February:</p> <ul style="list-style-type: none"> • Host one presentation events on the project to explain the potential and our findings to industry in Germany • Delivering our supply chain case studies in the UK managing: <p>End-to-end item tracking of Smoked Haddock process from Cornwall to London</p> <p>Luxury bag tracking from Kent to Buckinghamshire and London</p> <p>(Honed version of the prototype ready for implementation with our two sets of supply chain stakeholders).</p> <ul style="list-style-type: none"> • Releasing case studies on our website to communicate our work to potential clients and other stakeholder. Public blog post and code release (done) • First draft report of the outputs and findings from the prototype. • Identified the direct and indirect competitors in the space (see them in the market report) • Outputs on April: • Host one presentation events on the project to explain the potential and our findings to industry in the UK • Design document to attract larger clients <p>Includes 5) and 6) from the application</p>
<p>Description of work this period</p> <ul style="list-style-type: none"> • Final technical implementations and research gathering for pilot tests. Further market research to inform future direction and exploitation plan.
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> - No major variables or problems

Description of planned activity for next reporting period

- Structured interviews with retailers (linked to WP2)
- Structured interviews with consumers
- Structured interviews with product making businesses
- Third set of supply chain stakeholder: Final tests from research (linked to WP2)

Work Package Number : WP4 Deep understanding on opportunities

Actual Starting month : September 2015

Predicted / Actual End month : April 2016

Work Package Objectives:

- **Understanding of existing IT systems for supply chain management**
- **Understanding of pros and cons for tracking technologies (ongoing)**
- **Development of draft legal framework for ownership transfer (April)**

Description of work this period

- Made mock tags for final pilot (ready) Tested in the food and fashion case studies
- Design and development of tracking technologies
- In depth research on the food sector supply chains. Started the understanding of existing IT systems by researching particularly in the food sector. Visit fisheries and starting report on fish sector (ongoing)
- Finalised existing system research including various partnership discussions (ongoing conversations with various partners and collaborators)

Summarise any problems you have encountered, and how they have been overcome

- No major variables or problems

Description of planned activity for next reporting period

- Feedback gathering from on-site supply chain work/visit to brainstorm future developments. Our surveys will input into the opportunities on tracking items from the gathering of supply chain information and research. Basically focuses on food and fashion sectors (together with previous WP3)
- Documenting IP strategy and key elements of research

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

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No management concerns

Detail any publications, publicity or other dissemination activity.

Relevant presentations (Q3)

- WIRED Retail - 24th November 2015, London:

<http://www.wired.co.uk/news/archive/2015-11/24/jessi-baker-wired-retail-2015><http://www.wired.co.uk/news/archive/2015-11/24/jessi-baker-wired-retail-2015>

- RCA Design Products - 14th December 2015, London

Highlighted press (Q3)

- IB Times - 11th January 2016

<http://www.ibtimes.co.uk/provenance-has-big-year-ahead-delivering-supply-chain-transparency-bitcoin-ethereum-1537237>

- Brave New Coin - December 2015

<http://bravenewcoin.com/news/provenance-to-restore-consumer-trust-with-the-blockchain/>

- BC News - December 2015

<http://www.the-blockchain.com/2015/12/09/provenance-report-how-blockchain-can-bring-trust-and-transparency-to-global-supply-chains/><http://www.the-blockchain.com/2015/12/09/provenance-report-how-blockchain-can-bring-trust-and-transparency-to-global-supply-chains/>

- Robert Mc Grath's

<https://robertmcgrath.wordpress.com/2015/12/21/provenance-for-supply-chains/>

Relevant Presentations in Q2

- Hosted an event at the V&A "Data systems for social good"
- Presented at Open Tech, London and Ouishare, Paris

<https://www.provenance.org/news/intelligence/jessi-baker-on-technologies/><https://www.provenance.org/news/intelligence/jessi-baker-on-technologies/>

<https://www.provenance.org/news/intelligence/jessi-baker-on-technologies/>

Highlighted Press (Published in Q2)

- *Featured in the New Scientist article on*

[blockchains](https://www.newscientist.com/article/mg22730384-100-blockchain-startups-promises-a-world-where-no-one-is-in-charge/)<https://www.newscientist.com/article/mg22730384-100-blockchain-startups-promises-a-world-where-no-one-is-in-charge/>

<https://www.newscientist.com/article/mg22730384-100-blockchain-startups-promises-a-world-where-no-one-is-in-charge/><https://www.newscientist.com/article/mg22730384-100-blockchain-startups-promises-a-world-where-no-one-is-in-charge/>

- Contributed to the UK Government Department of Science report on blockchains

- *Featured in Director magazine*

<http://www.director.co.uk/how-can-provenance-persuade-a-well-known-brand-to-become-its-first-big-name-customer/http://www.director.co.uk/how-can-provenance-persuade-a-well-known-brand-to-become-its-first-big-name-customer/>

- Also featured in *Just Style*, *Courier* magazine and *Protein* magazine

http://www.just-style.com/analysis/supply-chain-mapping-using-the-bitcoin-blockchain_id125834.aspx?utm_source=daily-html&utm_medium=email&utm_campaign=31-07-2015&utm_term=id90826
http://www.just-style.com/analysis/supply-chain-mapping-using-the-bitcoin-blockchain_id125834.aspx?utm_source=daily-html&utm_medium=email&utm_campaign=31-07-2015&utm_term=id90826

http://www.just-style.com/analysis/supply-chain-mapping-using-the-bitcoin-blockchain_id125834.aspx?utm_source=daily-html&utm_medium=email&utm_campaign=31-07-2015&utm_term=id90826

14.3.4 Sustainability of the solution

Short-term exploitation of key results with SMEs and makers (Year 1-2)

The thorough understanding of the functional and technical requirements will allow us to rapidly take our results to a full prototype. Part of the project will be to assess suitable identifiers for material items, for example barcodes or serial numbers or internal business references, and how we attach the digital passport to the physical item. We have already:

- carried out some research into tags (RFID/NFC, bluetooth, etc) that could form part of our “package” for businesses.
- Tested barcodes and serial numbers

We plan to employ a licensing agreement with corporate entities to test usage at scale. Our item tracking will serve as a great start to develop transparent accounting tools on top. We can build on existing business relationships to major consumer brands.

We have outlined three pilots in more detail for 2016:

Fish supply chain (looking at international as well as UK/Europe).

Coffee - with support of EU through ODINE

Jewelry - we have been approached to do a pilot with a Canadian jewelry company.

Licensing to corporates (year 2-3)

After successful deployment of our offer to SMEs & makers (lowest implementation barriers) we plan to employ a licensing agreement with corporate entities to test usage at scale. Our digital passport will serve as a great start to develop transparent accounting tools on top. We can build on existing business relationships to major consumer brands.

Towards a web of needs (year 3 to 8)

A future use case is the so called web-of-needs. While there is a great number of commercial offers playing to ostensible wants, true consumer needs are rarely represented explicitly – a fundamental asymmetry of our commerce today. Smart assurance contracts akin to crowdfunding campaigns, but with an incomparably **higher degree of security and transparency** (see Appendix A) could allow users to pool needs and empower customers.

Location

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We are firmly looking at a global market and keen to prove the potential of the tech in a global market. We have been successful in securing further funding from the EU for a full supply chain pilot starting on May 2016.

Based on payments made, and revenue generated, on a transaction basis. We have calculated potential return on a tiered SaaS model and number of commits to the blockchain to yield revenues in the region of £2.4 million/year by 2017 - assuming sales to UK product producers, certifiers and retailers at under 5% market penetration. Expanding this to larger international consumer brands in 2017-8 could see revenues in excess of £10 million by 2019. EBIT based on similar SaaS projects.

14.3.5 2.4 Risks

Technical risks: Meeting industry requirements presents high risk - Provenance sits within a complex landscape of stakeholders, industries & regulatory bodies. We will mitigate the risk of adverse reactions to Blockchain, or failing to meet industry needs, by working closely with industry (in DoP project & beyond) to identify specific requirements and concerns. The flexible system architecture inherent to Blockchains will help to respond to these specific requirements quickly.

Integrating R&D features into an end-to-end prototype is high risk, as we aim to include product transformations and multi-step transactions in this development step. Hence, we will include slack in the project plan for this Work Package. We will mitigate impact of this risk by increasing our already large resource, implementing and testing features in stages and removing non-critical elements to meet deadlines.

Identifying a method to prove product authenticity offers high risk - Our proposal does not try to improve existing solutions for physical labeling. Yet to mitigate this system risk, we will allow easy integration of arbitrary high-security physical identifiers with our digital passport, like DNA or other uncloneable entropy labels. We will test usability of the resulting system in various use cases, using best practices to ensure code/system robustness from the outset.

Commercial risks: There is a potentially high risk for usability/reliability of mobile devices (eg. Smartphones) in rough working environments to limit commercial interest. We start out with smartphones as open platform for fast prototyping, but will iterate on the software to make our functionality available offline and embeddable into task-proved devices. Whilst we have completed an initial Freedom-To-Operate search within our PoC project, patenting and FTO will also be investigated as part of the DoP deliverables within WP07.

Operational risk: There is high risk in implementing business logic on Blockchain as the technology is still emerging and in beta phase. The cost of scalable interaction with blockchains, as well as interruption and data loss through blockchain "reorgs" can hinder operations or increase support effort.

Commercial and marketing entry: There is a potential risk on market penetration and on implementing business logics on the blockchain. We start Strong network of advisors, a close collaboration with customers and a secure key client early to build confidence in others. We are focusing on high value market with known cost benefits (i.e. food and fashion). We also create back-up and data loss procedures and work closely with blockchain platform Ethereum to mitigate systematic risk as it arises.

14.3.6 User-based evaluation of the concept

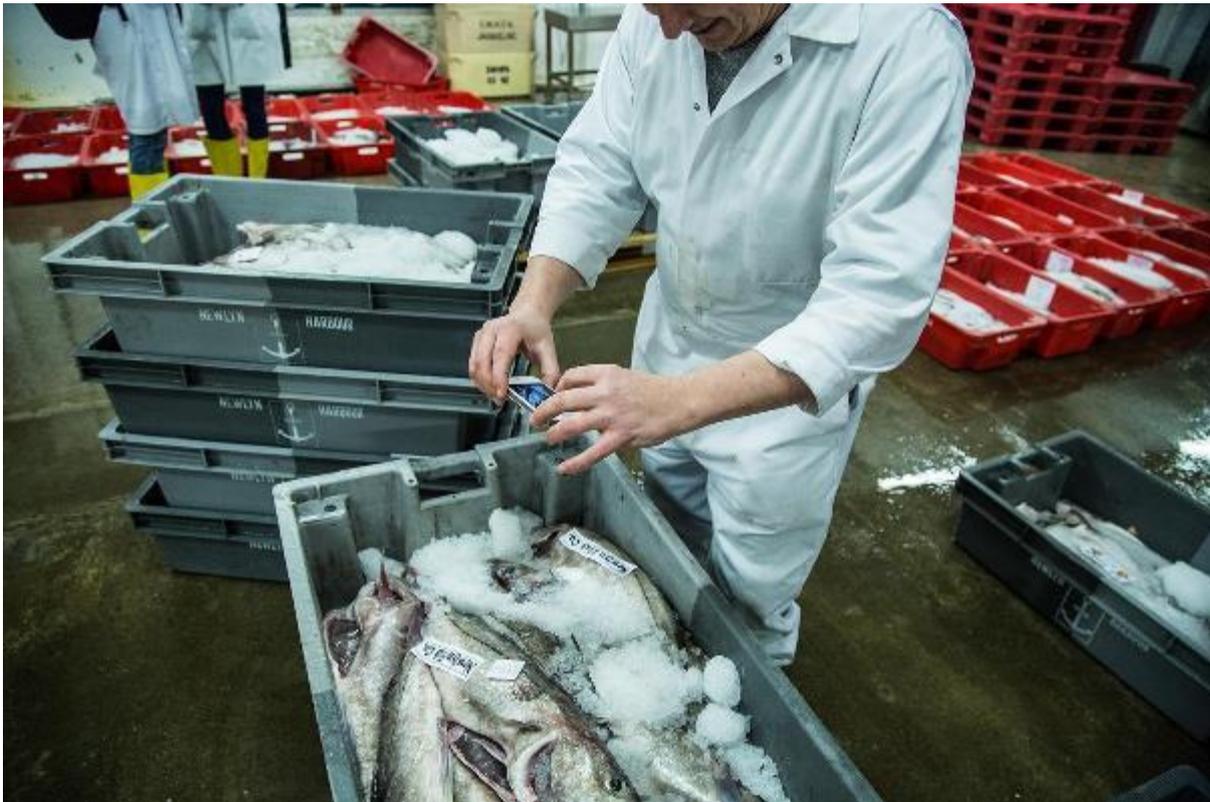
We've developed some scenario-based testing and paper based prototyping. Here you are some images on one of our scenario-based research. See results on the following links and below:

<https://www.provenance.org/news/technology/how-to-make-a-fish-transparent/>
<https://www.provenance.org/news/technology/bringing-provenance-into-the-impossible-store/>

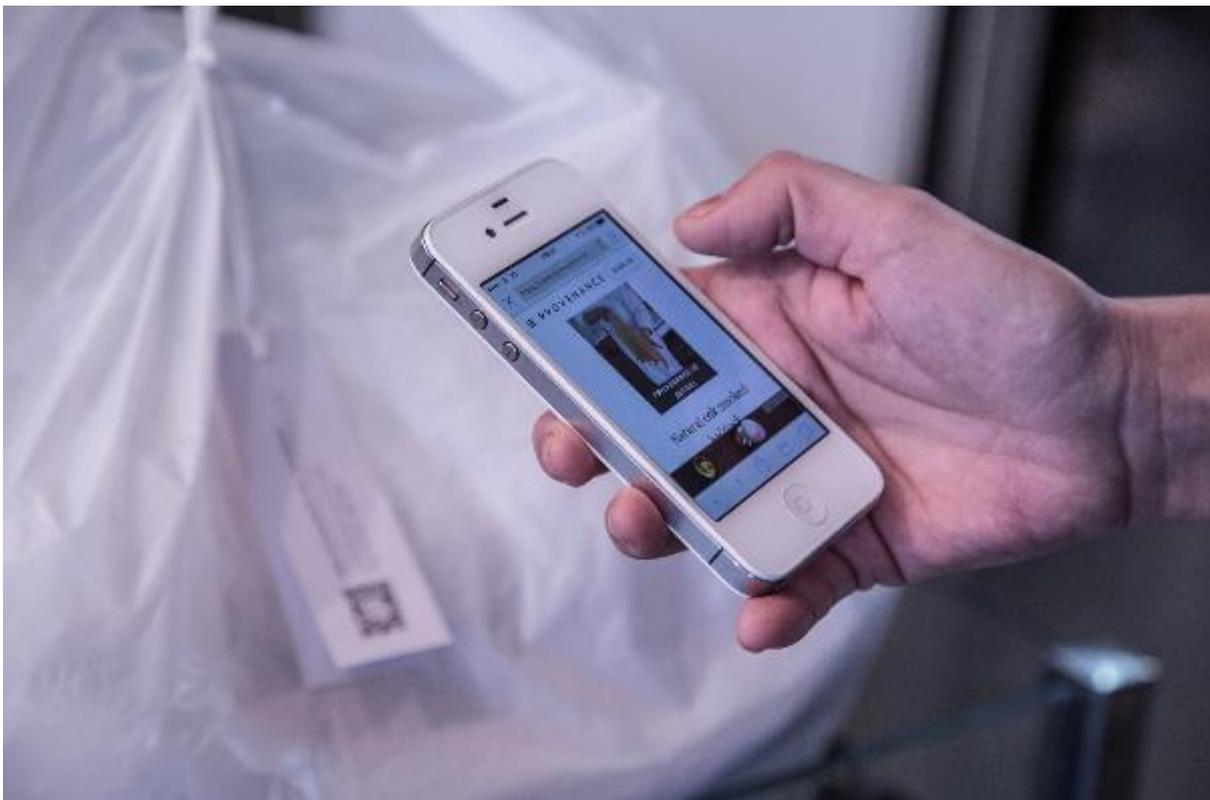
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<https://www.provenance.org/news/technology/bringing-provenance-into-the-impossible-store/>

Here are also some images on one of the scenario-based researches:



a. User (maker) using Provenance on a fish auction



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b. User (shopper) using provenance after buying a product

In this specific scenario-based one there were 5 target groups involved:

- Retailers
- Consumer
- Supplier
- Maker (processed the fish)
- Facilitator (transport)

The number of users where: 35 including

- Fisherman
- Shopkeepers
- Shoppers
- Makers
- Transport companies

The ratio between men and women involved was 10 to 7 since in the fish sector there are more men involved

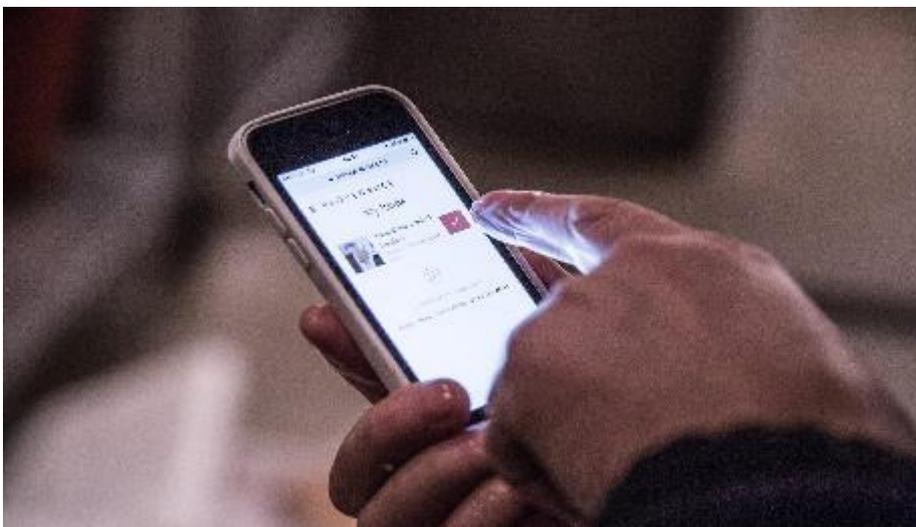
The ratio between adult, young and old people was the following:

Adult - 55%

Young - 5%

Old - 40%

This scenario-based case study together with two more case studies informed the iteration of Provenance to refine the system to a better UX



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c. User (transport company) tracking an item on Provenance



d. User (maker) using provenance together with provenance team

14.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 26.

Table 26: Snapshot of project "Provenance Coin"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
<p>To build a prototype blockchain application to demonstrate the mechanics of an open registrar for access to:</p> <ol style="list-style-type: none"> 1) product identifiers, 2) asset tracking and 3) related product information (e.g. certifications, contracts and audit details) to be used by a network of businesses along a supply chain. 	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Planned case studies and refined understanding of user experience. ○ Formed partnerships with key stakeholders and researched supply chains of key sectors. ○ Established design requirements and created customer facing screen for prototype. ○ Designed and developed tracking technologies ○ Developed and tested full working prototype for tracking the provenance of physical products with supporting web application. ○ Developed working prototype for registration, item issuing and tracking on Ethereum. ○ Piloted the prototype in a supply chain of key stakeholders and reported on findings/results. ○ Undertook a full market analysis including a report on competitors. <p>The project successfully delivered 21 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Organisation/project website: https://www.provenance.org/ ○ Organisation/project social media: Twitter (4,249 followers) and Facebook (1,588 likes), plus Provenance Tech (294 Twitter followers). ○ Written a white paper on how to use blockchain for tracking materials and products: https://medium.com/@provenancehg/using-the-blockchain-to-provide-transparency-in-product-supply-chains-7acf4b8d1d74#.d999cawwg ○ Attended and presented the project at events in the UK, France and Germany. ○ Featured in a wide range of publications, including magazines (e.g. Just Style, Director, Courier) and news websites/blogs: IB Times, Brave New Coin, BBC News, Robert McGrath, BC News, The Guardian. ○ Contributed to UK Government Department of Science report on blockchains.

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Table 27 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on environment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 27: Mandatory KPIs for Provenance Coin

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	3	5	4
		Number of users involved in co-design process	150	200	200
		Ratio between men and women involved	50-50	50-50	50-50
		Ratio between young, adult and old people involved	0-100-0	0-100-0	0-100-0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	3	5	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	4	10	10
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	4	2
		Number of comments / replies on project blog entries on CHEST website	0	6	0
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	3000	10000	7000
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	50	200	150

15 ReadRunner²⁷

This project aims at creating a revolutionary mobile platform aimed to assist people with Dyslexia in improving their reading and comprehension aptitudes through a unique intelligent play experience.

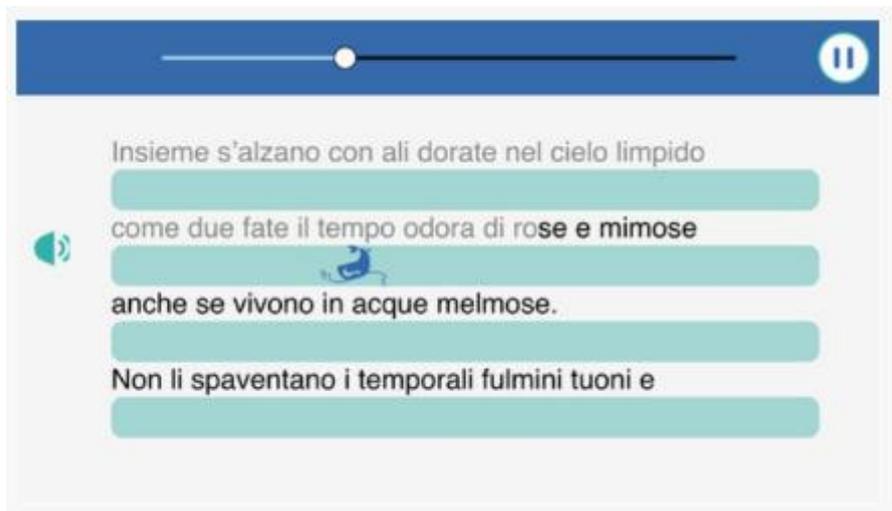


Figure 20: Picture of the ReadRunner mobile app

15.1 The societal problem

15.1.1 Description of the problem

The problem we want to solve is the difficulty in reading in a society where reading is as crucial as ever but the reading experience is lagging behind.

As the medium of reading is rapidly changing, people who have difficulties in reading to no fault of their own (cognitive condition, immigration, lack of access) need an available and viable solution, which ReadRunner (RR) hopes to provide.

RR touches on a challenge up to 10% of the population faces to no fault of their own: the challenge of reading. Dyslexia, although incomparably more understood now than in times past, is still a source for objective reading difficulties accompanied often by decreased cognitive performance, low self-esteem and aversive social behaviors, especially at a younger age.

RR's objective is to unequivocally and quantifiably improve reading and comprehension skills of children with Dyslexia. However, utilizing advanced digital capabilities, RR's aims farther - to instill reading as a rewarding experience, emit anxiety while improving performance, and simultaneously provide timely, valuable data and oversight tools to the supporting ecosystem.

Dyslexia is partially pertained to the native language. The estimated rate across languages is widely spread (5-18%). Some research suggests that in **Italy 3-5% of the population is dyslexic, in English and French-speaking countries 7-10%. In the relevant age group**, the higher reported percentages are in the UK, France, Spain and Germany. (source: UNECE statistical database <http://w3.unece.org/>)

Specific Developmental Disorders of Scholastic Skills are disorders in which the normal patterns of skill acquisition are disturbed from the early stages of development (WHO - World Health Organization, 2015). Labelled under the F81 diagnosis code in the ICD10 of the WHO, they include: specific reading disorder, specific spelling disorder, specific disorder of arithmetical skills, and mixed disorder of scholastic skills. The Italian law system has first acknowledged Specific Developmental Disorders of Scholastic Skills in 2010 (i.e. State law No. 170/2010) and grouped four diseases (i.e. dyslexia, dysgraphia, dysorthographia, and dyscalculia) under the label of "Disturbi Specifici di Apprendimento" (DSA).

²⁷ Chapter contributors: Mathias Becker, Remo Ricchetti, Maria Gabriella Brodi

However, the current approach to teaching dyslexic pupils displays at least two main critical issues: 1) Most of the tools currently adopted (e.g. voice recorders, vocal synthesis, video-writing programs, etc.) do not tackle the problem as they do not help pupils to permanently gain better reading skills; 2) Schools alone are deemed to deal with pupils dyslexic disorders often letting families to expect the successful achievement and completion of the entire *cursus studiorum*.

Currently, solution space for people with dyslexic disorders is limited and conservative, clinically and technologically. The debate about dyslexia's DMS definition as a "learning disorder" aside, clinical and diagnostic techniques have made little progress in the past couple of decades despite significant cultural and regulatory shifts.

People with learning/reading disabilities, like most groups of minorities, they face a distinct stigma by the larger population²⁸. The goal of inclusion and equality for those with reading challenges could be missed in case of no action is taken and RR can aid in finding ways to identify, address, and attenuate these stigmatizations within all aspects of our society.

Along the way we've come to understand that reading, in general, in this hyper-visual, image-based era is a developing challenge.

We consume more and more of our textual content via smaller, more mobile screens, and we do our reading while standing, talking, moving. ReadRunner, both in terms of user experience and meta-data engine, can provide a disruptive solution of reading in different contexts and for different populations²⁹.

This suggests a scenario where difficulties in reading could lead to harsher risks of social/cultural exclusion if the problem was neglected.

15.1.2 Scale of the problem

The general consensus among researchers is that Dyslexia affects between 5%-10% of the general population, with similar statistics among children up to the age of 12 The American Annie E. Casey Foundation reports that 68% of all U.S. Fourth graders scored "below proficient," on the National Assessment of Educational Progress reading test in 2011. These statistics reflect not only a widespread clinical phenomenon, but also a profound cultural and social problem with remarkable impact over quality of life for a significant part of the population.

Over the last 5 years, the number of students diagnosed DSA has steadily increased. Data speak about 2.1% of pupils in the school year 2014/15 (i.e. 186,800 of 8,845,984 students) compared to 0.7% in the school year 2010/11 (i.e. 50,900 of 7,278,000 students) (MIUR, 2015). 58% of DSA diagnosed students suffer dyslexia (i.e. 108,844) of which 0.3% attends nursery (3-5 y.-o. students), 24% primary (6-10 y.o. students), 39.3% lower secondary (11-13 y.o. students), and 36.4% upper secondary school (14-19 y.o. students).

The Italian Ministry of Education, University and Research (i.e. MIUR) acknowledges the social and economic urgency of providing dyslexic students with special assistance (see MIUR, 2011). To this extent, Law 170/2010 affirmed that students with learning disorders do not need special teachers but rather new and innovative teaching methods. Individualized and personalized learning is then strongly encouraged also through the adoption of compensatory tools and dispensatory measures, including technological tools.

²⁸ Identifying the Negative Stigma Associated with Having a Learning Disability - Kelsey Lisle - 2011 - Bucknell University

²⁹ "Young Americans and Public Libraries", Zickuhr, Rainie, 2014
<http://www.pewinternet.org/2014/09/10/younger-americans-and-public-libraries/>

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A conservative empirical estimate suggests that the different types of Dyslexic disorders affect 5-10% of the population.

Considering only the middle of scholar age (10-14) there are more than 3 million potential users in Europe alone.

Dyslexia is partially pertained to the native language.

The estimated rate across languages is widely spread (8-15%).

RR is designed to support different languages.

Even under a conservative scenario, the impact on the population in terms of people interested by the problem is remarkable, as depicted in the table below.

Country	Population (M)	age	Dyslexia %	Dyslexics (M)
ITA	3.2	8 - 14	5%	0.16
ENG	3.4	8 - 14	8%	0.27
EU28	30.4	10-14	10%	3.04
US	21.1	10-14	10%	2.11

(source: UNECE statistical database <http://w3.unece.org/>)

Statistical parity of Dyslexia and learning disorders in general is relatively stable across time and geographical location; awareness of this issues, however, is increasing: both caregivers and institutional systems are becoming more sensitive to the challenge ahead due to the increased availability of quality information as well as social awareness.

It is becoming clear that people with dyslexia or other learning disorders or not lacking in intelligence or talent, and in some cognitive areas (spatial perception, visual acuteness) are superior.

There is no monetary estimation of the cost societies at large have suffered due to erroneous or misguided approach to Dyslexia. It is beyond any doubt, however, that effectively and efficiently empowering people with reading difficulties to read, and facilitating their other given talents, can benefit both the individuals as well as macro economies and cultures.

A more focused analysis on the monetary impact has been conducted by UniBocconi led to the following conclusions:

*“The monetary benefits are high not only for parents and children but also for therapists. In the long-term is expected to be also beneficial for researchers. Moreover, the report assumes that one of the reasons why some children that are diagnosed with Dyslexia are not in treatment is due to the high therapy costs. Is important to remember that children with Dyslexia face difficult learning challenges and therapies can change their lives in a positive way. Therefore, the most important contribution from RR is that by lowering the costs of the therapies, the price per session decreases and more parents will be able to afford them.”*³⁰

³⁰ “RR Social Business Plan” - 12.1 monetization of the RR benefits; full report to the following link: <http://bit.ly/2bHbK4r>

Table 7. Summary of monetary benefits (Impact 1)

Scenario	Therapist Income per day (Euros)		Therapist Income per year (Euros) ¹		Price per therapy session (Euros)		Price for therapy sessions per year (Euros) ²	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
As-is	350	960	87,850	240,960	70	120	3,360	5,760
To-be (optimistic)	350 (0%)	960 (0%)	87,850 (0%)	240,960 (0%)	56 (20%)	96 (20%)	2,688 (20%)	4,608 (20%)
To-be (realistic)	394 (13%)	1080 (13%)	98,831 (13%)	271,080 (13%)	63 (10%)	108 (10%)	3,024 (10%)	5,184 (10%)

Note: Numbers in parenthesis show the percentage of improvement with respect to the As-is scenario.

Table 8. Summary of Monetary Benefits (Impact 2)

Scenario	Total Cost of Treatment per Child (Euros)		Additional Value of Leisure Time for the Whole Treatment (Euros)	
	Lower	Upper	Lower	Upper
As-is	10,080	28,800	---	---
To-be	4,334 (57%)	12,384 (57%)	856	1,142

Note: Numbers in parenthesis show the percentage of improvement with respect to the As-is scenario.

Table 10. Summary of Monetary Benefits (Impact 3)

Scenario	Potential Office Rental Savings (Euros per therapist per year- 4x3 square meters office)				Potential Transportation Savings (Euros per child per year)	Potential Value of Additional Leisure Time (Euros per child per year)
	Italy	Germany	US	UK		
As-is	---	---	---	---	---	---
To-be	6,672	6,480	11,916	25,464	132.9	96.1

15.1.3 Previous approaches to solving the problem

Currently, the solution space for people with Dyslexic disorders is limited and conservative, clinically and technologically. The debate about Dyslexia's DMS definition as a "learning disorder" aside, clinical and diagnostic techniques have made little progress in the past couple of decades despite significant cultural and regulatory shifts.

At the moment, most marketable products are based on text-2-speech technologies (e.g. texthelp, Ghotit, AlphaReader). Aside from the inherent passivity in this kind of reading interaction, most existing products are aimed at making reading "easier", or increase comprehension on a text-by-text bases. Interaction and interface issues (e.g synthetic voice, repetitive visual design) and pricing are to be considered as well. The main available products for Dyslexia treatment are still DVD or Desktop based, and are location-specific. Web based solutions are upcoming; they are mainly structured as lists of single exercises assigned to the children remotely by the tutor/clinician.

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Some RR's competitors are actually able to sell to doctors and researchers; for example Erickson³¹, which is specialized in learning difficulties, has software that helps the patient in reading and the clinician in developing exercises. Anastasis³² is also selling to medics, offering a package of exercises. With this ICT tool the doctor is able to work online, through his personal account and manage hundreds patients. These products are sold also directly to parents.

Some competitors offer dedicated tablet with specific softwares. The aim is to give a tool safe for school and homeworks because kids can't install other apps or browse the internet (Anastasis and Edutouch, see table below)

name	link	price [€]
texthelp	www.texthelp.com/uk/campaigns/readwrite-gold	160
kurzweil3000	www.kurzweiledu.com/default.html	1032
ghotit	www.ghotit.com/get_it_now/	150
reading from scratch	www.dyslexia.org/buy.shtml	180
phonic books	www.phonicbooks.co.uk/orderform.php	20 to 45 each
captura talk (android)	www.capturataalk.com/	48
dragon dictation	www.nuancemobilelife.com/apps/dragon-dictation	132
Lexion	www.lexion.co.uk/about-lexion.html	1060
anastasis / RIDInet ³³	info.RIDInet.it/abbonamenti/	99-1500
anastasis / ePico	www.anastasis.it/catalogo-generale/carlo-mobile-pro	199-420
anastasis / carlo	www.anastasis.it/catalogo-generale/epico	199-420
alfa reader	www.erickson.it/Dislessia-e-altri-DSA/Pagine/Scheda-Minikit.aspx?ItemId=40148	>135
edutouch	digitallydifferent.it/shop/index.php?id_category=6&controller=category	320-410

15.2 Implementation of organizational structure

15.2.1 Maturity of the project

TRL6

Deployments: web/mobile app (iOS+Android), websites. Completed and planned field studies. Significant developments on automatic error detection in reading. Community building strategy set up.

15.2.2 Organizational structure

Cofounders

R. Ricchetti: Product management, System Concept, UI, UX (CEO)

³¹ <http://www.erickson.it/>

³² <http://www.anastasis.it/>

³³ RIDInet is the principal competitor in the mobile market: built by medics for medics, RIDInet is a web platform where the therapist assigns homeworks to the assisted kids choosing single exercises from the Anastasis' large collection. Children can make their exercises at home on their own desktop and the system communicate the results to the therapist. Differently from RR, RIDInet has a rigid top down structure, kids are not supposed to make their choice in reading and actually they don't read but make exercises assigned by their tutor/therapist.

Subscribe to RIDInet can be expensive: it needs an una tantum subscription for the professional (medic/therapist) and one for the parent, plus a hourly fee. It is available only in italian.

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M.G. Brodi: App/web design and integration (CTO)
E. Fried: Interaction Design, User Research (CDO)
Development Team (freelance and collaborators)
D. Pasetto: Mobile/web application
G. Falco: Web dev. + SEO (www.polarcoffee.it)
G. Borelli: full stack developer
M. Piccini: mobile/web application dev (early stage)
S. Mor: graphic designer
E. Patacchini: Social Media and Contents
Asaf Shalev: IPR specialist
S. Albertarelli: game designer + publisher

Scientific Advisors (v)

Prof. B. Rossi, Dott. L. Bonfiglio
Neurorehabilitation and cognitive disorders
University of Pisa

Field test campaign (v)

Scuola Bozzini-Fasani Lucera (FG)
Mario Tibelli: director
Associazione e-ducere
www.e-ducere.it
Alessandra Repetto: president
Associazione La Grande Casa
www.lagrandecasa.net
Vincenza Nastasi: Area Manager

15.2.3 Key personnel

Maria Gabriella Brodi (Co-Founder)

ICT specialist, BS and Master's in Computer Science from the University of Pisa, Executive Master's in Innovation Management and Services.
Web and DB design and development. App/web integration.

Maria Gabriella's interest in Computer Science started when she was 16 as she wrote her first computer program. In 1994 she got her Master's in Computer Science from the University of Pisa, and also owns an Executive Master's in Innovation Management and Services. Ms. Brodi has worked as a backend developer with various institutes such as Scuola S. Anna and the University of Pisa, and companies such as CDC, DADA, ALEPH Integration (Kataweb), before joining with a TLC company owned by her husband and friends (Phonica s.p.a.). Later she became the CTO at Phonica and Technical Director at Flynet s.p.a. Ms. Brodi's son has been diagnosed with Dyslexia, which inspired her to initiate the ReadRunner project as a much-needed disruptive solution in the clinical and educational domains. She now resides with her family in New-York State, the US.

Remo Ricchetti (Co-Founder)

Bachelor degree in Mechanical Engineering at the Scuola Superiore S. Anna in Pisa. Skills in perceptual and medical robotics and interaction design.
System Concept, UX, UI.

Remo Ricchetti earned his Degree in Mechanical Engineering at Percro (Perceptual Robotics) Lab of the Scuola Superiore S. Anna in Pisa, with focus on Material Science and Robotics. In Percro he has been in charge of the mechanical design of medical devices, robotic exoskeletons and Haptic Interfaces for Virtual and Augmented Reality (2003-2010). In his professional background has worked with several companies and organizations on projects such as the design of a novel device for physio-therapeutic rehabilitation, wearable robotic devices, medical devices and tactile actuators in national and European research programs. 2006-11 Remo has been partner of Id-Lab, a design consultancy based in Milan, where he was in charge of technology-rich projects, technology transfer, and part of the Expo 2015 flag project. Remo teaches at the NABA Design School in Milan.

Eyal Fried (Co-Founder)

Interaction designer and Cognitive Researcher; BA in Psychology and Communication, Master's in Information

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Sciences Rutgers University (US) and Master's degree from the Interaction Design Institute (IDII) in Ivrea, Italy. Interaction Design, UX, User Research.

Eyal is an interaction designer and social researcher specializing in the research and design of future products and services. He consults for international companies in the technological and cultural domains and is Co-Founder of Acclair Neurocapital, a venture that explores the monetization of neuro- information, and OpenInvo, an online marketplace for innovation. Having served in the military for five years as an officer, Eyal turned to the studies of psychology, and after completing his MSc in Information Sciences at Rutgers University in the US, he worked as an information architect and user-experience designer both in New York and Tel Aviv. Eyal has focused on the design of smart environments and physical computing while earning an additional Master's degree from the Interaction Design Institute (IDII) in Ivrea, Italy. Eyal is directing the Design & Technology program at the Bezalel Academy for Art and Design, and was a guest lecturer at Duke University, NABA in Milan, and the University of Delft. Aside for his experience in psychology and cognitive research, Eyal's two younger brothers are mentally retarded, a fact that has driven him to apply his expertise in helping people with special needs.

Davide Pasetto

WEB and mobile app development.

Senior IT professional with comprehensive technical skillset and expertise in requirements analysis, system integration, project management, process modelling, software development, performance enhancement, parallel and distributed design and development, testing and quality assurance, linux system administration, network administration, network security, telecom industry, gaming industry and internet industry.

Proficient problem solver able to catch on user requirements and technical limitations and devise workable solutions. Motivated achiever with a broad IT knowledge and experience who can select the correct technology and approach for the customer needs.

Specialties:In depth knowledge of software design, object oriented development, high performance computing, team working, technical leadership.

Beside the professional interest, Davide has skin in the game: even if not personally, he knows directly about dyslexia disorders and the related issues a kid can face in the first school years. This of course raises the Davide's interest and involvement in the project.

G.Borelli: full stack developer

S. Mor: graphic designer

E. Patacchini: social media manager

15.2.4 Partnerships, cooperations, and networks

In order to empirically validate its solution and gain recognition within the relevant research community, Bee3ee has initiated collaborations with several scientific organizations. The organizations listed below have consented to test the ReadRunner system under controlled conditions.

One field study, with extremely positive results, has already been completed and published (http://simfer.it/cont__259_2518.phtml); RR was featured in a poster presentation by Dr. Alessandra Crecchi et al from the University of Pisa. RR scored an Efficiency=5.97 (a measure of time effectiveness of the practicing method after Tressoldi et al.), while best “conventional” method (Davis) scores 3.8. A new article from the same authors is in press.

1. Unità Ospedialiera di Neuroriabilitazione, Clinica Universitaria, University of Pisa
2. Pisa Vision Lab (<http://www.pisavisionlab.org/>)
3. IRCCS Stella Maris, Pisa (<http://www.irccs-stellamaris.it/>)
4. UNITN - Dipartimento di Economia e Management

Bee3ee has raised great interest from several accelerators and foundations, and is an active participant in a few of the following programs:

5. Fondazione Filarete (<http://www.fondazionefilarete.com/en/>)
 - a. involvement in new initiatives like
 - Innovageing (<http://www.fondazionefilarete.com/it/innovageing> , ReadRunner attained the final phase)
 - Startcup (<http://www.startcupml.net/>) (attained the final phase)
6. impactHUB Milano (<http://milan.impacthub.net/>)
 - a. Fellowship on e-Health (20k€ grant)
7. Microsoft Bizspark/StartUp4U (<https://www.microsoft.com/bizspark/>)
 - a. free tech support (up to 120k€)
8. Intesa SanPaolo Startup Initiative alumni (<http://www.startupinitiative.com/>)
 - a. networking and invitation to special events:
Italian Corporate Venture Forum Torino
http://www.e-unlimited.com/events/view.aspx?events_pages_id=6245

Bee3ee is planning an extensive field-testing in order to evaluate its user experience, collect preliminary data and reach early customers. Currently the company is in advanced stages for the implementation of such research with the following institution:

Istituto Comprensivo Bozzini-Fasani, Lucera (Italy)

- a school with 1200 students interested in new products for special learning needs.
- a test campaign with the beta release of RR is ongoing.
- signed agreement.

Associazione e-ducere (www.e-ducere.it/)

- no profit association to support children with special needs in education
- a group of professionals and specialists that works in collaboration with schools
- agreement to test and adopt ReadRunner as a didactic tool.

Associazione La Grande Casa (www.lagrandecasa.net/)

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no profit association to support social integration of families and kids with special needs
a group of professionals and specialists that works in collaboration with schools
preliminary agreement to test and adopt ReadRunner as a didactic tool.

Associazione Segni D'infanzia (www.segnidinfanzia.org/)

Segni d'infanzia cultural and artistic association was founded in 2008.

The main activity of the association is the artistic management and organisation of the homonymous festival, in addition to the organisation of cultural events during the whole year.

The strength of the association is the capability of creating precious synergies and a net of relations among different realities such as institutions, school, companies, associations, voluntary services, enriching them by careful looks aimed at catching inputs coming from European and worldwide cultural panoramas.

The Association believes in the principle according to which only by giving children high quality culture it is possible to contribute to cultural maturity that takes its origins from them, offering them the best possible energies and useful instruments to grow up.

Ongoing collaborations with startups as technological/media partners

Twletteratura (www.twletteratura.org)

Twletteratura is a social biased startup dealing with education. They are suggesting a novel approach to reading, their method needs to understand and synthesize in a tweet part of literature masterpieces promoting discussions and engagement of readers.

Twletteratura created a huge community on twitter and is active in schools, where they would use ReadRunner in their workshops.

Yeerida (www.yeerida.com)

“Literary streaming” platform, Yeerida offers textual contents shared by authors/publishers via web browser. Yeerida aims to promote new works or classics to new readers.

ReadRunner can help Yeerida in distributing their contents.

Mivoq (www.mivoq.it)

Mivoq provides synthetic voices and custom Text-To-Speech (TTS) technologies. The TTS technologies market is dominated by synthetic voices with good timbre quality (audio quality), but flat prosody (utterance intonation) with little flexibility. Our technology allows developers to obtain complete control over prosody and to use several effects to adapt voice timbre. Mivoq comes from the experience of CNR Padova.

Bee3ee is in contact with several Venture Capital firms active in the domains of eHealth and mobile content. In addition, Bee3ee has been contacted by a major publishing house for potential partnership or collaboration. All these leads are in early stages.

15.3 Implementation of the solution approach

15.3.1 Solution approach

ReadRunner is a first step in appropriating digital technologies and social interactions to treat children with Dyslexia- through a desirable yet clinically-effective play experience that improves and encourages reading, and through a comprehensive solution to the dyslexic's ecosystem (clinician, tutor, parents) for efficient communication.

RR is a product aimed to treat dyslexia by transforming the reading experience with an engaging and intelligent environment hosted on a mobile app.

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RR's mobile environment allows the reader to experience reading independently and location-free, while being (seamlessly) monitored for performance and feedback by the clinician. As a result, reader is motivated to practice and repeat, oversight is efficient and "non threatening" and performance analysis is instantaneous.

The RR solution facilitates an integrated communication between therapeutic staff, education system and family. Treatment coordination and discussion is time-consuming, at times stressful. Costs are rapidly becoming an issue as well as access to updated information. RR allows for a synchronized networking of all parties involved with a hierarchical and friendly access to data, reports, and communication options.

Out of the dyslexia niche, RR could be a proposal for a new reading/learning experience. It fits with the promising markets of online language courses and online publishing.

Plus, it is supportive to experience texts from different internet based sources (websites, email...).

When scaled to a critical mass of users, RR can become a data-driven platform for collecting massive information on cognitive/learning disorders, and allow for the improvement in teaching and rehabilitation techniques as well as clinical research.

RR is therefore the entry proposal in an extended program of smart, connected personalized health support systems.

RR provides several benefits for the therapy results analysis. For instance, the software allows to assign and manage the reading texts, analyse the children's results in a graphic way, review the children's progress, among others.

It is also possible to measure the social impact of the reviewing time reduction in a Social ROI related to the cost reduction of the therapies and the increase of revenues of the therapists. RR not only allows therapists to reduce their reviewing-time, but also increases the efficiency of the therapy by accelerating the treatment, and therefore, reducing its length-of-time.

First, children will reduce their treatment length-of-time, which consequently leads to the second consequence that is a decrease in the income of the therapists. The third consequence is that children will have more leisure time due to the reduction of treatment length.

Further elements to take into account in evaluating the impact of RR in everyday life and in social behaviour are related to transportation.

About costs, actually there are still two elements that should be considered: the transportation time and cost. As a session can be done remotely this two expenses are reduced too.

Plus, the reduced needs of commuting has an environmental impact.

Note that the purchase intention is mainly based on performance since parents' willingness to spend money on their child's treatment is high. However, the treatments are so costly that the price has an important role as well.

The root of the competition basically lies in the offer of a new technology, which set up a clear separation line with the existing devices. It lies in the possibility to make reading a funny and interactive activity for children and also to make it more involving (social engagement).

However, RR outstands from competition since it allows children to use the product remotely, through a full interactive reading environment. It also helps them to be socially engaged and quantify their reading improvements, features that are not presented in any other product in the market. Plus, the extreme difference price between RR and its competitors is one of the main sources of competitive advantage.

15.3.2 Target groups

In the inner circle of the problem we defined 4 main actors,:

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KIDS: User of ReadRunner. They experience the problem on their own skin and must face all the related difficulties
5-8% of the overall population

PARENTS: Client of Readrunner. As main caregivers, they are supposed to want to solve the problem of their kids, so their interest in the new product and their willing to pay are the first items to check in the starting phase.

During the test phase the parents engagement has come out as a Critical issue: being concerned does not imply being collaborative.

More effort has been spent in defining engagement strategies (RR blog, newsletter, a renewed language on our social media)

and in a lighter and more clear user interface on the website for the caregivers

(www.thereadrunner.com).

After the first round of test we switched our attitude from “*trying to convince* parents that RR is nice for their kids and this is worth a little commitment” to “*make everything easy and enjoyable* (even for adults) in order to reduce resistances to adopt a new system”. RR was already nice for kids, simply we realized that is was not so manageable for parents.

TEACHERS/THERAPISTS: Professional Caregivers. They can get some advantages from ReadRunner. In the first phase they are asked to try RR to follow their students/patients.

RR allow them to save time in following kids and managing contents and homeworks.

In the following development a B2B option can be implemented.

Similar considerations about a more intuitive UI brought to a new environment for teachers and therapists as well.

CLINICIANS: Triggers. Professional Caregivers. As per the Teachers/Therapists they can access easily to the progress of their patients.

In the first phase they are eventually asked to try RR to follow their patients and coordinate with Therapists and Parents.

RR allows them to adjust therapy according to the actual performances of the patients with unheard reactivity.

In the following development a B2B option can be implemented.

WHO	NEED	READRUNNER's VALUE PROPOSITION
KIDS	Safe and engaging environment to improve reading performances	Interactive reading platform Based on personal mobile systems
PARENTS	Oversee child's progress + cut treatment costs	Online oversight environment Reduced needing to commute
TEACHERS/THERAPISTS	An effective tool for teaching and communicating	Special environment to manage and deliver contents Supportive check error system
CLINICIANS	A flexible system to determine and adjust proper treatment, collect, analyze and share data	Oversight patients and therapists Data gathering+analysis Epidemiologic/endemic analysis

RR is branded as an affordable aid tool for parents to 8-14 year-old children with dyslexia or reading deficiencies (B2C). Although RR's eventual customer is a relevant household, initial strategy following launch would be to build a sustainable community of users through an approach to educational/health organizations and associations.

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A successful and consistent collaboration with relevant stakeholders will achieve their endorsement and build credibility among potential purchase decision-makers, individual and organizational.

Initial selling efforts will be targeted towards the Italian market (estimated at 128000 dyslexic children in 2011). RR will sell licensing packages (free use of application) based on number of users and premium data analysis and reports production.

We decided to sell RR to the parents; they are already in charge of solving the problem for their children, they are the first clients of any technological aid their children are supposed to use to overtake reading and learning issues.

The aforementioned steps are based on the following educated projections:

- the eHealth market is growing exponentially
- mobile devices are now primary platforms for communication and content consumption
- game-based approach for rehabilitation could be extended to different cognitive disorders as well as other physiological domains
- data gathering, analysis and storage tools are more available and sophisticated than ever.

Other Target Groups:

Influencers

Parents (affiliated to local/national associations or individually) are active and sensitive on the main social networks (Facebook and Twitter). It is very common that “connected” parents share experiences and ask for advices to peers on FB groups. On Tw, many teachers, independent therapists and bloggers specially focused on dyslexia reach considerable number of followers. Worth to mention a brand new social network dedicated to dyslexyc people: <http://www.traib.info/> We started a social campaign on FB and TW to reach these influencers, join the associations and spread RR to the final users.

Teachers/Therapists

In the interviews we conducted in Italy, teachers are aware and concerned about the dyslexia issues. First of all because it is an everyday problem they face in class and although it is a yet well known issue, it is to them to solve or manage each single case often in contact with parents but sometimes with poor support from the school organization. Thanks to the common experience and the social and professional changings, teachers are getting familiar with the internet based tools for educational purposes and they are generally available to use a tool that can help them with a more demanding student category like the ADHDs.

RR is designed to help teachers in managing homeworks assignments and revisions, making their efforts more effective, allowing them to stay in contact with the kids and the parents and saving their extra school time.

We are in touch with several teachers in different schools of different cities (in Italy and in England) available and ready to test the system³⁴.

Institutional Associations

Bee3ee have access to, and will approach several Dyslexia and learning disorders associations both for collaboration and endorsement. (eg.: AID [<http://www.aiditalia.org/>], BDA [<http://www.bdadyslexia.org.uk/>], IDA [www.eida.org], EDA [<http://www.eda-info.eu/>])

Bee3ee will offer its solution to, and through these associations and intends to work with them to improve and distribute its tools.

³⁴ e.g.: www.e-ducere.it/

Scientific community

Bee3ee's solution is scientifically evaluated and is based on contemporary research. It complies with benchmark standards and empirical methodologies in the field. Bee3ee works closely and diligently with top-tier researchers from top Italian institutions (University of Pisa³⁵, IRCCS Stella Maris³⁶, CNR Pisa Vision Lab³⁷, CIDAAl/Università di Piacenza³⁸) and utilizes its technology to improve research and data-gathering methods. Bee3ee has recognized and accomplished researchers on its advisory team.

15.3.3 Activities and work performed

WP1.1: Further improvements after the test campaign feedbacks. Refinements for the user experience and the user interface components.

WP1.2: as per the intermediate report

WP1.3: new releases of the websites

- www.thereadrunner.com : web user interface (brand new)

- www.bee3ee.com : company website

WP1.4: as per the intermediate report

WP1.5: Error recognition feature in english deployed.

WP1.6: as per the intermediate report. Tablet Build (iOS, Android) optimization on ver 1.5. Minor fixes on Android build.

WP1.7: as per the intermediate report. Since automatic recognition of errors has been recently deployed (may 2016), RR can not use the log of errors in the analysis.

WP1.8: as per the intermediate report

WP1.9: Presence on Facebook and Twitter. Communication, advertising, influence, feedbacks from the potential users.

Improvements in strategy and graphics. Contacts increased by 20%.

WP2: The whole WP had been very challenging because automatic error detection in reading and text to voice matching need huge computational effort. To be considered that the common voice library and dictation SWs are conceived to interpretate the intention of the speaker, in other words they *guess* the pronounced word and type it correctly neglecting the mistakes the user can make. Our task is strongly different: we are dealing in searching and detecting errors in the voice of the reader. A critical issue we overtook by ourself as better described in the report (See full report at: <http://bit.ly/2ble1T9>).

WP2.1

- Definition of the algorithm
- Development of the prototype
- Test on given and generic texts
- Deployment of the feature on RR for public use.

WP2.2: The architecture and tools for the transliteration have been identified

- Installation configuration and test of the main tools
- Design and configuration of the pipeline to collect-transform-transcript the audio
- Deployment of the feature on RR (web+app)

WP2.3

- Detection and categorization of the errors in reading
- Recognition and transcription mechanism

³⁵ http://www.ao-pisa.toscana.it/index.php?option=com_content&view=article&id=1519:uo-neuroriabilitazione&catid=350:neuroriabilitazione

³⁶ <http://www.irccs-stellamaris.it/>

³⁷ <http://www.pisavisionlab.org/>

³⁸ <http://www.giuseppeciarenza.it/>

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- Filter for voices in the backgrounds
- Filter for upcoming conversations (RR recognizes word accidentally pronounced during the reading practice from reading aloud)
- Feedback in the caregivers' frontend

WP2.4 ReadRunner release2 beta testing in schools, involvements of parents, teachers and school management.

The test report lacks the impact of automatic error detection for readers and caregivers due to the fact that we have been able to deploy the error detection feature in may (the new app has been deployed in late june), when schools were almost at the end and kids on vacation. Update of the test report with errors by end of sept 2016

Detailed info in in the tables below

Work Package Number : wp1.1: Gamification UX/UI - Interaction and engagement (achieved)
Actual Starting month : phase 1: jun 2015 phase 2: nov 2015 Predicted / Actual End month : phase 1: jul 2015 phase 2: dec 2015
Work Package Objectives: phase 1: Design of the user experience and interface, how the reader and the caregivers interact with the tool and with each other. phase 2: Improvements after the test campaign feedbacks. Refinements for the user experience and the user interface components.
Description of work this period: Main achievements: phase 1: definition of roles: reader, parent, tutor, clinician definition of tasks for each role design of the interaction interaction framework proposal (UI/UX) phase 2: redesign of the user's structure improvements in the UX for each role updated UI/UX framework to implement in the webapp/app

Detailed description of work performed to reach the achievements listed above:

Starting from SmartRehab (<http://bit.ly/2bPWW3H>) a brand new system has been designed: The website (www.thereadrunner.com) hosts the webapp (for the kids³⁹) and the frontend for the caregivers (parents, teachers and therapists⁴⁰)

Along the CHEST period we deployed 3 versions of the website improving the UX/UI

Release 1: basic features, rough UX⁴¹

Release 2: current, improved UX, still not well accepted by adults⁴²

Release 3: improved UI/UX, improved graphic, online from 16th sept 2016⁴³

ReadRunner App:

1st release: 0.1 (nov 2015)

Current release: 1.04⁴⁴ ; v 1.5 under evaluation, available by sept 16

Summarise any problems you have encountered, and how they have been overcome

With the aim of copying the needs of the users we choose a two step approach in which our first design proposal must be tested by the actual users of ReadRunner in order to give them an experience strongly different from the top down proposals they are used to deal with.

The two-step approach was successful: once implemented, the UI/UX designed in phase 1 has been well received by the kids but not so positively on the caregiver's side (mainly parents and teachers).

The feedbacks obtained in the field tests led to a new UI, leaner, faster and more easy to use by parents and professional caregivers.

Description of planned activity for next reporting period

Planning and organizing a customer support service for the early users.

Gather feedbacks for further improvements.

Work Package Number : wp1.2: tech survey and definition (achieved)

Actual Starting month : jun 2015

³⁹ Mokup for readers 1st release: <http://bit.ly/2bPZNK8>

⁴⁰ Mockup for parents/teachers: <http://bit.ly/2cvVnNn>

⁴¹ Users manuals for parents:

<https://drive.google.com/file/d/0B0qfFbbIMa59RHRMYUZNX3RyQWM/view?usp=sharing>
and teachers

<https://drive.google.com/file/d/0B0qfFbbIMa59bkxkktTXJSS2s/view?usp=sharing>

⁴² Users manual for parents and teachers:

<https://drive.google.com/file/d/0B0qfFbbIMa59WG5qTFV4Ykw5U3M/view?usp=sharing>

⁴³ New UI (available online from 16 sept 2016):

<https://docs.google.com/presentation/d/1KJyYxDTU1XuEV0yvXBe1fADkCuiQFpfeo05dFtCnFzM/edit?usp=sharing>

⁴⁴iOS: <https://appsto.re/it/lzoMab.i>

Android: <https://play.google.com/store/apps/details?id=bee3ee.read.runner&hl=en>

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Predicted / Actual End month : jul 2015
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> Define the technological tools that fit the project, sw resources, native or hybrid framework and architecture.
<p>Description of work this period: A technology survey has been conducted, that led to the definition of tools to adopt for the implementation of RR. Full report is available at: http://bit.ly/2cv73k3</p> <p>Main achievements: Definition of architecture, tools and technology</p> <p>Detailed description of work performed to reach the achievements listed above: The Application follows a Client Server paradigm: there is a back end provided by a Web Server running on a Linux based system. Clients can connect and use the solution through a standard Web browser as well as native Apps running on different classes of mobile devices. The Web Server will be developed using Python and Flask framework and it is storing data in MongoDB server. It provides a number of REST API used by both the Web and the App clients. The Web client will be developed in JavaScript and leverages AngularJS and Bootstrap frameworks. It provides both functionalities for Back Office and Management as well as a point of access for different classes of users. The Mobile App will be developed using Multi Platform Technologies to support all mobile devices: HTML5, JavaScript and Bootstrap within an Apache Cordova framework.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> The main challenge was to identify the right tools and Application framework to minimize the effort in developing and maintaining the native Application code.
<p>Description of planned activity for next reporting period</p> <p>Bee3ee continuously surveys and refine the sw tools in order to improve performances and offer</p>

<p>Work Package Number : wp1.3: Web development - websites www.bee3ee.com www.thereadrunner.com [D1] (achieved)</p>
<p>Actual Starting month : jun 2015</p> <p>Predicted / Actual End month : sep 2015</p>

<p>Work Package Objectives:</p> <p>design, implementation and deployment of the websites</p> <ul style="list-style-type: none"> - www.thereadrunner.com : web user interface - www.bee3ee.com : company website
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • New layout for the two Web sites with improved functionalities • Improved performance in terms of responsiveness of the two Web sites • Improved functionalities and definition of REST API for thereadrunner.com Web site • Detailed description of work performed to reach the achievements listed above: • Set up and development of the new Bee3ee server using WordPress • MongoDB transition from MySQL: design, implementation and migration of the structure from MySQL to MongoDB • Development of the REST API layer: design and implementation of the main functionalities • Development of the Web Server with Back Office functionalities: design and implementation of the features by user class. • Development of the Native Client Application: design of the new flow for the application and development of the Cross Platform layer as well as the native portion for the different classes of devices
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> • The main challenge in this phase was to identify the best persistence layer to improve performances and responsiveness of thereadrunner.com Web site. After some tests MongoDB was selected as best option
<p>Description of planned activity for next reporting period</p> <p>A third release of the RR website has been deployed in august 2016. Bee3ee will adopt a <i>continuous Beta</i> approach in order to improve and enrich constantly the user experience.</p>

<p>Work Package Number : wp1.4: multilanguage - text processing (achieved)</p>
<p>Actual Starting month : jul 2015</p> <p>Predicted / Actual End month : aug 2015</p>
<p>Work Package Objectives:</p> <p>integration of multilanguage feature to process texts in italian, english, french, spanish and german</p>

<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • Implementation of a mechanism to parse and split in syllables text in different languages <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> • Based on the language selected the text is parsed and splitted in syllables to produce an output file in a custom format that can be used by the Web or Mobile App to properly color the text during the reading in the smoothest and quickest way possible.
<p>Summarise any problems you have encountered, and how they have been overcome</p>
<p>Description of planned activity for next reporting period</p> <p>Improvement of the pagination of text in the reading environment (depending on the different languages)</p>

<p>Work Package Number : wp1.5: App development - mobile builds [M1] phase 1: (achieved) phase 2: (achieved)</p>
<p>Actual Starting month : phase 1: sep 2015 phase 2: mar 2016</p> <p>Predicted / Actual End month : phase 1: oct 2015 phase 2: mar 2016/may 2016</p>
<p>Work Package Objectives: phase 1: design, integration and deployment of the iOS mobile beta app phase 2: design, integration and deployment of the iOS mobile app with error recognition features</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • The iOS App is obtained from the Web App via customization of the graphic layout and access to device specific functionalities • EXTRA text2speech “emergency rescue” feature has been added (in case the kid struggles to read a specific word/line) • Tablet specs on v1.5 <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> • Developed a Unified Multi Platform Application • tested and adapted application layout to iPhone4S, iPhone5, iPhone6,

<p>iPhone6+</p> <ul style="list-style-type: none"> • verified compatibility to different iOS releases
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> • Identify the right layout definition to minimize and make as much as possible automated the identification of the correct UI, once the right organization and naming convention has been identified it was possible to move forward • Identify the custom configurations and call that differ on a specific device when using resources like audio or microphone. This part required a lot of test on the different system to understand the right core. • Automatic error detection is demanding in computational terms; currently ReadRunner processes the reading performances not realtime but only when the caregiver checks the reader's activity (available on the website from 16 sept 2016)
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none"> • Refinement of features for professional caregivers • New releases (bugfixing and new features) will be online on monthly bases since september 2016

<p>Work Package Number : wp1.6: app releases - different OS build releases [M2] (phase 1 achieved, phase 2 achieved)</p>
<p>Actual Starting month : phase 1: sep 2015 phase 2: mar 2016</p> <p>Predicted / Actual End month : phase 1: oct 2015 phase 2: mar 2016/may 2016</p>
<p>Work Package Objectives: phase 1: design, integration and deployment of the iOS, Android, Windows mobile app phase 2: design, integration and deployment of the iOS, Android, Window mobile app with error recognition features</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • Developed a Unified Multi Platform Application • tested and adapted application layout on the four standard Android screen resolution • verified compatibility with different Android releases

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- disabled functionalities not available in specific releases
- EXTRA text2speech “emergency rescue” feature has been added (in case the kid struggles to read a specific word/line)

Detailed description of work performed to reach the achievements listed above:

- Specialize the right layout as defined in previous work item
- Specialize the custom configurations and call that differ on a specific device when using resources like audio or microphone.

Summarise any problems you have encountered, and how they have been overcome

- Working with different platform and maintaining different builds requires a barely affordable effort. Android versions still presents some special *minor* issues (precision in touch tracking, image resolution et sim)
- Bugfixing RR for Android versions/devices.
- Windows mobile version has been dropped because of its poor penetration on the market⁴⁵ and with the aim to focus on the main two competitors iOS and Android.
- Automatic error detection is demanding in computational terms; currently ReadRunner processes the reading performances not realtime but only when the caregiver checks the reader’s activity.

Description of planned activity for next reporting period

- Refinement of features for professional caregivers
- New releases (bugfixing and new features) will be online on monthly bases since september 2016

Work Package Number : wp1.7: Analytics - Data gathering and analysis (phase 1 achieved - phase 2 in progress)

Actual Starting month :

phase 1: sep 2015

phase 2: mar 2016

Predicted / Actual End month :

phase 1: nov 2015 / mar 2016

phase 2: mar/sep 2016

⁴⁵ <http://www.cnet.com/news/windows-phone-market-share-falls-below-one-percent/>
<http://www.kantarworldpanel.com/global/News/Android-OS-Share-in-China-Gets-Boost-from-New-Years-Sales>
<http://www.ibtimes.com/microsoft-ceo-admits-windows-mobile-market-share-unsustainable-focus-services-2248985>

<p>Work Package Objectives: phase 1: design and integration of the analytics: user’s data related to the reading performances and behaviour are processed and visualized to the user and the caregivers (with proper access and privacy cautions) phase 2: integration of the error detection data in the analytics</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> ● Definition of KPI (Key Performance Indexes): syllables per second, speed, reading completed or not ● Information about reading are collected during the activity and presented summarized at the end of the session. These information are always available on the BackOffice <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> ● While reading is performed various data are collected: start time, end time, number of syllables, average speed ● At the end of the reading sessions these information are processed to provide a summary of the reading KPI (Key Performance Indexes)
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> ● Automatic error detection feature has took more time and effort to be developed, tested and deployed. Integration of errors detected in the analytics is easy to implement but it is late in delivery. ● This feature, useful for the caregivers, is already integrated for english texts on the app and will be available in the next release of the caregivers’ frontend by sept 16th 2016 on www.thereadrunner.com
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none"> ● Increase the number of reading KPI (add number, kind and occurrence per type of mistakes in reading) ● Improve and update the dashboard for users and caregivers.

<p>Work Package Number : wp1.8: Field Test - test campaign in schools [R1] (achieved)</p>
<p>Actual Starting month : oct 2015</p> <p>Predicted / Actual End month : dec 2015/mar 2016</p>
<p>Work Package Objectives: beta testing with a school, involvements of parents, teachers and school management deliverable D2: Intermediate Report.</p>

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<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none">● agreement with a school in Lucera (FG) to test ReadRunner during the normal teaching activities● 16 kids (8-12yo) with their parents and 5 teachers are using ReadRunner● feedback on usability and acceptance <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none">● presentation of RR● training session● meeting and interviews with users● report form available at: http://bit.ly/2cl2BTX
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none">● after parents and teachers found some difficulties in using RR despite the training session, a new UI has been developed and deployed● few iOS users, Android devices are more popular (more affordable, generally speaking); problems with different versions or not updated OS: a new release of RR optimized for Android 4.5+ has been deployed.
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none">● meeting and interviews● First distribution and check the willing to pay on the e-commerce

<p>Work Package Number : wp1.9: Communication, social network campaign (achieved, ongoing)</p>
<p>Actual Starting month : oct 2015</p> <p>Predicted / Actual End month : ongoing</p>
<p>Work Package Objectives: Presence on Facebook and Twitter. Communication, advertising, influence, feedback from the potential users.</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none">● Facebook page: www.facebook.com/ReadRunner1http://www.facebook.com/ReadRunner1● Twitter account: @read_runner● 480 contacts on Facebook, 150 followers on Twitter

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<ul style="list-style-type: none">• periodic posts on both channels• interactions with followers• Deployment of the ReadRunner's Blog (ITA) <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none">• Creation of the different channels• Development of graphic language• Editorial plan• Set the launch campaign
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none">• slow grow in community members due to the fact that ReadRunner is still not available as product; new boost on the social channels in may 2016 and corresponding to launch in aug - sept 2016.
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none">• deployment of newsletter• Communication strategy• populate blog: LBOG (www.lbog.thereadrunner.com)

<p>Work Package Number : wp1.10: IPR - trademark and provisional patenting (partially achieved)</p>
<p>Actual Starting month : ago 2015</p> <p>Predicted / Actual End month : dec 2015 / oct 2015</p>
<p>Work Package Objectives: IPR protection: registration of marks; analysis and provisional process of IP protection.</p>
<p>Description of work this period: Main achievements: USPTO applications submitted:</p> <ul style="list-style-type: none">• "A system for the analysis and adaptation of contents displayed on communication devices" application number: 62150975• "SYSTEM, METHOD AND COMPUTER PROGRAM PRODUCT FOR AUTOMATIC PERSONALIZATION OF DIGITAL CONTENT" application number: 62244545 <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none">• Patent research

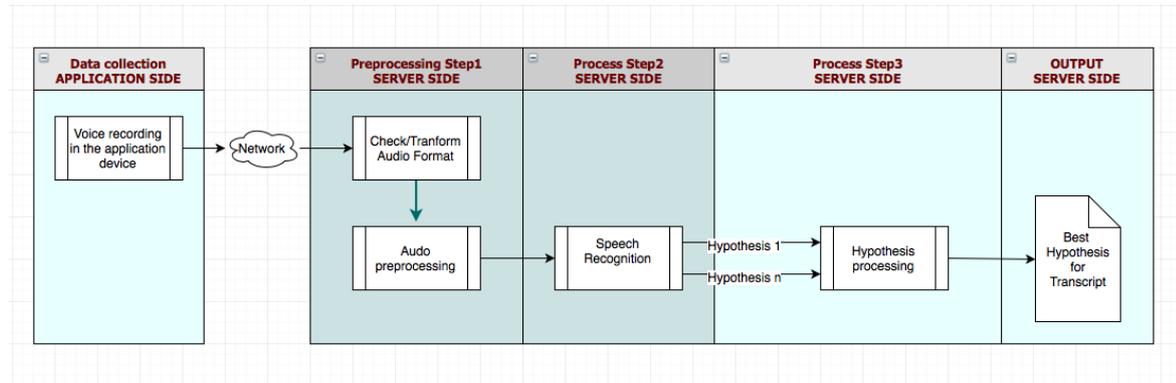
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<ul style="list-style-type: none">● Tech Research● Proposal for USPTO (written with the aid of a specialist) submitted
Summarise any problems you have encountered, and how they have been overcome <ul style="list-style-type: none">● Any special problem, still to decide to convert in patent (needs funds)
Description of planned activity for next reporting period <ul style="list-style-type: none">● registration of mark “readrunner” (available to register)● evaluation of patent conversion by nov 2016

Work Package Number : wp2.1: Voice2Text (achieved)
Actual Starting month : oct 2015 Predicted / Actual End month : dec 2015 / may 2016
Work Package Objectives: analysis and integration of the dictation feature: ReadRunner records and recognizes the word mispronounced by the user.
Description of work this period: Main achievements: <ul style="list-style-type: none">● Definition of the algorithm● Development of the prototype● Test on given texts● Test on generic texts (uploaded by the user)● Deployment of the feature on RR for public use. Detailed description of work performed to reach the achievements listed above: <ul style="list-style-type: none">● Research state of the art for tools and technology available for speech recognition● Design and implementation of the pipeline● Automatic error detection based on voice recognition <p>We are building a system that takes as input a voice recording and analyzes it using the following state of the art tools:</p> <ol style="list-style-type: none">1. the KALDI toolkit for speech recognition.2. the GStreamer framework for creating streaming media application.

3. the GStreamer plugin that wraps Kaldi's SingleUtteranceNnet2Decoder.

The architecture that we are working on is summarized in the following picture:



The comparison uses machine learning techniques to understand if there is an error and the type of the error.

The system is trained with a set of predefined speakers and texts and a range of common errors. As the individual reader practices and its own personal results are collected, the model is extended with a reader specific portion to increase accuracy.

See full report at: <http://bit.ly/2ble1T9>

Summarise any problems you have encountered, and how they have been overcome

- Speech to text and audio model are a really complex field and tools for this purpose have been difficult to configure for our purpose that is to make as less correction as possible.
- In order to process Italian voices we started contacts with an external expert dr Piero Cosi (<http://www.istc.cnr.it/people/piero-cosi>), and with potential partners like mivoq (www.mivoq.it) and Ninispeech (www.ninispeech.com) that are involved in activities related to the voice recognition/speech to text and are not direct competitors.
- Automatic Creation of TTS Intelligibility Tests, Tesser et al, 2015 : See the abstract for further reference on the approach we choose: <http://bit.ly/2bZAGak>

Description of planned activity for next reporting period

- Optimization of the process (reduction of computational needs)
- Multilanguage option: recognition of mispronounced/misread words in other languages (IT, FR, ES, DE)

Work Package Number : wp2.2: Voice/TXT match - transliterate/spell the spoken words of the reader (achieved)

oct 2105-jan 2016

Actual Starting month :

oct 2015

Predicted / Actual End month :

dec 2015 / apr 2016

<p>Work Package Objectives: analysis and integration of the feature that detect and list the errors the user made in reading. ReadRunner compares what the reader says with the words on the screen and highlight the detected errors. To avoid/reduce false positives, the caregiver could be asked to confirm the correct detection of the misreading.</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • The architecture and tools have been identified • Installation configuration and test of the main tools • Design and configuration of the pipeline to collect-transform-transcript the audio • Deployment of the feature on RR (web+app) <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> • After researches and tests the architecture for speech analysis has been identified in the client server as the Mobile device does not offer necessarily the right capabilities and resources are really heavily HW dependant • The Kaldi toolkit has been selected (http://kaldi.sourceforge.net/index.html) • The audio stream is sent to the server and the server will process the data to provide a transcript • Kaldi and GSstreamer are used in combination to build the pipeline • During manual error insertion, the automatically generated reader's mistakes placeholders are highlighted and the therapist can approve or reject them, providing a feedback. • See full report at: http://bit.ly/2ble1T9
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>The whole process is demanding in terms of computation and cannot be performed realtime: for the time being it is an automatic post process routine available to teachers/caregivers when they want to review the "homeworks" of the kids; on the other hand this does not affect the reading experience.</p>
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none"> • Improvements on machine learning process to recognize mistakes in reading. • Optimization of the pipeline, reduction of time for the postprocess.

<p>Work Package Number : wp2.3: Errors Detection; detection and categorization of the errors in spoken [D2] nov2105-jan 2016 (achieved)</p>
<p>Actual Starting month : -</p> <p>Predicted / Actual End month : dec 2015 / may 2016</p>

Work Package Objectives:

analysis and integration of the feature that compares the word pronounced with the written text. ReadRunner compares what the reader says with the words on the screen, automatic interpretation is reduced at minimum to avoid usual dictation softwares: RR trained to transliterate the word as read by the user.

Error detected with the dictation mechanism will be categorized accordingly to each language specific classes of errors.

Description of work this period:

Main achievements:

- Detection and categorization of the errors in reading
- Recognition and transcription mechanism
- Filter for voices in the backgrounds
- Filter for upcoming conversations (RR recognizes word accidentally pronounced during the reading practice from reading aloud)
- Feedback in the caregivers' frontend

Detailed description of work performed to reach the achievements listed above:

On the Application side we are taking care of the recording using device specific function libraries.

The output of the recording is then uploaded to the server where the analysis starts with the conversion, if needed, to the expected audio format. More steps of audio preprocessing can be added here, for example to clean the sample removing noise. This "cleaning" phase will be added in the future, as right now we want only to account for it.

The audio samples that we are working on are standard wav or mp3 recordings with environmental microphone in iOS/Android phones.

The recorder is an english mother language speaker.

Once the sample is in the proper audio format it can be passed to the speech recognition engine that will output a series of hypothesis in JSON format.

We are experimenting with different parameter configurations and different vocabularies in order to understand what is the right path to follow. We are running the recognition 3 times:

1. against a standard english vocabulary,
2. a vocabulary that contains only the words in the read text
3. a vocabulary that contains the words in the read text plus words from the text with typical misspelling errors.

Once we have the different transcript in JSON format the last step is doing a comparison of the results on the basis of the likelihood to define the best hypothesis.

Summarise any problems you have encountered, and how they have been overcome

Description of planned activity for next reporting period

- Set up for different languages
- Investigation of voice patterns
- First studies on behaviour analysis of the reader

Work Package Number : wp2.4: Field Test - test in schools/early users, Final Report [D3][R2]
 jan-mar 2016 (achieved - ongoing)

Deliverable D3: Final Report.

Actual Starting month :

oct 2015

Predicted / Actual End month :

dec 2015 / sep 2016

Work Package Objectives:

ReadRunner release2 beta testing with a school, involvements of parents, teachers and school management

Description of work this period:

Main achievements:

- This WP was intended as a second test after the wp1.8. Actually it started later because of the delay of the wps 2.1-2-3.
- report form available at: <http://bit.ly/2cl2BTX>

Detailed description of work performed to reach the achievements listed above:

Summarise any problems you have encountered, and how they have been overcome

- This second round of test have been conducted without the error recognition feature that took more effort and time to be set up even as a prototype.

Description of planned activity for next reporting period

- New field test phase (with fully featured RR) will start in schools from second half of september 2016

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

The main concerns with ReadRunner are related to

- reliability on android devices
 - this is a present issue that can affect the audience and therefore the community of users, on the other hand it relies on quantity of work, so it can be recovered when Bee3ee can afford more coding effort
- efficiency of the automatic error recognition in reading
 - technological challenge that is also an important asset for ReadRunner even if the RR's value proposition is anyway considerable also in case of "manual" error detection. Although this item is a truly challenging goal we finally met a robust and reliable feature to automatically detect misreadings in english texts.
- need of massive customer support
 - as per the first issue on reliability this is a time/work consuming task critical in a product but, for the time being, we can assume recoverable with adequate resources/funding.

Detail any publications, publicity or other dissemination activity.

impactHUB	incubator/VC http://milan.impacthub.net/	Milan	established	ReadRunner won the impactHub/AXA e-health fellowship 2015. Our Team can work in the co-working spaces in Milan: consistent network opportunity and local dissemination. As follows we are in the ImpactHub community (http://milan.impacthub.net/la-community/) with more than 7000 members around the world.
Vision Lab (CNR)	research team http://www.pisavisionlab.org/	Pisa	established	Research team involved in a new approach for early diagnosis of dyslexia. We are planning joint activities to be reported to the scientific community (reports and papers)
BASE_milano	Enterprise and Citizen Social Association http://www.base.milano.it/	Milan	established	a new space for social innovation in Milano. Strongly connected with Fondazione Cariplo (http://www.fondazionecariplo.it/en/index.html)
Innovits	No Profit Association/incubator http://www.innovits.it/en/	Milano Italy	established	startup networking - mentorships, events. met at GEC 2015 (http://gec.co/)
Invitalia	VC (e-health/social) http://www.invitalia.it/site/eng/home.html	Italy	established	Met in may 2016

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reply	VC http://www.reply.eu/en/	Milano - italy	established	Met in aug 2015
AXA	enterprise	Milano Italy Paris HQ France	established	co-promoters (and funders) of the e-health fellowship we won, AXA disseminated ReadRunner all over their press/web channels; see the press release section on www.bee3ee.com Axa Strategic Ventures Business Dev director Mr. Sebastien Loubry Met in may 2016 Axa Research Fund Director Ms. Ulrike Dekoene Met in may 2016
Fondazione Filarete	research center and accelerator (social/e-health innovation) http://www.fondazionefilarete.com/en/	Milano Italy	established	bee3ee is in the alumni network of Fondazione Filarete.
Unicredit	Enterprise https://www.unicreditstartlab.eu/it.html https://www.unicredit.it/it/giovani/iniziative/tuttiglieventi/uwinbestpaperaward.html	italy	established	Ongoing relations with several branches of the company. ReadRunner will appear in their regional newsletter (http://www.craltounicredit.it/)
Cass Business School / NEMOG	EDU / UK Research Council http://www.nemog.org/ http://www.city.ac.uk/	GB	established	ReadRunner has been included as a case study in the NEMOG program activities. Working paper/work by Dr. Alberto Nucciarelli (http://bunhill.city.ac.uk/research/casestudies.nsf/(smarturl)/A.Nucciarelli). RR is also mentioned as case study in the upcoming article “Understanding the multiple roles of customers in value creation and capture” Alberto Nucciarelli; Nucciarelli A.; Li F.; Fernandes K.; Goumagias N.; Davlin S.; Cabras I.; Cowling P.; Kudenko, D.

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MIUR	government organization	Italy	established	Met in may 2016
Luigi Bocconi University	university http://www.unibocconi.eu/	italy	established	a team of students led by prof. Clodia Vurro is dealing with social innovation business models. Full report at: http://bit.ly/2bHbK4r .
UNITN Dipartimento di Economia e Management	University	Italy	established	Seminar in Business Policy DTC course “Serious Games should be fun” Mar, 11th 2016 Slideshow (ENG): http://bit.ly/2bOwNIQ Ongoing collaborations with prof. Alberto Nucciareli and post grad students Full report and prez (IT) at: http://bit.ly/2cei053 (report) http://bit.ly/2cvdkMV (prez) IEEE fellowship submitted AXA Research Fund proposal submitted
MUDI Museo degli Innocenti / Istituto degli Innocenti-Firenze		Italy	established	Istituto degli Innocenti hosts education and tutoring activities aimed to kids in school age. RR will be adopted in workshops and collective reading
Press/media coverage	14 articles on blogs, magazines and websites, many of them reposted by other sources	italy/web		See press section on our website and/or table below http://www.bee3ee.com/it/press-release/

	Press/media coverage links
	http://www.esanitanews.it/?tag=read-runner
impactHub	http://milan.impacthub.net/2015/06/26/readrunner-un-gioco-intelligente/
SMAU	http://www.smau.it/milano15/partner_products/33459/
ANSA	http://www.ansa.it/canale_expo2015/notizie/news/2015/10/28/salute-da-axa-premio-bambini-dislessici_6d172680-e318-4237-8361-8ad962758430.html

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impactHub	http://milan.impacthub.net/2015/10/28/read-runner-aggiudica-impact-hub-fellowship/
TGcom24	http://www.tgcom24.mediaset.it/2015/video/read-runner-la-piattaforma-che-aiuta-a-leggere_2072995.shtml
	http://www.intermediachannel.it/fellowship-on-e-health-il-progetto-vincitore-e-read-runner/
	https://www.facebook.com/impacthubmilano/posts/10154018628759026
	http://www.makemefeed.com/2015/10/29/read-runner-si-aggiudica-limpact-hub-fellowship-741895.html
AXA	http://www.axa.it/web/corporate/axa-italia-e-impact-hub-sostengono-tre-nuove-startup
	http://www.insurancetrade.it/insurance/contenuti/compagnie/4949/read-runner-vince-all-italian-axa-forum
Wired italia	http://www.wired.it/economia/start-up/2015/11/12/read-runner-vince-laxa-impact-hub-fellowship/
	http://www.bookblister.com/2015/11/13/blisternews-13-novembre/
	https://www.giovanigenitori.it/news/read-runner-la-piattaforma-che-aiuta-i-bambini-dislessici/22518/
	https://omnimilanostartup.com/2016/06/21/readrunner/

15.3.4 Sustainability of the solution

After the CHEST funding period RR is ready for a limited market distribution. As Bee3ee is based in Italy, it will be the initial, although by no means primary, place for market testing. We are in the process of forming market testing and penetration to other markets, the US market as a primary goal.

Currently we are targeting “soft spots” in the education system - in other words schools and cities with high level of awareness and need for solutions such as RR. In parallel, we are working on collaborations with content providers interested in utilizing RR as a platform for their content.

The table below shows penetration estimate of the market we want to pursue per year and geographical area. For each area, a percentage of the potential market (Serviceable Available Market) is given as a final target to calculate the total potential revenues.

	S.A.M.	2016	2017	2018	2019
ITA	8%	60,357	120,714	211,250	301,786
EU28	3%	102,016	212,534	425,068	850,136
US	4%	94,410	283,230	566,459	1,132,918
Tot[€]		256,783	616,478	1,202,777	2,284,840

Groups of interest (parents, teachers, therapists) have been contacted via social network and via direct contact (see the dissemination table in **Project Management and Dissemination** section). To enlarge the offer of contents Bee3ee is dealing with a main publisher in Italy and authors available to distribute their contents on the RR platform.

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Bee3ee won the e-Health Fellowship by mpactHub Milano and Axa (20k€).

We have been selected among 280 proposals for the first group in IC Innovazione Culturale 2016 call⁴⁶ by Fondazione Cariplo⁴⁷ (up to 100k€ for social/cultural innovation).

Bee3ee is in early contacts with several Venture Capital firms.

As a company Bee3ee will rely on revenues from products, therefore the new website has an e-commerce section where parents can subscribe different offers at a monthly fee.

This is obviously the main goal to ensure sustainability .

We intend to move into the market preliminarily by converting the initial sets of free early users recruited during test campaigns to paying customers. After finalizing the testing phase, the new releases will require a monthly fee, with special offers for early users. Other, flexible packages (including data-based reports) will be marketed thereafter. We will utilize our connections with motivated interest groups, (local, national and international associations), user endorsements, scientific acknowledgements, to help with market penetration and recognition.

Formulizing collaborations with key companies in the publishing industry help distribute the RR platform in schools and among the defined users/clients groups.

15.3.5 Risks

RR enters a highly traditional market. Although computerized solutions are not foreign to the learning disorders market and Dyslexia in particular, many of the available products are DVD or desktop based. Most recently several mobile-based and internet-connected products have entered the market, but most of those still revolve around a rigid set of exercises. Physicians and therapists use these tools for rehab sessions and their presence is crucial. Hence, RR will need the endorsement of clinicians.

Our experience with schools shows parents as the actual audience to engage: while kids enjoy RR, surprisingly the caregivers seems to be lazy in adopting any kind of support that need them to make - even little⁴⁸ - additional effort.

Regulatory challenges in different countries are another potential barrier. We are setting up our policy regarding our product's usage and data safety for both the EU and US markets.

In terms of competition, we are in the process of protecting our IP.

15.3.6 User-based evaluation of the concept

The ReadRunner started with experience with clinicians and schools:

- Clinica Universitaria di Neuroriabilitazione at the University of Pisa
- Istituto "M. Pellegrini" elementary school, Massarosa, Italy

were the first target group involved in the design process.

With them we defined and tested the main features of ReadRunner (formerly SmartRehab).

Preliminary results from a series of studies utilizing RR are extremely promising. Performed at the Istituto "M. Pellegrini" elementary school, Massarosa, Italy, and supervised by Prof. Bruno Rossi from the Clinica Universitaria di Neuroriabilitazione at the University of Pisa (who endorses RR), two test

⁴⁶ <http://www.fondazionecariplo.it/it/progetti/arte/innovazione-culturale/innovazione-culturale.html>

⁴⁷ <http://www.fondazionecariplo.it/>

⁴⁸ A paradigmatic example of unexpected "lazyness" from a parent has been: "*Do I really need to sign in with name and password to use ReadRunner?*" (as a question/complain after a RR demo).

To remark she is 38 years old, familiar with smartphones and active on social media in many ADHD facebook groups.

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groups of 5-15 children ages 8-12 previously diagnosed with dyslexia have been using RR under the supervision of a trained tutor.

After 5 months of use, significant increase both in reading speed and reading accuracy (error rate) has been recorded - with strong correlation to length of text read. Lesser improvement in performance has been noticed in longer and more “boring” texts, an issue to be resolved with future development of the reading experience.

Besides, a very good acceptance among the children has been recorded.

During the CHEST program period, a new and wider group of interest has been involved in a field test, with the same approach, but without a clinical oversight because the ongoing test is aimed to check and validate the user experience of the users.

Namely, we are now firstly interested in confirm the good acceptance of RR among the first beneficiaries (children) and evaluate the interaction of the caregiver (parents and teachers/tutors) with the user interface. Later on, the same group of trained users (kids, parents and tutors) will participate to a clinically controlled test to confirm the preliminary results of the *Massarosa experiment*. The new group has been recruited in a school in Lucera, Istituto comprensivo Bozzini-Fasani, similar to the one in Massarosa by size (1200 students) and age of the kids (6-14yo) and, according to the dyslexia penetration (4-6%), with almost 60 dyslexic subjects.

November 12th 2015, after preliminary meetings and agreements with the director of the school, Mr Mario Tibelli, RR has been presented to the parents and teachers of the school with a little training in class. Since ReadRunner has been presented to kids and parents as an inclusive tool to make reading more easy and pleasant, and to support *undefined* reading deficiencies, we made no special requests on the test group (if they are diagnosed as dyslexics or not).

With the aid of a pdf manual, on voluntary basis, parents and teachers started using RR with their kids for homeworks or other kind of readings. The participants are 16 kids (and 16 parents) and 12 teachers.

15.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 28.

Table 28: Snapshot of project "ReadRunner"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop ReadRunner (RR) as the first step in appropriating digital technologies and social interactions to treat children with Dyslexia, through a desirable yet clinically-effective play experience that improves and encourages reading, and a comprehensive solution to the dyslexic's ecosystem	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Designed and redesigned the UI/UX framework via a 2-phase/3-release process. ○ Conducted a comprehensive technology study. ○ Designed and deployed new company and RR app websites with increased functionality and improved performance. ○ Designed, integrated and deployed iOS and Android mobile apps. ○ Designed and integrated analytics (including error detection data) ○ Tested RR with children and teachers in 2 rounds of field 	<ul style="list-style-type: none"> ○ Organisation and dedicated project websites: http://www.bee3ee.com/ and https://www.thereadrunner.com/static/index.html#/ ○ Organisation/project social media: Facebook (477 likes) and Twitter (177 followers) ○ Featured in 14 articles (blogs, magazines, websites) for: Wired Italia, Impact Hub Milan, AXA, SMAU, ANSA, and TGcom24. ○ Winner of the Impact Hub Milan/AXA e-health fellowship – meetings with key figures, networking opportunities in a community of over 7,000 and publicity. ○ Included in the CASS Business School NEMOG program as a case study,

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(clinician, tutor, parents) for efficient communication. RR aims to treat dyslexia by transforming the reading experience with an engaging and intelligent environment hosted on a mobile app.	<p>testing.</p> <ul style="list-style-type: none"> ○ Defined algorithm and developed prototype for dictation feature. ○ Designed, configured and installed a voice/text error feature. <p>The project successfully delivered 3 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<p>working paper: http://bunhill.city.ac.uk/research/cassexperts.nsf</p> <ul style="list-style-type: none"> ○ Collaboration with Pisa Vision Lab (CNR) that should lead to reports and papers. ○ News article on CHEST website: http://www.chest-project.eu/readrunner-a-playful-reading-platform/ ○ 91 interactions in the project's section on the CHEST Community Forum.
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Table 29 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on community building and empowerment) and secondary (impact on ways of thinking values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 29: Mandatory KPIs for ReadRunner

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	2	7	6
		Number of users involved in co-design process	21	60	60
		Ratio between men and women involved	1/3	3/5	3/5
		Ratio between young, adult and old people involved	1/2/0	1/2/0	1/2/0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	3	4	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	3	2
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	4	2
		Number of comments / replies on project blog entries on CHEST forum	0	0	0
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0 fb 0 tw	442 fb 170 tw	405 fb 160 tw
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	average coverage on fb: 600 tw: 72 mentions / notifications:	average coverage on fb: 150 Tw: 54 mentions / notification

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				>400RT	s: >180 RT
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16 Schule PLUS⁴⁹

An innovative matching platform for schools and their external partners. It allows stakeholders like foundations, universities, companies, individual experts, NGOs or cultural institutions to post their cooperation offers for schools. On the other side, teachers are able to find the offers for their needs very easily due to a tagging and matching algorithm. SchulePLUS builds the basis for an overarching infrastructure and network, which schools are currently missing and do not have the resources to build themselves. The SchulePLUS Mobile Application not only enhances the network's scope and relevance. By employing modern technology it helps to facilitate cooperation between schools and external partners by enabling both sides to arrange new cooperations while being flexible in their working schedule.

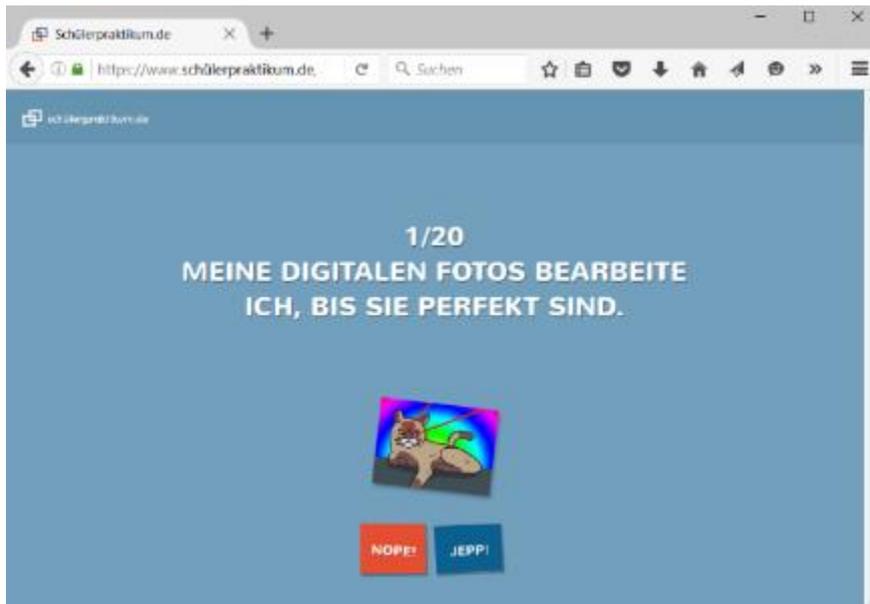


Figure 21: Picture of the SchulePLUS solution

16.1 The societal problem

16.1.1 Description of the problem

We have identified the lack of student's involvement and lacking self-empowerment as a central problem in solving the problems described above. Students are not sufficiently involved in the process of choosing the corporate/organizational partners of their school. As a result, school cooperations or individual extra-curricular activities do not play into the strengths of the students themselves. This leads to frustration and often time it results in missing interest on the part of the students.

As already described, we have altered the product accordingly. We will elaborate more on that in the following sections. For this part, we cannot report a change of the overall description of the problem. We will start helping to solve these issues as soon as our product is on the market.

In a quickly evolving society our schools face the enormous challenge to keep pace with new developments and integrate them into their curriculum. To shoulder this task, schools need outside help. Who is the best partner to teach kids about electronically-driven engines? An engineer! Who can authentically explain social media? An online-marketing-expert! But how can schools find these specialists? How do they communicate effectively and design a partnership?

This is where SchulePLUS comes in. We help schools open up to their environment and to outside expertise through technology. We have spoken to many teachers and defined the most important

⁴⁹ Chapter contributors: Mathias Becker, Robert Greve, Julian Fürstenau, Johannes Rothe

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aspects of finding cooperation partners: it has to work quickly, there have to be uncomplicated ways of communication and information has to be accessible in a simple manner.

Two target groups are directly affected by our social impact: the (1) students and the (2) teachers. Students profit from exciting classroom activities because they will be facing hands-on approaches inside and outside the classroom. Through workshops, presentations and practical trainings outside partners create learning situations that actually matter to a student's every day life.

But it is not only the students who will profit. Teachers are amongs the most critical professional group when it comes to burnout syndromes. One main reason is that teachers are overwhelmed by the speed that technology and the subsequent societal changes progress. This tendency has rapidly gained speed in the last years. Teachers are struggling to integrate those changes into their curriculum. This dissatisfaction can be greatly decreased by offering teachers a simple source of help: society itself.

By playing our part in solving this problem, we also help out other interdependent causes. One of the major effects of poorly trained students is their lack of contributing to a highly skilled workforce. In Germany, as in other parts of Europe, there is a shortage of skilled professionals due to a lack of interest in specific fields such as the industrial, natural scientific or technical sector, and due to demographic changes which result in a lower number of young people. These developments constitute major anxieties among political and economic decision makers. Because of this, it is very interesting and important for external partners to cooperate with schools from an early stage, especially in the area of vocational guidance. For companies and businesses, school cooperations are becoming increasingly attractive.

16.1.2 Scale of the problem

Schools all over Europe are teaching around 95 Million students (source: Eurostat). The results in standardized test are rather disappointing. Although the European Union is one of the most successful and industrialized area in the world, only four European countries are ranked within the TOP 10 at the internationally acknowledged PISA-tests. Some European countries, especially from the southern European Region, rank strongly disappointing.

That is how the European dimension of the problem becomes evident. Our theory of change follows the basic logic that hands-on and practical classroom activities increase the students capacity to learn. The motivation to learn is higher - and if the topic discussed is in direct correlation to a students every day life outside the classroom, the opportunity to apply school-knowledge increases dramatically.

The long-term and institutionalized cooperation between schools and external stakeholders will help schools tackle the task to teach students the knowledge they actually need for life. We are absolutely convinced that thereby test scores will gradually improve for all European countries.

However, SchulePLUS does not only target students when it comes to social impact. In Germany alone 800.000 teachers are currently employed in public schools (source: statista.com). The target group for the whole European Union goes well into the millions. Statistically speaking, the range of an imminent threat of a burnout syndrome statistically stretches from 19,7% in Italy (source: University of Udine) to around 60% in Germany (source: University of Potsdam). On average around 25-35% of all teachers (source: University of Udine) are at risk.

By inviting outside help into the classroom, SchulePLUS will effectively help lowering these numbers an making the school a more open learning institution.

Since the project has just started, we cannot yet report on the social consequences and shifts that we have managed to influence yet. We will gladly do so in the months to come.

16.1.3 Previous approaches to solving the problem

The major difference between our approach and previous attempts is that we are trying an online solution. Networking between schools and their students with external partners was traditionally

promoted through local networks of interest groups or networking events organized by public administrations. This has one clear advantage: Partnerships agreed upon in those events are usually morally more binding. If you have met the actual person that you are working with regularly, the success of the cooperation is highly likely.

However, this approach bears two major problems that have prevented the opening up of schools to really establish itself in Germany and Europe: (1) It is usually a very narrow and like-minded group of people that organize in interest groups. (2) This approach is not scalable at all.

That is why we aim to take the matter of establishing multiprofessional schools out of the niche-existence it now lives within local communities – we will open up the process, making it accessible for everyone. Through our products everyone can offer their expertise to schools. And teachers can choose from a wide variety of possibilities: locally, nationally and hopefully soon even internationally.

Through our technological approach this solution is scalable easily. The network is already implemented in Germany, the source code can – without a hassle – be applied in other countries.

16.2 Implementation of organizational structure

16.2.1 Maturity of the project

Test/bugfixing phase: the fully developed beta-version of the web application is put to test in a live environment. In addition we are also currently implementing a sustainable marketing strategy for the web application.

16.2.2 Organizational structure

The organizational structure stays unchanged and involves:

Permanent employees:

Product design manager

The product design manager, Johannes Rothe, is in charge of developing the basic concept of the mobile application together with the product development manager. Furthermore, he is in charge of creating wireframes for and coordination of the implementation of the design by the respective subcontractor.

Product development manager

Apart from developing the basic concept (see above), Franziska Gensch is responsible for coordinating the development of the application based on the design implementation. This involves assigning tasks to the development subcontractor and testing of the application.

Marketing manager

Once the initial development is completed, the app has to be marketed in two phases: First to existing users and later to broaden the user base. Developing and executing the marketing strategy is the responsibility of the marketing manager, Christian Johann.

Subcontracting

The design will be implemented by Olli Feichtinger, a highly qualified web-design freelancer.

The development of the application will be carried out either by the agency Step Byte Services.

1.1 Key personnel

The leadership-team stays unchanged and consists of:

Robert Greve, who as a founder of our parent company SWiM Bildung proved that he is able to build up a successful company. His well-developed network in the education sector is crucial for SchulePLUS.

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Robert studied to become a teacher in Berlin between 2005 and 2009. In the middle of this process, in 2007, he decided to found his first company, SWiM Bildung, which focusses on providing workshops in different areas to schools in Berlin and now all of Germany, that are carried out by teaching students. In this way, the students are able to add practical experience to their studies and the schools profit from the input straight out of university. In order to increase his skills in running a business, Robert then got an MBA with a focus on education from the university of Oldenburg in 2012.

From his experience with cooperating with schools himself, Robert identified the need for a platform to improve this communication and founded SchulePLUS on this idea. With this, he has been accepted as an Ashoka fellow in 2014.

Robert has great experience in both the education sector as well as in running his own company. For this project, he will use this experience, the vast network in the sector and his entrepreneurial drive to devise and implement the marketing concept for the SchulePLUS mobile application.

Julian Fürstenau is a graduate from the University of California. In our team he is responsible for product development and finances.

Julian studied Mathematics at Jacobs University Bremen from 2004 to 2007. After this, he worked at Landesbank Berlin AG from 2007 until 2014. At LBB, Julian was responsible not only for the pricing of derivatives instruments, but also worked in many different IT projects, responsible for introducing new features and thoroughly testing the introduced software.

In 2011 and 2012, Julian interrupted his work at LBB in order to study financial engineering at University of California, where he received a Master's degree. After returning to LBB, Julian acted as project lead for several more large-scale IT projects, which involved both coordinating in-house activities as well as managing relations to external software providers and developers.

Since 2014, Julian has been responsible for finances and technical product development at SchulePLUS GmbH. In the development of the SchulePLUS mobile application, Julian will be in charge of contributing the technical aspects to the application concept. He will also supervise the front and back end development work to be carried out by our external software developers.

Johannes Rothe is in charge in the field of product innovation. He uses his creative mind to envision what features are needed to make SchulePLUS an even better working instrument.

Johannes studied Art History and Philosophy at Freie Universität Berlin from 2006 until 2012 and scriptwriting at Filmuniversität Babelsberg Konrad Wolf from 2012 until 2015. Johannes has been working as the creative head of SchulePLUS since 2014 and SWiM Bildung since 2012. In this time, Johannes has gained experience in devising ideas for new projects and websites. He has been responsible for writing concepts and producing wireframes as well as for coordinating the work of our freelance web designer, Leonid Fishman.

For the SchulePLUS mobile application, Johannes will serve as the product design manager. He will coordinate the finalization of the app idea, contribute to the concept papers to be written and produce the necessary wireframes. In addition, he will coordinate the design process and sign off on both the designs for the app as well as the front end development based on these designs.

16.2.3 Partnerships, cooperations, and networks

The company EINSTIEG is one of Germany's largest companies to organise youth fares for job-seeking adolescents. We have teamed up to promote our new app with the exact target group it aims to help out. We will directly market the product at a variety of fairs all over the country.

The KULTUSMINISTERKONFERENZ is THE central political body to assemble all 16 ministries of education in Germany's states. It is therefore - in our view - the most important political institution in the educational sector

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The SENATE DEPARTMENT FOR EDUCATION, YOUTH AND SCIENCE (Berliner Senatsverwaltung für Bildung, Jugend und Wissenschaft) has been a strong partner and caring supporter from the beginning. It provided us with addresses, contacts to experts, and much needed feedback. Providing us with its support and contacts the Senate Department established a major part of the credibility we are trying to live up to in our daily work. The basis for this partnership is both a verbal agreement as well as contractual for individual projects that have been financed by the state of Berlin.

The TECHNICAL UNIVERSITY BERLIN (TU Berlin) helped us to establish a feeling for the needs of institutions of higher education regarding school cooperations. Universities like the TU Berlin are frequently sought and at the same time searching organizations when it comes to school cooperation. Here, all of the university's efforts are channeled in the so called "Schulbüro," which is one of our most profound partners. The basis for this partnership is verbal.

Media support for SchulePLUS is provided by "ZEIT FÜR DIE SCHULE". Thanks to its two million readers and the high-regarded quality the school division of the national weekly newspaper "Die Zeit" is one of the major sources for informations about new development in education and school development. They are helping us to gain national attention with schools and educational organizations. The basis for this partnership is verbal.

ASHOKA is a nonprofit organization which supports an international network of social entrepreneurs through advice and active help to find investors and sponsors. The founder of SchulePLUS, Robert Greve, is one of ASHOKA'S latest fellows. The basis for the partnership is a contractual agreement defining the terms of the scholarship of Robert Greve.

16.3 Implementation of the solution approach

16.3.1 Solution approach

We build a product that helps students identify their own strengths and choose a company to intern with accordingly. The product is a mobile web-app that provides the user with 20 scenarios. Within the app they can take a test of their interests and skills – and will then be redirected to an organisation that fits their skills. They can be engaged themselves in choosing organisation to work with during mandatory school projects or internships.

The innovative potential of SchulePLUS becomes visible in an extensive competition analysis by Ashoka, the largest network of social entrepreneurs worldwide. They state that their research has "not shown anything we would see as a competition putting a question mark on the innovative character of what Robert and his team aim for: A paradigm shift in teachers' role and perception as well as a systematic support for schools to make use of external expertise effectively".

Furthermore, they compare local and international projects with a similar focus to SchulePLUS, showing that many in the education sector have similar aims. While agreeing that the education system needs to be improved to prepare students for independent lives, their approaches are quite different from ours. We are building a unique web of trust between teachers and stakeholders from the society. We actively promote the cooperation between schools and outside partners.

What makes us unique is our bottom-up approach, starting from the teachers' and students' perspective and putting the needs of the school first. While others build products to exactly fit an attractive market, SchulePLUS puts the social impact first. Only after many teachers and schools have proclaimed their interest by registering on the site, we are now developing features that appeal to a willing-to-pay-audience.

16.3.2 Target groups

As mentioned above, we have pivoted our project in a sense that we now target 13 to 16 year old students more directly. The size of the target group is roughly 1 Million per cohort. That makes a total of 4 million potential users.

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In regard to schools, our first target group (Germanwide more than 30.000 schools, more than 8 Million pupils and more than 750.000 teachers), we aim at actively involving teachers, school principals, social workers and vocational advisers. We'd like to establish the SchulePLUS Mobile Application as a tool for their everyday work. Whether teachers are looking for a field-trip destination or an expert on social media issues, on SchulePLUS in combination with its flexible Mobile Application they will always be able to find partners or events in the sector.

Furthermore, with a more European launch of SchulePLUS, the internationalisation of schools is simplified. Trips abroad and student exchanges can be organised and new partnerships can be established. As the platform is completely free for schools, institutions from socially more challenged areas are equally able to use it.

Our second target group are external partners, which could be quantified as follows:

- volunteers: around 12 million volunteers in Germany
- businesses: 522.000 companies that offer vocational education and might therefore be interested in partnerships with schools
- NGOs: 37% of all NGO's worldwide are from Europe. Europe is #1 in this statistic, followed by the US (27%).
- sport clubs: 90.000 sports club are actively working
- universities: 415 universities in Germany

theatres:

For companies and businesses, school cooperations are becoming increasingly attractive. In Germany, as in other parts of Europe, there is a shortage of skilled professionals. These developments constitute major anxieties among political and economic decision makers. Due to a lack of interest in specific fields such as the industrial, natural scientific or technical sector, and due to demographic changes which result in a lower number of young people, it is very interesting and important for external partners to cooperate with schools from an early stage, especially in the area of vocational guidance.

Also for educational operators our platform can be useful. They often experience difficulties reaching the schools, either because they do not know the right contact person or because the competition within the sector is quite high. By using SchulePLUS they can directly get in contact with the adequate person and are so able to establish cooperations in a much easier way.

The first 12 months have been just as successful concerning this second target group: More than 800 organizations and private persons publish offers for schools on SchulePLUS. Until now, about 210 new cooperations were established upon contact on SchulePLUS.

The first group of users for our app will be recruited from our existing online user base. We will use the platforms communications channels to reach every registered user and offer them the possibility of using SchulePLUS on their mobile devices. This will help improve the functionality of the app and also spread awareness of its availability. We will be able to identify features that are well-received and add and remove those that are missing or unnecessary.

After that, we will have an application that perfectly suits the needs of the users of our platform. We will be able to use this app as an additional selling point when marketing the platform to new users in existing markets and to enter entirely new Europe-wide markets. By giving users the choice between conventional browser-based use on computers and app-based use on smartphones, we will reach a much broader group in both scenarios.

16.3.3 Activities and work performed

Work Package Number : 1 App Concept
Actual Starting month : 09/2015 Predicted / Actual End month : 12/2015
Work Package Objectives: The main task of the WP was to create a clear vision for the product, analysing the existing SchulePLUS structures and detailing the list of features for the upcoming app.
Description of work this period: Main achievements: <ul style="list-style-type: none"> • Rough concept • Detailed concept • Wireframes Detailed description of work performed to reach the achievements listed above: After analysing the existing online structures of SchulePLUS and deciding which parts of the website would be suitable for a mobile application, we created a first rough concept which included the basic features and basic user story of the mobile application. After involving our main target group the teachers we continued to apply the concept for their needs. Based on the results of the testing we then added the pupils as a second target group to our project and continued to adjust the concept based on their needs. From this point onward we developed a much more detailed concept document, including the different page types, all basic user types and all different user stories. From there we developed a first set of wireframes addressing all aspects of usability, user flow and features of the mobile application.
Summarise any problems you have encountered, and how they have been overcome We had to adjust the concept based on the results of our user-based evaluation. By adding one new target group we were able to develop a concept that really benefits our target audience.
Description of planned activity for next reporting period This WP is completed.

Work Package Number : 2 App development
Actual Starting month : 01/2016 Predicted / Actual End month : 06/2016
Work Package Objectives:

<p>The main task of the WP was to create a design for a mobile interface and furthermore all aspects of the web application development, including a marketing concept paper</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> - Designs for mobile interface - Frontend development - Backend development - Marketing concept paper - <p>Detailed description of work performed to reach the achievements listed above:</p> <p>With the web designer we discussed the existing wireframes adding his expertise for UX-Design and Usability to the concept. Afterwards we developed a “look and feel-board” for the product, which was the basis for the actual designs conducted by the web designer. The results, the actual designs, were passed on to the frontend developers, who then started and completed the frontend development. The backend development was also started and completed based on the wireframes and the detailed-concept. With the release of a first rough beta version a marketing concept paper was developed and the testing phase started.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>Based on the user-evaluation we also needed to adjust the designs for a web based mobile version of the product. We also had to adjust our technical requirement profile based on the user evaluation and the new development requirements of a web application.</p>
<p>Description of planned activity for next reporting period</p> <p>We plan to carry out the next steps of this WP, as layed out in the project plan.</p>

Project Management And Dissemination

<p>Summarise any management concerns and activities to recover the situation.</p>
<p>No new management concerns.</p> <p>We had to adjust the project management plan regarding the results of our user evaluation. We applied two significant changes: we added the pupils as a new target group and we changed product focus from a mobile application to a web application. These changes had to be implemented into the existing WP.</p>
<p>Detail any publications, publicity or other dissemination activity.</p>

We promoted our activities concerning the CHEST-Project throughout all our channels, e.g. facebook (combined followers 10500), twitter (2400 followers) and our press contacts, resulting in a print-article in "Süddeutsche Zeitung" and a radio feature in SWR2. Furthermore we include our activities to the communication with all our project and network partners.

16.3.4 Sustainability of the solution

As this project is an extension to our existing SchulePLUS platform, the mobile application is not intended to end after the project period. We will continue to operate the mobile application and further enhance it.

Likewise the SchulePLUS platform will continue its operations to match teachers, student and school needs with cooperation offers from stakeholders like foundations, universities, companies, individual experts, NGOs or cultural institutions.

We will be able to use this app as an additional selling point when marketing the platform to new users in existing markets and to enter entirely new Europe-wide markets. By giving users the choice between conventional browser-based use on computers and app-based use on smartphones, we will reach a much broader group in both scenarios.

We have already begun with the general commercialization of the browser-based platform SchulePLUS. It is possible for companies to buy premium features. We also offer to carry out projects in cooperation with schools for these companies and have had first commercial success with this on the road to a sustainable future of the platform. The SchulePLUS mobile application will also serve as a key element in this strategy as it will allow us to work even closer with the schools and external partners involved in our projects and cooperations.

In addition to these commercial projects, SchulePLUS relies heavily on public funding for different projects at the juncture between schools and externals. Examples of these are several endeavors in the area of occupational orientation that are funded by the state of Berlin or the German ministry of economics. These projects also rely heavily on finding suitable partners and communicating via SchulePLUS, which will be greatly enhanced with the introduction of our mobile application.

The revenue for the year 2015 has been 250.000€ - which is around 70.000€ higher than we expected. We could reach this number by acquiring a good number of clients that we help to "speak the languages of schools". We are partners in their endeavour to develop school projects that actually fit the school schedule and that are valuable to the school community.

16.3.5 Risks

We cannot report any significant problems we encountered while working on this project. We have launched the beta version on time and with enormous success.

- Risk due to reliance on external help for designs. Can be mitigated by quickly checking availability and contacting back-up designers.
- Our estimation for the complexity of implementing the mobile application can be too optimistic. Since we will rely on an external developer, this could cause conflicts with his or her availability and increase the needed budget.

In order to mitigate, we will involve the developer in early stages of the development to identify potential show-stoppers quickly.

- Slow adoption by existing users, difficulties in collecting feedback in order to improve functionality.

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- This will once again involve an external app developer and potentially web designer. If our previous contacts are not available for this phase, introducing new resources has the risk of delaying the process.

16.3.6 User-based evaluation of the concept

User-based evaluation

Within the last months, the user-based evaluation has taken in four separate phases, which we will discuss individually in the following part. There you will also find concrete results. 60 % of the interviewees have been pupils, 33,3% have been adults and 7,7% have been seniors.

Phase 1: Teachers' testing

Within the initial phase we dedicated our focus on one of our main target groups: teachers. Within a timeframe of two months we interviewed thirty teachers, of which 70% were female and 30% were male. These interviews were carried out in diverse ways. We made appointments with teachers from partner schools and directly asked the teachers about their opinion towards a SchulePLUS application. Furthermore we contacted teachers via telephone, to gather further opinions on the creation of the application. Our aim was to find out, whether the creation of such an application would be an enrichment for the targeted group.

The answers we received during these interviews were very clear: teachers mainly used SchulePLUS from home or school. Hardly any of the interviewees could imagine using a mobile version of SchulePLUS or downloading an application to do so. They stated that they preferred using the desktop version, also because specific functions, like writing messages, seemed to be much easier using a computer instead of a mobile device.

Result 1: The use of a SchulePLUS application has little added value for the teachers and they prefer using the desktop version on a computer.

Phase 2: Pupils' testing

After collecting the teachers' opinion with regards to the application, we shifted our research focus to our second target group: the pupils. In total 45 pupils have been interviewed, 55,5% of which were female. All of them were instantly excited about the prospective of using an application. We went on explaining possible functions and ... They are using their smartphones on an everyday basis and in diverse contexts. Due to this they can easily imagine using an app like SchulePLUS. However, they also stated that downloading the app would be more of an "one-stop-shop" action, meaning that they are more likely to use it a couple of times but not on a daily basis. They frequently use apps when they are not at home or when they are meeting their friends. Due to the limitations of their data volume, it would be difficult to download the application whilst being mobile, in order to try it out on the spot.

Result 2: Pupils like the general idea, but would not use the application again, once their search was successful.

Phase 3: Pupils' testing 2.0

Within the last month we evaluated our interim results within the team. Our main aim was to include the results of our previous research within the project and define the next steps we had to take. In order to surpass existing problems, we decided to speak to the pupils again. Since they were worried about using up their mobile data volume, we asked them whether they'd rather use a mobile version of the website. This would use less data volume but still enable them to use SchulePLUS and quickly find whatever they were looking for. The pupils expressed clearly that a mobile version would be much more attractive to them than downloading an application.

Result 3: Pupils would prefer using the mobile version towards the using of an app.

Phase 4: live environment/ bugfixing phase

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In phase 4 – our current stadium – the fully developed web application is put to test in a live environment. Besides coding optimization and dealing with process issues and enhancement options the goal of the evaluation is to find out

- 1) how the users react to our application,
- 2) where we loose users while using the application (customer experience, bounce-rate and what to do as consequence), and
- 3) how the unique visits develop?

In addition we are also currently implementing a sustainable marketing strategy for the web-application.

Interim result 4: So far the users react very positively: more than 5.000 users started the application and more than 4.000 finished it, which in regard to the focus group is a surprisingly high ratio of completion.

16.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 30.

Table 30: Snapshot of project "SchulePLUS"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To build a product that helps students identify their own strengths and choose a company to intern with accordingly, by developing a mobile web-app that provides the user with a range of scenarios, and the ability within the app to take a test of their interests and skills and be redirected to an organisation that fits their skills accordingly.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Created initial and detailed concepts plus wireframes. ○ Created designs for mobile app interface and undertook the required front-end and back-end development. ○ Produced a marketing concept paper and started testing the beta version. ○ Evaluated user-feedback to determine the necessary changes for the web application ahead of final release. <p>The project successfully delivered 10 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Organisation website and dedicated project website for the BETA version: https://www.schule-plus.de/ and https://www.xn--schlerpraktikum-1vb.de/profilcheck/start ○ Organisation/project social media: Facebook (8,604 likes) and Twitter (2,381 followers) ○ Print article in "Süddeutsche Zeitung" ○ Featured in a radio programme on SWR2. ○ Finalist in the Google Impact Challenge, which was also promoted on the CHEST website: ○ http://www.chest-project.eu/schuleplus-in-the-google-impact-challenge-germany-final/ ○ News article about the project's progress on the CHEST website: http://www.chest-project.eu/schuleplus-innovative-matching-education/ ○ 242 interactions in the project's section on the CHEST Community Forum.

Table 31 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on ways of thinking values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

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Table 31: Mandatory KPIs for SchulePLUS

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	/	3	3
		Number of users involved in co-design process	/	80	75
		Ratio between men and women involved	/	50/50	Students: 44,5% (m) 55,5% (f), teacher: 30% (m) 70 (f)
		Ratio between young, adult and old people involved	/		60 – 33,7 – 7,3 %
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	/	5	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	/	4	4
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	/	8	6
		Number of comments / replies on project blog entries on CHEST forum	/	8	6
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	fb: 3427, 1008 tw: 899	fb: 10300, 3700 tw: 2000	fb: 7721, 2546 tw: 2272
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	1 1 1	6 6 6	4 4 4

17 Shop & Drop⁵⁰

The Shop&Drop app will offer a personal service for citizens that makes waste separation simple and effective. It gives the users some personal advice on where to separate their waste and offers insight in the value of reusable products and waste. Users can add information, help other users and complement each other for doing good. For every drop the user makes at the right location he will get drop-points, which will start the competition between her or him and her or his friends.



Figure 22: Picture of the Shop&Drop mobile app

17.1 The societal problem

17.1.1 Description of the problem

With the Shop&Drop solution we try to solve the problem that a lot of household (waste) products in Europe are not collected for reuse and recycling, for the simple reason that citizens don't participate in waste separation enough. The necessity of separating household products and waste is broadly accepted, in most of the European countries the facilities are there, but citizens just don't seem to make the effort to use them or don't know where to find these facilities.

For the European governments (local and national) the urgency is there (due to intensified legislation) to make sure that much more of the household waste products are collected to enable reuse and recycling. They have the obligation to make the targets - of the percentages of waste that need to be reused or recycled - set by the EU and their national governments. Six Member States have already effectively eliminated the landfilling, reducing it from 90% to less than 5% in the past 20 years and reaching recycling rates of 85% in certain regions. Although this does not mean yet that all of the collected waste is recycled, it is quite often still burned for energy purposes. In other Member States, however, over 90% of waste is still landfilled and less than 5% is recycled (European Commission, 2014).

But this problem - in the long (or middle long) run - also affects manufacturers of consumer products.

- First of all, for more and more products and materials there is a 'manufacturers responsibility' set by national or European law, that commits them to take care of the collection and recycling of the products put on the market, when they reach their end of life. If they don't live up to this responsibility, it will cost them.

⁵⁰ Chapter contributors: Mathias Becker, Francien Eppens

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- Besides that, there is a commercial necessity to take part in recycling services: If not enough resources are collected and recycled manufacturers will not have a sufficient supply of resources to produce their products and serve the growing amount of customers.
- Next to that: If their customers don't participate in the collection and recycling of end of life products, they will neither be encouraged to set up new business models based on the reuse of collected products and materials. Several bigger consumer brands are experimenting with 'designing products for disassembly' (making sure that at the end of the product's lifecycle it can be taken apart and the components and materials can be used for the production of a new product). With that they have the aim to minimize the amount of resources needed and the energy used to produce. But to make that business model really work, they need large volumes of collected end of life products and thus the cooperation of their customers to bring their products back.

In the third place the citizens (consumers) themselves will be affected if we do not resolve this societal problem. Because eventually the supply of products they want to buy to fulfil their needs, will decrease due to a scarcity of natural or recycled resources. Currently this is hardly felt by people, as you can buy products from all over the world for the lowest prices ever, but sooner or later that will change if we do not change our consumer behaviour now.

During the project period we've learned (through research, reports, events and the feedback on the current Shop&Drop solution) that the problem of citizens not participating enough in waste separation, is not mainly caused by the fact that they are not motivated or that they don't think it is important to separate waste. The main reason they don't separate all their waste on a regular basis all comes down to one main cause: **it is just no easy enough to do it in the right way.**

That feeling of complexity has several causes.

First of all there is a lack of information and knowledge. European citizens are quite often confused by the information given on reuse and recycling.

- The 'rules' on what to separate were change continuously, as governments and municipalities change their policies;
- It is not always clear what material products are made of and thus to what waste stream they belong. Something that looks like paper can contain plastics or aluminium on the inside, something that looks like plastic, might be biodegradable;
- It differs per country, city, municipality or region how products should be separated. In one municipality (in the same country) beverage cans can go with the plastic waste, in the other they belong in the grey bin.
- The information on what facilities are there does not reach the citizens. To give an example, quite often people tell us that their municipality 'does not recycle plastics', when in fact it is a national obligation for municipalities and they do collect plastics for over a year already.
- Stories about separated waste streams being landfilled or burned after all have an enormous impact on the motivation of people.

Next to that the facilities are not always there, not sufficient or hard to access for people.

- In some (parts of a) municipalities you need to drop every waste stream at a different location (there are no combined facilities) which makes the effort bigger;
- Often facilities are overloaded and not cleared often enough, which demotivates people and results in them leaving their waste next to the container or putting it in the grey bin after all.
- Often you need a car to bring your waste to the municipal waste collection centres, which not everyone has.

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- Or you need to pile up your separated waste/products in your house for a week or two, before it is collected. Taking a lot of space in your house that a many people don't have.

For Shop&Drop this strengthened knowledge and improved insights have led to a shift in focus from developing a service and tool that mainly motivates (rewarding users for waste separation) and informs people (showing where locations are), to a service that focuses completely on making it as easy as possible for European citizens to separate their waste on a regular basis. And in that service, really joining efforts with the parties involved: the manufacturers & retailers selling the products and informing their customers on collection and recycling; the logistic companies delivering us our online purchases; and the governments and recycle companies collecting and recycling the waste.

Instead of showing citizens only where they can 'drop' what kind of (waste) products, we offer them a new easy to use channel to 'drop' their disused products. Every time the delivery guy comes at their doorstep to bring an online purchase or other parcel, they can give back a box of waste products and earn a discount on their next purchase in return. Shop&Drop tells them what items can go in the box, when the delivery guy will come at their doorstep and how their products are reused or recycled. With this additional version of our service we make it easy to participate in waste separation. They don't have to leave (if they don't want to or can't) their homes anymore to separate specific waste streams. They get rewarded for their effort, with a discount on a new purchase. They get detailed instructions on what product belongs to what waste category. They get feedback on what happened with the products they 'dropped'. They learn that buying something new is ok, as long as they make sure that their disused products turn up at the right location to enable a second life.

For the manufacturers and retailers this offers the possibility to live up to their responsibility of collecting end-of-life products; to learn what volumes of products and materials they can collect through their customers; to build a sustainable relationship with their customers. For governments and waste collectors, this offers a new collection scheme that is very traceable and manageable.

17.1.2 Scale of the problem

In Europe, we currently use 16 tonnes of material per person per year, of which 6 tonnes become waste. Although the management of that waste continues to improve in the EU, the European economy currently still loses a significant amount of potential 'secondary raw materials' such as metals, wood, glass, paper, and plastics present in waste streams. In 2010, total waste production in the EU, which is very progressive compared to other parts of the world, amounted to 2,520 million tons. From this total only a limited share, around 36%, is recycled, while the rest is landfilled or incinerated (European Commission, 2014). Just in terms of household waste alone, each person in Europe is currently producing, on average, half of tonne of such waste. Only 40 % of it is reused or recycled and in some countries more than 80% still goes to landfill (source: Environmental Data Centre on Waste, Eurostat).

While the European focus lies heavily on recycling of waste streams, this does not have the best results in terms of value preservation out of used products and materials. Therefore more European policy and research has shifted its focus to the potential of reuse of products. "Higher value preservation through reuse within a circular economy restores products and components that have reached their end-of-use back to their original state in a way that consumes the least amount of resources to deliver the same or improved function. In this way, the value of products are preserved at the highest level, reducing the level of risk associated with price volatility, resource scarcity, energy demand, and environmental impact (Nederland Circulair!, 2015)". This new focus that received more followers in the last months (especially now that the Netherlands are President of the Council of the European Union) is strengthening the aims of Shop&Drop.

We inform and enable citizens to not only 'drop' their waste and disused products at the right location, but show them how their products and materials will get a second life. By interlinking their 'drop' with a new purchase, we make them understand that all materials and products they 'drop' at the right location, will in one way or the other be reused as or in a new product that they (or

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someone else) can shop. The rewards-system that is part of the Shop&Drop service is therefore is not only used as a motivator, but most of all to make users understand that every material or product they dispose can be turned into a new 'shop'.

Over the past decade, there has been a dramatic increase in price volatility and the supply risk of essential resources -, which have critical impacts on environmental sustainability and economic prosperity (Benton & Hazell, 2013), and this trend is expected to continue. The reuse of products and materials in all ways possible, not only reduces the environmental impact in terms of resource and energy efficiency, it as well creates a lot job opportunities, coming from the greater labour needs of reuse. Estimations have been made that by 2020, nearly 1.4 - 2.8 million jobs could be created within the European Union (European Commission, 2015).

Besides this European shift to a focus on reuse prior to recycling, there is also more and more activity on the side of manufacturers. Large brands like Adidas, Coca Cola and Philips have set up programs to use more and more recycled materials in the production of their products. On the one hand because they want to show their customers and suppliers the environmental importance of resource efficiency. But on the other hand because they start to see the positive numbers: due to improved knowledge and techniques they are actually able to save costs by reusing products, components and materials. Currently the supply of these materials and resources is only enough to serve percentages of their overall production. In order to scale their production even more materials need to come back to the production plants to eventually use up to 100% recycled products and materials.

This tendency strengthens Shop&Drop's vision to directly connect - within the minds of consumers – people's shopping behaviour to their 'dropping' behaviour. If they want to keep on buying their favourite brands, it is of great importance that they assist those brands in the ability to reuse and recycle used products and materials. That is why - with the existing and new version of Shop&Drop - we learn them to dispose their disused products and materials at the moment they buy something new. Either by disposing their old products in a container in or in front of their favourite stores, or by giving them to the delivery guy that brings them their online purchase. It makes it easy for them to get rid of their old stuff and shows them directly why it's worth the effort. At the same time it enables retailers and brands to collect their end of life products and where possible, bring them back into the production process.

17.1.3 Previous approaches to solving the problem

There are many initiatives from governments, manufacturers, retailers and other private companies aiming to make the collection of household (waste) products easy *and* rewarding for citizens.

For example the German government has set up a very clear and easy to use waste separation system for its citizens, that works according to the same principles in almost all German municipalities. All waste streams have their recognizable colored bins and are either collected at your home or in public containers. Germany also involves manufacturers in the prevention of waste. The 'Green Dot' system makes them pay for the volume of packaging material they bring onto the market. Less material used for the package, means less costs. With this system for citizens and manufacturers Germany has reached the highest recycling levels of Europe.

In the Netherlands a new system called 'reversed collection' is released in several municipalities, which makes it easier and less expensive for citizens to take part in waste separation. Normally citizens pay a general waste tax based on the composition of their household, no matter if they separate their waste or not. In the case of 'reversed collection' citizens don't pay anything for all the waste streams they recycle, only for the rest-waste (grey bin) they dispose. The less non-separated waste you thus have, the less you have to pay. In some municipalities this has proved to work very well and serves as a good motivation for citizens to recycle. In others, people just dump their waste in the bin of their neighbors and make them pay for the waste. This last example was seen most in municipalities where the facilities to separate all waste streams were perceived to be minimal.

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Consumer brands and retailers also experiment with collection schemes that help their customers to recycle and reward them for doing that. For example H&M launched an in store garment collection scheme in 2013 where customers that turn in a full bag of old garments can get 15% discount on their next purchase. That resulted in a collection of 22000 tons of garment. Other examples are retailers and brands collecting mobile phones, cartridges and shoes, 'rewarding' their customers indirectly by donating the revenues to charities. These schemes motivate people, but the main issue is that when people go out to do their shopping, they are not focused on disposing off old products and therefore most often forget to use these opportunities.

Digital information and motivation tools also exist in many varieties. In Germany the mobile app *ecotastic.de* motivates people to share their 'green actions' like waste recycling and reward them for that with discounts on a next sustainable purchase. Several European countries work as well with different mobile applications that help you to find waste collection bins, pick up calendars or just information on what product belongs in what recycling category (*recyclemanager.nl* – *bin-ovation.com* - *elbatrop.com/recycling* - etc.). The number of people using these applications is unfortunately not that large. This has several reasons: people don't know of their existence; the game element is too weak to keep people involved; the rewards are irrelevant; the social interaction aimed at is minimal; the information people can get from the application is only searched for once and after that the app loses its value.

The above examples all show that people *can be* motivated to recycle more/better if they are better informed and/or there is a financial benefit. But they have also shown that the value of the information and the financial benefit needs to be interesting enough for people to make the effort and to keep them involved in the long run. And most important, the use of the application or the participation in the scheme needs to be easy. UK research has shown that financial benefits work best as a motivator if this concerns direct, promotional rewards instead of tax-deductions or penalties. But that more important than any financial benefit is a sufficient recycling infrastructure (and the ease for citizens to recycle) and clear communication about the way to participate (Shaw & Maynard, 2007).

Making it easy means

- Making sure that everyone can participate (no matter where and how they live);
- Making people choose the rewards that are personally relevant for them (not only sustainable rewards or of just one brand);
- Choosing the right communication medium for your target group;
- Taking care of user retention, to keep people involved.

Therefore Shop&Drop offers a service that is not related to only one municipality, one specific brand and one specific medium. With the new version of Shop&Drop you can find information on recycling facilities in every municipality, you can choose rewards from both big national brands and small sustainable brands, you can give back waste to the delivery guy no matter from what retailer you have bought your product and you will receive push messages of your 'drop-results' and changes in the recycling rules to keep you updated and involved. Our aim is to make waste separation easy and personally relevant for *all* European citizens/consumers.

17.2 Implementation of organizational structure

17.2.1 Maturity of the project

Version 1.0 of the Shop&Drop application is live in the three biggest Dutch cities: Amsterdam, Rotterdam, Utrecht.⁵¹ Version 2.0 – the nationwide version – is set up in prototype and being tested. During the project period this version has been developed with a more specific focus than outlined

⁵¹ **Android app:** <https://play.google.com/store/apps/details?id=nl.shopendrop>
iPhone app: <https://itunes.apple.com/nl/app/shop-drop/id940655928?mt=8>

before. Based on research, retailer feedback and user tests we've focused the scope and strategy of our business with an intensive focus on online shopping, instead of in store shopping. Enabling us to keep more control over the service, our partners and the social value we offer.

17.2.2 Organizational structure

A team consisting of a frontend and backend developer, an interaction designer and the CEO fulfils the technical development and implementation of the technical application. This team consist of employees, freelancers and interns.

The business development, marketing and research are executed by a team of three members, which includes two employees (the CEO and a marketing&communication officer) and several interns (BSc or MSc candidates who are in the final stage of their studies or just entered the labour market).

The complete team working on Shop&Drop is involved in meetings and brainstorms on strategy development and decision making in order to have a perspective and opinion from all disciplines when we take important steps. Besides our internal team we also have a lot of business coaches and advisors in our network with whom we discuss strategic decisions and business opportunities.

17.2.3 Key personnel

Francien Eppens (CEO) holds two Master degrees in Art Management and Business Studies and is driven by the continuous ambition to find the right balance between societal impact and economic sustainability, in all the businesses and projects she works on. For 5 years she worked as a marketeer and business manager for The International Choreographic Arts Centre Amsterdam where her main tasks were to realize financing (including EU funding) and develop marketing strategies. In 2012 she decided to look for a new challenge, which she found in the circular economy 'buzz'. In the past three years she has successfully build a network in the sustainability world and made name with her charm and persistence, that make others want to join her on her mission for a better world. In 2014 she founded her social enterprise DIT project.

Growing up as the daughter of a successful technical entrepreneur she knows all about the challenges of (technical) entrepreneurship. Endurance and strong networking & leadership skills are what characterize her. Besides her work for her own company, she has been/is president of the board of several social foundations and is involved as a sustainability certification manager (FSC and CO2) for the family business (Killiechonate Woodlands) in Scotland. Francien already received several nominations and rewards for her work with Shop&Drop, like the a nomination for the Next Green Entrepreneur 2015 and VIVA 400 category 'world improvement' and an award as Sustainable Young 100 and first prize winner of the E-waste 2.0 Challenge. Francien has the network and skills to bring Shop&Drop to the market, both in the Netherlands and abroad.

Peter Duijnste (Backend Developer):

Peter has twenty years of experience as a professional application/backend developer, is an autodidact and full stack developer with very good communicational skills. He has worked on consumer-facing and backend applications for international organisations such as the Boston Group (www.boston-group.com) and Sanoma (www.sanoma.com).

For Shop&Drop he is translating the new architecture of the application to an API that communicates with all the application clients and the analytics database used for the customer application. He has a lot of experience with privacy issues and scalability and enjoys working on new projects with unexpected outcomes. He never takes things for granted but will always ask questions to get to the bottom of things, that has as a result that we all continuously learn new things about our project and each other's ambitions.

Ruben Aarts (Frontend Developer):

Ruben is a multi-skilled developer, working on both frontend and backend development projects, in which he has over ten years of experience. Ruben has a lot of experience with geo-based applications

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and worked for companies with a high privacy level, like the Dutch police and Brinks (global leader in security-related services for all kinds of businesses).

For Shop&Drop Ruben develops the frontend of the new version of the Shop&Drop application, a hybrid app for iOS and Android phones. In this he works in close collaboration with the designer, backend developer and marketing team, to make sure that our users are served in the best possible way.

Bob Bouwense (Interaction Designer):

Bob Bouwense is a Digital Designer from the Netherlands. He graduated as a graphic designer at the WDKA, Academy of Art and Design. His main focus lies with Mobile design, User Experience (UX) and User Interface (UI). Bob worked on various projects all over the world. From small apps like the one for the Dutch Lowlands festival, to bigger projects like an App for ANZ (Australia and New Zealand Banking Group).

Bob has joined Shop&Drop to create the User Experience Design for the app and website and is translating that to the Final User Interface Designs for Android, iOS and website. Besides he develops several items of our communication material.

Lucinda Pronk: (intern – Marketing Research & Communication)

Lucinda is graduating at Shop&Drop from her bachelor's degree in international marketing and communication (her research for us was rewarded with an 8.5, that helped her to graduate cum laude). Next to her studies she is always looking for inspiration, innovation and social activities that motivate and inspire her.

While working on various study projects in the marketing and communication field Lucinda discovered her broad interests and her curiosity to get to the bottom of every challenge. Her analytical talents, perseverance and creativity are key in tackling every problem.

At Shop&Drop she is working as a graduate intern. She is doing research on the influence of discount programs on sustainable behaviour. What causes sustainable behaviour? And could discounts become a factor that plays a role in stimulating sustainable behaviour. Besides her research she also contributes to the marketing and communication of Shop&Drop by putting her knowledge and skills into practice.

17.2.4 Partnerships, cooperations, and networks

DHL and Post NL – Project Partner – these names are confidential

In January 2016 a collaboration was agreed on between Shop&Drop and DHL (courier company) to pilot the Shop&Drop 2.0 concept, as mentioned in section 1.1. Within this pilot we would test on a large scale – nationwide - the Shop&Drop service for online shoppers to give back a box a waste/disused products to the delivery guy that comes to bring them their online purchase. With every 'drop' at the delivery guy they collect points they can exchange for discounts on a new online purchase. With this service the ease for Shop&Drop users to 'drop' their waste-products increases and the empty van of the logistics partner is used to bring valuable resources back to the right location to enable reuse and recycling. Besides we can track what has been dropped and get results from the recycle companies we partner with, to make sure we can fully measure the social impact of the service.

Due to an investment freeze within DHL (announced by the board in May) the pilot, that should have started in August this year, has unfortunately been put on hold. If this 'freeze' has been reversed or additional resources can be invested by one of us, we can continue our project.

As Shop&Drop is not dependent of one specific logistics partner, we've decided to not wait for this situation to change but immediately got in touch with DHL's main competitor in the Netherlands: Post NL. We are now in discussions with the director of Innovation and Sustainability on a similar pilot to be started in winter 2016/2017. Compared to DHL who owns 20% of the b-to-c market in the

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Netherlands, Post NL, who owns 75% of the b-to-c market, is a partner with a lot more influence and a better reputation on sustainability and innovation. Status of the collaboration is that in August we will draw out the pilot form and planning, together with the other partners involved.

→ these two commercial partners are referred to in the report as LP1 (logistic partner 1 = DHL) and LP2 (logistics partner 2 = Post NL)

Thuisrecycling.nl – Project Partner

Thuisrecycling.nl is a Dutch webshop selling products that help customers to separate, reduce and reuse their waste in or around their homes. We have agreed with this webshop to test the Shop&Drop service on their customers to be able to already gather results on our service. We offer their customers the possibility to return (at their costs) a box of waste/disused products and in return give them a discount on the next purchase in the webshop. We have started this test in June and will use the results and experiences in the set up of the larger pilot with LP1 or LP2.

Coolrec – Project Partner

Coolrec is potential partner we've been introduced to by our partner Cirkellab. Coolrec is an electronics and plastics recycling company, subsidiary company of Van Gansewinkel holding, one of the biggest waste companies in the EU. Coolrec will handle all the electronic products we collect and will make sure they are reused (after upgrading) or recycled according to EU standards and certificates.

Urban Mining – Project Partner

Urban Mining is a smaller electronic recycling company based in The Hague, that is our partner in the test pilot we do with Thuisrecycling.nl. All the electronic and plastic products that are collected through this service are delivered to them, so that they take care of the recycling. In return Shop&Drop gets shares in their business that can be turned into cash within two years time.

Cirkellab – Project Partner

Cirkellab stimulates, creates and connects in the transition to a circular economy in de Drechtsteden (a region within the Netherlands). They research, advice, guide and initiate business-cases on resource efficiency and reuse; sustainable energy and sustainable deployment of people. In 2015 Shop&Drop and Cirkellab have collaborated on several levels: by giving workshops at each other's events, realizing media attention for one another, sharing network partners and sharing their knowledge within each other's community. In Autumn 2016 we will strengthen this collaboration by setting up a project to enrol Shop&Drop in the Drechtsteden and together start a project with a paper recycling company from that region.

Price Waterhouse Coopers (PWC) – Financial Advice

Shop&Drop was one of the 30 participants in PWC's Social Impact Lab 2015. We did not make it to the finals but were offered a full day of brainstorming about our business plan, with six consultants from various disciplines. During that day one of the consultants got so excited by our project, that she wanted to offer us more help. That resulted in an official assignment and a contract between PWC and Shop&Drop. PWC has committed itself for 280 hours to help us to strengthen our business model and build a scalable cost-model for the subscription we offer to our customers. In December 2015 the final report and financial model of this project has been delivered that serves as the foundation for the business model we now implement and the pricing we offer to customers. The model is designed to be easily scalable and contains an extensive risk analysis that helps us to mitigate and analyze risks now and in the future.

Utrecht Sustainability Institute – Knowledge Partner

In October 2013 Utrecht Sustainability Institute (USI) organized (together with Wecycle and Utrecht Inc.) the E-waste 2.0 Challenge. Shop&Drop won this challenge and was granted a startup budget, a work space and professional guidance and could make use of the extensive network of USI. Since

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then USI supports Shop&Drop as a (knowledge) partner in its further development. To give an example, USI notified Shop&Drop about the CHEST funding opportunity and introduced Shop&Drop to several customers we are now in collaboration with. Besides that, USI offers Shop&Drop a stage to present itself at several network events where we can pitch for businesses and network organizations. USI has also been the partner that introduced us to the above mentioned international logistics partner.

Nederland Circulair! – knowledge platform for the circular economy

Nederland Circulair! is an initiative of several leading Dutch organization in the circular economy: MVO Nederland, Circle Economy, De Groene Zaak, ClickNL Design, Het Groene Brein and RVO.nl. Together with partners as the Ministry of Infrastructure and the Environment, TNO, Acceleratio and ICE-Amsterdam they work on the realization of an acceleration to a circular economy. On their platform Circulairondernemen.nl they present best practices of the circular economy in the Netherlands. Shop&Drop is one of the best practices presented. Besides they organize events, set up projects and connect businesses, public bodies and individuals to join forces.

Municipality of Rotterdam – launching ‘customer’ and financing partner

The Shop&Drop app was officially launched in December 2014 in the first three municipalities in the Netherlands. All three of them supported us by investing ‘in kind’ (data, marketing, information), but the municipality of Rotterdam has as well been a financing partner. After the launch, the collaboration has continued, based on a verbal agreement that they will commit themselves to keep the data up to date and will promote Shop&Drop with their citizens, on a regular basis. Shop&Drop has introduced one of its network partners to the municipality for a project on the collection of electronic waste. This has resulted in a project assignment for that partner.

Nudge – sustainability network

Nudge is a network of businesses and individuals that contributes through co-creation to positive and lasting changes in our society. They achieve that with the help of their business and community partners, but above all, with the Friends of Nudge. Nudge operates as an important spokesman on a political level to enable a healthy environment for social entrepreneurs to grow. Shop&Drop is (by contract) an official member and friend of the Nudge network and through that is part of an important group of thought leaders in the Dutch sustainability scene. Nudge Friends as well help each other with in kind investments and promotion and the Nudge team promotes all of our events, vacancies, developments, etc.

Duurzaam Doen – governmental platform for sustainability

Duurzaam Doen (Act Sustainable) is an initiative of the Dutch Ministry of Infrastructure and Environment, Society for Nature and Environment and Milieu Centraal. It offers a platform to several sustainable initiatives. Duurzaam Doen is supporter of Shop&Drop and organizes many events where we can present ourselves to policy makers, businesses and customers. Being part of this network has led to many invitations for important events, media interviews and collaboration projects.

CE Booster – start-up program

CE Booster is a national start-up program that helps entrepreneurs contributing to the circular economy to scale up their businesses. We have been selected (based on our business plan and growth potential) to participate in this program for one year (starting September 2015). It offers us masterclasses, a network of investors and knowledge experts and a professional coach that will assist our CEO in decision making and realizing a healthy growth of the business. During the first half of this program we’ve gained a lot of new knowledge on Marketing and Finance and broadened our network of professional partners, investors and advisors. These new contacts have led to promising partnership opportunities. In 2016 we continued this program and were mainly coached on sales and investment acquisition. Shop&Drop’s personal coach from this programme continuously opens up his

network, that so far got us at the table with LP2 (logistics company that holds 70% of the Dutch b-to-c market) and CoolBlue (fastest growing online electronics retailer in the Netherlands).

17.3 Implementation of the solution approach

17.3.1 Solution approach

Our most important ambition was and still is to make it as easy and valuable as possible for European citizens to participate in waste separation, by interlinking that 'separation behavior' to their 'shopping behavior'. To make that more specific: we aim to achieve that every time a citizen goes 'out' to shop (whether this is in the store or online in a webshop) he will think of what waste/old products he has to drop AND will do that in the same routine. Because it is easy for him to do and has a clear value for both himself and the environment.

During the second half of the CHEST project period, we have intensified our focus on making the shop&drop-principle work both 'on- and offline'. Meaning that we want to make it as easy and rewarding for people to dispose their waste when they do their shopping in the city centre or shopping mall (offline), as it is to dispose it when they shop online. That means that the Shop&Drop service runs in parallel for both these situations.

Offline

By using the Shop&Drop mobile app citizens find the information on where to drop their waste in or around their favourite stores. When they 'drop' their glass, plastics, paper etc in the public containers, they tick off their 'drop', the gps-systems validates their location and rewards them with drop-credits. These credits can be exchanged for discounts on their next purchase in the (online) stores of their choice or of their favourite brand.

Online

By making an online purchase through the Shop&Drop website in the webshop of its choice a citizen/consumer will get the option to give back a box of (waste) products to the delivery guy that brings him his online purchase. In the order confirmation of his purchase he will receive a return label and instructions on what (waste) products can go in the box, he hands the box over to the delivery guy when receiving his purchase and receives his drop-credits ones the return delivery is received by the recycle partner of Shop&Drop. Again he can exchange his drop-credits (in the app or on the website) for a discount on his next purchase.

With this combined service we learn our users that it doesn't matter where, when and how you do your shopping, there is always an opportunity to combine your new purchase with the disposal of your waste or disused products. By enriching the information within our application and connecting more and more retailers, brands and municipalities, we will make sure that the information given is relevant and the effort to make is minimal. The opportunity to earn a reward (a shopping discount) serves as a motivation and an added value for citizens/consumers to use the services even if waste separation is not yet in their interest or if they think they already know all about it.

The applications we use (mobile and web) serve as an important source to optimize the services and keep them relevant. We learn what people drop and where and can remind them of doing this on a regular basis. We also learn what rewards they collect and thus how we can keep them motivated to make another drop. For example: as soon as a new discount of a certain brand comes online, we can send the users that favour that brand a push message, motivating them to drop their waste and collect the discount. But the choice for this technology does not only help us to serve citizens in the best way. We also generate a lot of relevant data that offers value to the waste collectors (both governmental and commercial). They learn where, when and how their citizens 'drop' most often and how they can adjust their infrastructure and logistics to that to increase the volumes of collected waste. After all, it is our main ambition to get European citizens more involved in waste separation and through that increase the volumes of collected, reused and recycled waste.

17.3.2 Target groups

SHOP&DROP (S&D) has three targeted user groups.

1. The users of the Shop&Drop service and application: the citizens/consumers.
2. Consumer brands: retailers and manufacturers.
3. Waste collectors: municipalities and waste management/recycle companies.

During the past months we have focused mainly on the first two target groups, as they are most important for the success of our service and our business model. And thus for the sustainability of our solution.

Citizens/Consumers

In the enrollment of our project we target a specific group of citizens: women - 25 – 49, higher educated, have a smartphone, busy professional and/or social life and aware of environmental issues (see first version of the social impact report, 2.1 million women in the Netherlands and 32 million in Europe (source: Eurostat)). To this target group S&D offers the possibility to improve their lifestyle on a sustainability level in a way that is of value for them in more than one way. We help them to efficiently separate their waste by making it less time consuming; we help them to feel good about themselves because of their waste separating behavior; and we help them to feel rewarded by offering them discounts on their favorite shops and brands.

Through the use of the mobile application (version 1) by the current users and the research of our marketing intern Lucinda, we've learned that our target group is still bothered by the fact that separating waste is not very easy in every city and for every waste stream. The rewards do help to give them a positive feeling about making the effort, but won't be the main reason for them to participate. Their wish for an additional service that makes separation more easy is much greater and convinced us to focus harder on the online shop&drop service. In the first half of the project the target group already expressed the necessity of a connection to online shopping, because due to their full schedules they shop more and more online instead of offline. We then decided to make sure that the discounts they can collect with their drop-credits, can be used in webshops. This has as an advantage that users don't need to print out a coupon or shops don't need to install difficult and expensive scanning systems to be able to accept these coupons. Users get a unique coupon code for every discount that they can use in the participating shops and the online shops can easily (technically) register every coupon used and notify our server about this. The retailers and brands also welcomed this change.

Service wise these insights have strengthened our ambition to make the combination of the offline and online shop&drop service. The offline service has a great value in helping citizens find the waste separation facilities in the public area or in stores. The online service however, helps them to drop off waste streams for which the facilities are less present or harder to access. This combination not only increases the ease for the consumers, but as well the interest for online retailers to participate and offer this service to their customers.

Consumer brands (retailers and manufacturers)

Our second most important target group is the consumer brands (both retailers and manufacturers) we involve as customers of our platform. We focus on retailers and brands that want (or need) to lower their environmental footprint and that of their products sold to their customers. But at the same time they seek to build a sustainable relationship with a continuously growing amount of customers, by using communication channels and customer services that combine the on- and offline world. To this target group Shop&Drop is an important loyalty service with a sustainable value that enables: direct communication with new and existing customers; an increase of brand loyalty by engaging customers with their sustainable values and personalized offers; the option to take back products at their end of use. We generate sales leads for this target group and offer their customers a valuable service.

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In the past months this target group did as well confirm the importance of our shift to a combined focus on on- and offline service. Due to the fact that more customers shop online, and there is less personal contact with their customers, they experience that customers become less loyal to their preferred brands. In online shopping customers switch to competitors more easily if their services or prizes are better. Offering the best online service on all levels is therefore of more importance. That can be realized by personalized offers and additional services that are of value to their customers. Their reputation on sustainable levels has become of more value to their customers as well, something that increased the interest in the Shop&Drop service. Thus the decision to work with online-shopping-rewards and add an 'online' dropping service does as well live up to the needs of this target group.

Waste collecting organizations

The last target group is the municipalities and/or waste management organizations that face the challenge of reaching the European and National targets for collected and recycled waste. To them Shop&Drop first of all offers a communication platform that helps them to personalize the information they can bring to the citizens and enables citizens to help each other as well. Next to that the applications helps them to gather valuable data about what citizens drop, what locations are used most, what problems citizens face etc. This will enable them to improve their services and reach their targets.

This target group has decreased in importance for us the past months. Not because they don't play an important role in the social impact we want to make, but in the way that their participation as a partner or customer of Shop&Drop is not conditional for the success of our project. The main input we need are the open data of the municipal collection services and locations, data that are open and can therefore easily be accessed. To make the municipalities a paying customer or partner, is a very time consuming process in the sense that decisions are made at such a slow pace that, it slows down the project rather than improves the quality. We've therefore decided not to focus on their acquirement as an official partner, but show them the results and through that trigger their interest and make them come to us when they're ready.

This however does not apply to the waste commercial management companies. The same insights apply to them as to the previous two target groups: there is a high interest of several waste management companies to become our partner in the 'online' Shop&Drop service. Most of these companies have an international scope and are therefore more important for us as partners than the Dutch municipalities.

17.3.3 Activities and work performed

Work Package Number : 1
Actual Starting month : October 2015 Predicted / Actual End month : 31 May 2016
Work Package Objectives: <ul style="list-style-type: none">• Implementation of the reward system• Marketing & sales to attract more customers• Marketing & communication focused on users• Optimization of functionalities based on user feedback

- Extend CMS and architecture to develop customer login

Description of work this period:

Main achievements during the last 5 months:

- Optimizations of the reward system based on marketing research
- New customer leads
- Community further extended due to weekly blogs and social media contests
- New smartphone application (including the reward system) developed for the 'offline', nation wide service

Detailed description of work performed to reach the achievements listed above:

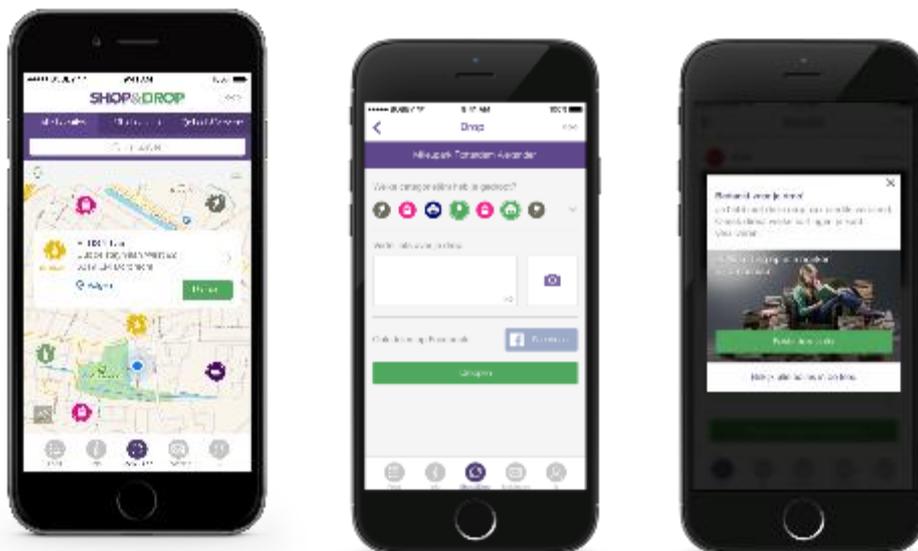
- Based on the marketing research of our marketing intern (qualitative research on our target group with the reward system as subject)⁵² we changed the focus of the reward system to a system of online coupons. Besides that we've put the release of the implemented reward system in the 'offline' version of Shop&Drop on hold, until we can roll out the 'online' version of Shop&Drop as well. As one of the research conclusions was that the target group sees the 'online' opportunity to drop their waste as an important alternative to make waste separation easier for them. They've given this priority above 'just' the rewards system for the 'offline' version.
- With the weekly blogs⁵³ we publish on our blog-site we continued to attract more and more followers and through that build a nice community. The blogs give our followers information on interesting initiatives that either have to do with sustainable shopping or a sustainable way to reuse, recycle or separate waste and disused products. Every other week the blog contains a social media contest through which followers can win nice sustainable presents. These competitions have a great value in broadening the audience for our blogs and app (and thus broadening our community), as users have to share the blog through social media in order to win the price. Also, the bloggers themselves are selected based on their reputation on social media followers to make sure that through their followers we reach a new audience as well.

⁵² "Recyclen doe je zo! De invloed van beloningen op recycle-gedrag (Recycling is done like this! The influence of rewards on the recycle-behaviour)" Report available at request, but unfortunately only in Dutch.

⁵³ All blogs can be found at shopendrop.nl/blog



- Again we've managed to attract new potential customers for especially the 'online' version of Shop&Drop. We are currently rolling out the 'online' pilot with Bol.com and CoolBlue, currently the two biggest online retailers in the Netherlands. Besides we've interested brands like Nike and Canon for our 'online' service.
- Based on the new application architecture we've established in the first part of the project we have now developed the new version of the smartphone application that delivers the 'offline' Shop&Drop service. This new version is now being tested by several user groups and will be launched once the 'online' version is ready as well, to make sure that our customers (the retailers) can be represented in both versions (something they've made conditional for their participation).



Summarise any problems you have encountered, and how they have been overcome

The main problem we've encountered is of course the fact that there has again been a delay in the project planning and payment of the funding. This has enforced us to take a loan to pay some of the team members working on the project, to be able to continue. But it has as well forced us to put the new release of the nationwide app on hold. Once a customer application service like Shop&Drop is out in the open it needs a lot of communication and continuous optimization to get users interested and keep them involved. The risk of not having sufficient resources to realize this and make the necessary impact has been too high due to all the uncertainties (delays and lack of clear communication and planning of the CHEST consortium) and therefore we cannot release

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before these issues have been solved and we know what we can expect. Besides it has put a large pressure on the time of the management and on the strategic decisions to make for the project.

Another issue has been the investment freeze encountered by our commercial partner LP1. The result of this freeze was not only that the project with them has been put on hold, but as well that a large investment from them in Shop&Drop has been put on hold too. We have not resolved this issue yet, but are in far reaching meetings with their competitor LP2 to set up a similar project with them in winter 2016/2017. This change in financial perspective of our project for the coming months has strengthened the decision not to release until one of the financial uncertainties (CHEST or the partnership with LP1 or LP2) is resolved.

Description of planned activity for next reporting period

The planning for after the CHEST period is to release the new, nation wide version of Shop&Drop 'offline' and 'online' in Winter 2016/2017.

Work Package Number : 2

Actual Starting month : December 2015

Predicted / Actual End month : 31 May 2016

Work Package Objectives:

- Execute desk research on the main challenges in EU countries and city statistics on population and waste
- Join network meetings to find and approach partners
- Set up meetings with existing partners to join forces with them and their EU partners
- Investigate additional funding options for an EU trial elsewhere
- Develop an international video animation to use as communication tool
- Write the interim project report

Description of work this period:

Main achievements during the last 5 months:

- Network meetings with new partners
- Application for new funding opportunity in progress
- Interim report finished and approved

Detailed description of work performed to reach the achievements listed above:

- We have heavily extended our network of potential partners for our services. This is due to the network meetings we attended and the fact that our business partners have introduced us with several important contacts. The main focus in these new contacts lies on the potential of the Shop&Drop 'online' service, that is of great interest to many businesses.
- We are currently writing a funding application for the Citylab010⁵⁴ program of the municipality of Rotterdam, that needs to be applied for on the first of September. This

⁵⁴ <https://www.citylab010.nl>

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funding is aimed at sustainable mobility in city centres and therefore fits the Shop&Drop 'online' service very well.

- The interim report was written in time and approved by the CHEST consortium

Summarise any problems you have encountered, and how they have been overcome

- The desk research on the main challenges in other European countries has not been completed yet, as our intern (who was responsible for that) stopped her internship due to personal circumstances. When she stopped (in May) it turned out that less work was done than we had believed.
- Some of the deliverables in this work package have not been reached due to the fact that we have made strategic changes to the project. For example: the video animation has not been made as the release of the new version is still on hold.
- The lead for a partnership with the project of Albert Meijer - Professor of Public Innovation at the Utrecht School of Governance of Utrecht University has unfortunately not led to a concrete collaboration (see previous report). We have been in contact about the research project they are undertaking, with the aim to make comparative analyses of smart governance in infrastructure, economy and poverty in Utrecht, Curitiba and Glasgow. The project scope was already too far established to add Shop&Drop as a partner and extend the project with our specific knowledge.

Description of planned activity for next reporting period

Set up a European partnership to test the Shop&Drop 'online' service in another European country. As our project partners are all operating in the Benelux and Germany, the countries we will most likely focus on are Belgium, Germany and Luxembourg.

Work Package Number : 3

Actual Starting month : October 2015

Predicted / Actual End month : 31 May 2016

Work Package Objectives:

- Update business plan for the next project period
- Continue communication with potential investor and search for other investment options of companies that see the value of our business model.
- Prepare final project report
- Marketing & sales to attract more customers – continuous
- Develop a project plan for EU implementation of the app

Description of work this period:

Main achievements:

- Found new commercial partners for a large investment in Shop&Drop
- Attracted more customers

Detailed description of work performed to reach the achievements listed above:

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- In the new logistics partner we are in discussion with, we've found an interesting commercial partner that can enrich our service to citizens (consumers and users of the app) and strengthens our offer to retailers and manufacturers (our customers). We have expressed the shared ambition to pilot our collaboration in Winter 2016/2017. From the start of this collaboration Shop&Drop has brought a very large online retailer at the table that both strengthens our position and the potential success of the service.
- Besides these partners we have now also found a dedicated waste collecting company that will collaborate with Shop&Drop.
- With the support of our continuously extending network of sustainability and business professionals⁵⁵, we've been very successful at attracting new customers for our service. Some of the customers we have been able to reach are: CoolBlue, Bol.com, Nike, Canon, HVC, and WE Fashion

Summarise any problems you have encountered, and how they have been overcome

See work package 1

Description of planned activity for next reporting period

See work package 1

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

Our main concern has been the fact that the delay in the funding (8 months later than the project was planned to start and again a (still continuing) delay of 6 months halfway the project) caused a huge delay in both the project planning and our business development. The funding was meant to support us to implement our business model and attract actual customers. We have managed to compensate some of the consequences of these delays, but as a start-up company we are financially not strong enough yet to compensate it all. Meaning we had to make strategic decisions to put several aspects on hold, to minimize the project risks.

Another concern has been the project focus, that was first only on 'offline' shopping&dropping, which did not seem to be convincing to everyone (customers and partners) yet. The project experiences, user tests and new partnerships have learned us that our scope should be on 'off- and online' shopping, something that now feels so natural and logic. We are therefore happy that we had the time to really explore our concept in more detail and strengthen the scope and focus our business strategy.

Detail any publications, publicity or other dissemination activity.

⁵⁵ among others, the network that was opened up to us through our participation in the CE Booster program: <http://cebooster.nl/experts/>

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We've been presenting ourselves at several events, giving presentations, pitches or workshop.

- Pitch for the Municipality of Dordrecht and several waste companies in that region⁵⁶
- Several presentation for investors and businesses as part of the Circular Economy Booster masterclass (June, July, August)
- Pitch for the Next Women 100 competition⁵⁷

Press and publications

- June 2016 - Cirkellab.nl - subject: Shop&Drop online service
- June 2016 – Nudge.nl - subject: tools that help you to live more sustainable
- July 2016 – Natuurmilieu.nl – subject: sustainable apps
- September 2016 – Milieu Magazine (magazine in print) - subject: producer responsibility

17.3.4 2.3 Sustainability of the solution

The CHEST project period served as a trial period for our business model and enabled us to prove the value of that model to customers, partners and investors. We currently have a well thought through financial model in place including a forecast of the coming three years. This helps us to set the financial targets that indirectly determine the business and social scope for the coming period. Unfortunately the CHEST period has – due to the delays and organizational issues –not been able to deliver us *all* the necessary results yet. But the project period has showed us where our focus should be business wise, which has improved our strategy and business potential.



As mentioned in the above report we will take our project to the next level by combining the 'offline' shop&drop service with the 'online' Shop&Drop service. Helping our users (the community) to not only drop off their waste and disused products at the right location when they go out to shop in the city centre, but as well when they shop online. The 'online' service, that we will pilot with the logistics partner, does not only increase the value of the Shop&Drop service for our users, it is also founded on the same business model as the 'offline' service: if the pilot is successful (and can thus be

implemented in other regions and countries) that improves the potential success of our business model as well. An important extra in that, is that our partner will then as well participate in the acquisition of new customers (consumer brands) for our joined service. Besides, this pilot will be done with large international brands and therefore serves as well as a research opportunity for the European expansion.

After the CHEST project and pilot period we will continue the process of customer acquisition and will focus on additional investments from investors that believe in this business model. Our business model is as follows: we generate sales leads for on- and offline retailers by offering their customers a discount on a new purchase and (the online customers) a free to use service to return old products. With this model we earn a kickback on the sales done and get a fee for the service delivered.

The steps we will take the coming months are:

⁵⁶ <http://www.cirkellab.nl/2016/02/17/dordrecht-bovengemiddeld-potentieel-voor-circulaire-economie/>

⁵⁷ <https://vimeo.com/159061893> (password TNW100)

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- Finalize and start pilot of the online Shop&Drop service together with the above mentioned commercial partners (= financial investment by commercial partner in Shop&Drop)
- Make that pilot part of the funding program Citylab010, that will support the marketing & communication of the project – application will be send in, in September (= funding)
- Release the national version of the Shop&Drop application. This indirectly means the start of the contracts with retailers that are customer of the app-loyalty program (= revenue)
- Continue blogs on shopendrop.nl to keep the our community involved and interactive through the social media channels and app itself
- Intensify the marketing and communication campaign to attract more users for both the on- and offline Shop&Drop service

17.3.5 Risks

During the last period we have learned our lessons the hard way and have seen that until a commercial partnership is confirmed with a contract and signature, we will always face the risk of a confirmed partnership and investment being withdrawn. With the new logistics partner we have therefore asked for a declaration of intent, to minimize this risk by at least having some formal commitment from the board of the company, before the final partnership contracts are there.

Another risk, which is always there with digital applications that need a high user/community commitment, is that we loose the interest of the users if we do not optimize our application to their needs continuously. To mitigate this risk we know it is of importance to have the necessary resources to keep on researching user experiences of the application and adjust it based on the feedback and results. As mentioned before that is one of the reason we have put the new release on hold to make sure that the financial resources are there and the commitment of the right partners (that strengthen the communication value and reach of our project) is 100% confirmed.

17.3.6 User-based evaluation of the concept

Evaluation goal

The aim of this evaluation was to execute a pre-test of the Shop&Drop online service on actual customers: offering webshop customers that made a purchase on the website a retour option for returning (without costs) a box of disused electronic products. Goal was to learn whether customers are willing and interested to use this service. The only (and quite important) difference with the actual Shop&Drop online service, is that customers could not give the box of products to the delivery guy, but had to bring it to the post office themselves.

For this test we partnered with the online webshop Thuisrecycling.nl, a webshop that sells products that help people to reduce, reuse and separate waste in or around their homes.

Evaluation set up

Target group: customers of the webshop thuisrecycling.nl in the period June/July 2016 that made a purchase of €50,- or more.

All of these customers received the email below, one or two weeks after the delivery of their purchase. In that they are offered a free to use return label to send back a box of electronic waste in

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the box of their original purchase or another box they have at home.

THUIS RECYCLING .NL

Rene Francke,

Ontvang deed je een bestelling bij Thuisrecycling.nl. We hopen dat je jouw bestelling in goede orde hebt ontvangen en dat je plezier hebt van de producten.

Ongeveer vijf tot zeven dagen na aflevering wordt de aflevering van de producten in goede orde ontvangen en de je plezier hebt van de producten.

Ongeveer vijf tot zeven dagen na aflevering wordt de aflevering van de producten in goede orde ontvangen en de je plezier hebt van de producten.

Dit Thuisrecycling hebben we terugkopen en recycling heeft in het weekend aan. Met onze producten zorgen we ervoor dat het schillen en vermalen van o.a. plastic, papier, glas en CFT-afval in en om huis een stuk eenvoudiger wordt. We zijn ons erachter ook van bewust dat het voor sommige producten niet zo eenvoudig is om ze te schillen en op de juiste plek in te leveren. Want wat doe je bij voorbeeld met oude apparaten zoals een broodrooster, kfm of wasdroger? In veel gevallen staan die in een hoekje van je huis te wachten op een rijtje naar het milieupark. Een rijtje waar je maar niet aan toe komt...

Het is onze ambitie om de inzameling en recycling van die producten makkelijker te maken voor onze klanten. Daarom bieden we je aan om deze aan ons retour te sturen. Wij dragen dan zorg voor een verantwoorde verwerking. Zo kunnen we er samen voor zorgen dat alle producten en materialen een tweede leven krijgen.

Stuur ze vandaag nog gratis retour en ontvang een korting op jouw volgende aankoop bij Thuisrecycling.nl

Hoe gaaf het in zijn werk:

- wil de doos van jouw bestelling (of een zelf meegebrachte doos van max. 100 x 60 x 50 cm) met maximaal 10kg oude elektronica
- geen oude elektronica: verstaan we alles waar een batterij in zit of een stekker aan zit
- zorg ervoor dat alle producten droog en droog zijn (bij voorbeeld geen oude wasdroger maar nog water in zit)
- plak de doos af met een zelf plak of met een afklevende plak
- plak de instructies op de pagina die wordt gepresenteerd en print het retourlabel
- plak het retourlabel op de doos en breng de doos naar een PostNL.com/depot bij jou in de buurt
- je hoeft bij het PostNL-pakketpunt waar je het pakket inlevert NIET voor het label te betalen
- Zodra we je retourzending hebben ontvangen, krijg je van ons per email een bevestiging, met daarin een kortingscode. Deze code geeft je recht op een korting van 5% op het volledige aankoopbedrag van je volgende bestelling in onze webshop.
- Deze retourzending is 28 dagen geldig.

We hopen dat we je hiermee helpen om het thuis recyclen nog makkelijker te maken!

Heb je vragen of wil je meer informatie over waarom we dit doen? Mail ons dan op info@thuisrecycling.nl

Hartelijk groet,

Francke
Thuisrecycling

Evaluation results

During the test period the email offer was send to 40 customers that made a purchase of more than € 50,-. Four of them have send a box of ewaste back to the webshop, the rest didn't. We've send a short questionnaire to understand why they did or did not use this opportunity. The results were:

Did you read the email? 22 = yes, 18 = no

Did you use the service? 4 = yes, 14 = no

Can you explain why you've used the service?

- Accidentally I was just cleaning up my house and this was an easy way to get rid of the electronic equipment (1)

- I liked the offer (2)

- it was a good reason to go through the stuff I have lying a round at home and never took the time to bring to the municipal waste centre (1)

Can you explain why you did NOT use the service?

- I forgot about the offer (4)

- I didn't have electronic waste at the moment (6)

- I didn't have time to bring it to the post office (2)

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- It makes no difference for me to bring it to the post office or the municipal waste centre (2)

Which of the following situations would make that you WOULD use the service? (the interviewees could choose more than 1 answer)

- If I can give it to the delivery guy instead of having to bring it myself (12)
- If I knew that this service would be offered to me when I made a purchase at the webshop (6)
- If I have E-waste (12)
- If there are more webshops that offer this service so I can use the service no matter at what website I make my purchase (10)

Conclusion

From this small test, that we are continuing still with Thuisrecycling.nl, we've learned that the timing of the offer and the effort that needs to be made by the customer are key for its success. Just offering this opportunity for free is not enough, because if the effort is too big, people won't get into action. It thus strengthened us in our idea that it is very important that the service does mean a customer can give the box directly back to the delivery guy (no effort) when he receives his purchase (timing) and knows about this service in advance (when he makes his purchase). Besides it seems important that the service is offered by as many webshops as possible, so that customers start to learn that whenever they buy something online, they can give waste products back.

The coming weeks we will put more focus on the *timing* of this offer by promoting it already before and during the purchase the customer makes, so that they know they will be offered this service. If that already makes a difference in the success rate, that gives us important information we can use in the execution of the pilot with the logistics partner, in which customer DO get the opportunity to hand over the box of waste directly to the delivery guy.

17.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 32.

Table 32: Snapshot of project "Shop&Drop"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop a service using web and mobile apps that makes it as easy and valuable as possible for European citizens to participate in waste separation, by interlinking 'separation behaviour' to their 'shopping behaviour' – every time a citizen goes 'out' to shop (whether in store or online) they will think of what waste/old products to drop AND will do that in the same routine.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Collected user feedback to optimise the application ○ Used feedback to aid development of new software architecture and smartphone app, as well as an optimised rewards system. ○ Conducted research on the main challenges in EU countries, particularly the waste separation issue. ○ Established and maintained relationships with key stakeholders, including key commercial partners. ○ Produced a detailed business plan 	<ul style="list-style-type: none"> ○ Organisation/project website: http://www.shopendrop.nl/ ○ Organisation/project social media: Twitter (492 followers) and Facebook (344 likes) ○ Weekly blog as part of online promotional strategy (that was underpinned by social media): http://www.shopendrop.nl/blog/ ○ Attended 8 events to deliver presentations/pitches and take part in workshops, including the Circular Economy Booster Masterclass and a guest lecture at Rotterdam University. ○ Featured in 11 regional/national

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	<p>and financial model, as well as delivering an extensive sales and marketing strategy to attract more customers.</p> <p>The project successfully delivered 12 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<p>publications for print/online magazines and online blogs.</p> <ul style="list-style-type: none"> ○ News article about the project's progress on the CHEST website: http://www.chest-project.eu/shopdrop-love-shop-care-drop/ ○ 195 interactions in the project's section on the CHEST Community Forum.
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Table 33 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on ways of thinking, values and behaviours) and secondary (impact on the economic value generated by the project) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 33: Mandatory KPIs for Shop&Drop

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	2	3	3
		Number of users involved in co-design process	10	50	60
		Ratio between men and women involved	50/50	10/90	23/77
		Ratio between young, adult and old people involved	0/100/0	0/100/0	0/100/0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	2	5	4
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	2	12	15
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	8	5
		Number of comments / replies on project blog entries on CHEST website	0	5	8
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	221	1500	856
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	Weekly FB posts and Tweets	Twitter tweets: 304 FB posts: 40	Twitter tweets: 1044 FB posts: 70

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18 SourceIT⁵⁸

A GIS (geographic information system) mapping tool to support existing and new enterprises, both social and commercial, which have a specific focus on the reuse and recycling of materials, in locating unwanted resources/waste materials which are essential to the existence of such enterprises. SourceIT would provide a tool for organisations such as local authorities, civic amenity sites, waste companies, private companies etc., to upload data on quantities and types of materials that they may have available, which both social and commercial enterprises are seeking for reuse and recycling, and would then allow for that data to be geographically mapped. SourceIT would also enable more efficient, co-ordinated and environmentally friendly transport systems for such resources/waste materials by allowing existing and new enterprises to track volumes and quantities by location.

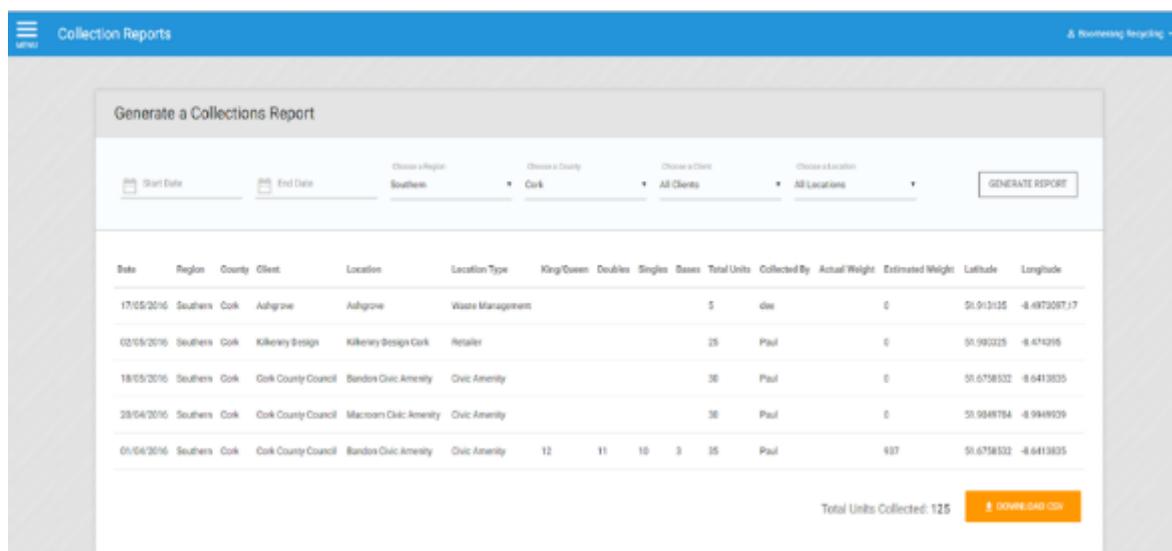


Figure 23: Picture of the SourceIT prototype (collection report)

18.1 The societal problem

18.1.1 Description of the problem

- **Which specific problem did you intend to solve? The social problem should be described as specifically as possible. If several problems can be identified, they should be prioritised based on importance.**

Environment: Based on current consumption patterns, it is estimated that the equivalent of more than two planets will be needed by 2050 in order to support the growing global population. In the EU, each person uses approximately 15 tonnes of materials and generates 4.5 tonnes of waste per year with almost half disposed of to landfill. This linear approach relies on the extraction of natural resources and with a limited supply; it is imperative that a more sustainable approach to their use is adopted. A transition to a circular economy is required where waste is treated as a resource, reuse/recycling levels are increased and the level of natural resources used in production is reduced. Many resources in Ireland end up in landfill because they are not commercially viable for enterprises to enter the market and therefore social enterprises provide a huge role in meeting this demand and need for recycling of such materials.

Unemployment: Long Term Unemployment still remains a significant challenge in Ireland, however Social Enterprises provide opportunities for employment. Today the rate is 4.7% following a record low 1.20% in 2001. Considerable research documents the association between long-term unemployment and poor socioeconomic outcomes. Unemployment can also lead to worse mental,

⁵⁸ Chapter contributors: Mathias Becker, Michelle Green, Maeve Bowen, Eimear Cusack

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wellbeing and poor physical health and parental unemployment can hamper children's educational progress.

Disability: Similarly, Social Enterprises offer opportunities to those with disabilities who may face challenges integrating into society. Up to 600,000 people have a disability in Ireland (CSO 2011) and among the age group 15 to 49, one in six have completed no higher than primary level education (compared with one in twenty of the general population). Secondary school was the highest level completed by around a quarter of people with disabilities, while one in seven of non-disabled people stopped there. The link between disability and education extends, as you'd expect, to the workplace. This is from the press release accompanying the CSO publication: "There were 162,681 persons with a disability in the labour force giving a labour force participation rate of 30%. That compares to 61.9% for the overall population. Of the total of 542,277 people aged 15 and over with a disability, 112,502 or 20.7% were at work. This compares with 50.1% of the overall population aged 15 and over."

The above issues are tackled by the Community Reuse Network (CRNI - www.crni.ie) who is the all Island representative body for community based reuse, recycling and waste prevention organisations. Collectively the social enterprises have diverted over 39,000 tonnes of material for reuse & recycling whilst providing over 690 jobs & 7,650 training opportunities. They play a key role in providing training and employment opportunities for those most marginalised in society and distanced from the labour market due to a disability, mental illness, conviction etc. They provide an opportunity for integration/reintegration back into society, developing their readiness for work, which can lead to a whole range of benefits including improved mental health etc. They face many barriers in attracting funding, governance, capacity building and there can be a lack of understanding of what a social enterprise is and lack of recognition of their valuable contribution to society. The sustainability of the sector is challenged and in order to keep the sector alive and thriving and contributing to the progression of Ireland economically, environmentally and socially it is vital we support this sector now and in the future.

SourceIT aims to provide one such support.

- **Who is affected by the problem? Please describe in detail who is affected by the problem and how so.**

Broadly speaking, given the global issue of the overconsumption of resources and the demands on the planet, the environmental issue of not consuming resources in a sustainable way means everybody is affected, to some degree. By sending viable resources to landfill, the impact on the environment is great and through working with social enterprises, we have learned that this is something that can be effectively avoided.

Social Enterprises play an integral role in the management of waste resources and help support and overcome the issues associated with a lack of resource efficiency. The Social Enterprise model also assists with other social issues such as unemployment and disability, as previously discussed. If the sustainability of these social enterprises is compromised through poor data management, administration or reporting, the sustainability of the provision of jobs and associated supports for these vulnerable populations is also compromised.

- **How has your perception of the problem changed during the reporting period (lessons learned)?**

Since the last reporting period, it is accurate to say that the environmental challenge has not changed. The issue with overconsumption remains a serious one however; Social Enterprises such as Boomerang are endeavouring to tackle this challenge. Whilst initially, it was thought that the environmental challenge was the key focus, through working with Social Enterprises throughout the lifetime of the project, it was clear that there were social issues evident that were not originally considered or recognised e.g. long-term unemployed, disability, ex-offenders, and other vulnerable populations. The need for social enterprises in this regard was even more evident, in that without them, it impacts on the lives of those who are reintegrating themselves back into society.

➤ **How has the social problem itself evolved over time? What is the current situation? How will the problem develop in the future if no action is taken?**

As previously highlighted, Social enterprises have faced and continue to face many barriers in attracting funding, governance, capacity building and there can be a lack of understanding of what a social enterprise is and lack of recognition of their valuable contribution to society.

If no action is taken, the sector will continue to be challenged and will be restricted in its ability to grow. For example, no action could lead to a continued lack of understanding of social enterprises and the contribution they make to society could lead to reduced investment in the sector.

Similarly, transient staff with low skill levels can lead to poor internal processes, compliance issues and a lack of structured and co-ordinated data which can lead to poor planning decisions and poor overall performance. This can produce poor data and reporting, which again leads to lack of confidence in the sector and a compromised reputation for the sector which can, again, results in a lack of investment.

In order to keep the sector alive and thriving and contributing you the progression of Ireland economically, environmentally and socially it is vital we support this sector now and in the future. SourceIT delivers once such solution to this.

18.1.2 Scale of the problem

It is estimated that we send 400,000 - 600,000 old mattresses (this calculation is based on 1.5 mattresses per head of population being changed every 10 – 15 years) to landfill every year in Ireland. Up until 2013 there was no facility for recycling mattresses in Ireland. Today there are two social enterprises operating, *Boomerang Enterprises* and *Eco Mattresses* in Cork and Dublin respectively. Three full time paid jobs have been created by both enterprises and approximately twenty people have participated in community employment and training schemes encouraging socially disadvantaged and long term unemployed back to work. Both social enterprises combined recycle approximately 30,000 mattresses annually. Both social enterprises have received state funding to establish and aim to be self-financing. However, in order to sustain such an enterprise, a co-ordinated approach to identifying all unwanted mattresses in Ireland needs to be established.

Civic amenity sites and waste management companies all around Ireland are disposing of mattresses to landfill and without an effective means for collaboration and data sharing on quantities and location of mattresses, this will continue. The European Waste Framework Directive (Directive 2008/98/EC on waste) includes two new recycling and recovery targets to be achieved by member states by 2020: 50% preparing for re-use and recycling of certain waste materials from households and other origins similar to households, and 70% preparing for re-use, recycling and other recovery of construction and demolition waste. While mattresses are not yet banned from landfill, it is certain that they will be in the very near future, like many other waste streams, and it is imperative that a system be developed that allows the different stakeholders to collaborate to come up with solutions. To help these enterprises and enterprises in Ireland, in Europe and internationally to increase the number of mattresses and waste materials that come through their facilities which ultimately helps them become more sustainable, self-sufficient whilst safeguarding jobs and training places for the long term unemployed and contributing to the circular economy and its associated environmental benefits, it is essential that we develop an efficient system for locating mattresses and for also coordinating an efficient collection system of same.

18.1.3 Previous approaches to solving the problem

There are many websites out there that support the exchange of resources, e.g. www.smileexchange.ie; www.wastematchers.ie; www.freetradeireland.ie; www.donedeal.ie etc. These websites allow users to become members and then post resources they either have to

give away or that they want to get. The websites are useful for once off items and it is useful in identifying where some resources may be. However these websites just provide piecemeal information on all waste streams e.g. 10 mattresses in Dublin; 4 chairs in Cork; Timber in Galway; Cardboard in Mayo etc. They do not at a glance show that there are up to 1,600 mattresses on any given day in all different locations across Ireland, e.g. civic amenity sites, retailers warehouses, waste management warehouses etc. They do not provide a direct link between the owner of these waste streams and a potential end-user i.e. the reuse or recycling organisation. They do not provide a mechanism to geographically map all the specific waste streams and to then co-ordinate an efficient and economical collection process. They do not facilitate ongoing interaction between the owner and end user through technology.

18.2 Implementation of organizational structure

18.2.1 Maturity of the project

SourcelT is at the demonstration stage of development, with a demo for mattresses version currently being tested by stakeholders. The next stage of the project will be to roll it out to end users. Michelle Green (MG) and Eimear Cusack (EC) have been testing the software and providing demonstrations to potential end users (e.g. Boomerang Enterprises – the Irish mattress recycling enterprise). The software has been developed primarily for waste mattresses however the aim is to also test it for use by providers and recyclers of other waste materials and a demonstration of the software has been planned with Repak (End of life tyre) ELT for May 2016. Since November 2015, Repak ELT is the only compliance scheme now in operation for ELT in Ireland. The Producer Responsibility Initiative (PRI) scheme spearheaded by Repak ELT is a new development for Ireland one of the key aims of the scheme is to greatly improve the reporting of used tyres, which is currently very poor. SourcelT could be a very beneficial way of supporting Repak ELT's scheme and in particular, streamline and speed up the business process, and in particular the reporting of tyres, in Ireland. An official launch of the software will take place in Autumn 2016.

18.2.2 Organizational structure

This project is being managed by Michelle Green (MG), Environmental Programme Manager at Macroom E, who reports directly to Maeve Bowen (MB), General Manager at Macroom E. Both Michelle and Maeve are permanent staff members of Macroom E. Eimear Cusack (EC), Project Assistant, is also part of the project team.

- MG's role on the project involves the following:

- 1) Project planning
- 2) Management of the Advisory Group
- 3) Liaison with the software developer
- 4) Engagement of stakeholders (potential users of the software)
- 5) Reporting and financial management

- EC's role on the project involves the following:

- 6) Brand design and development of marketing strategy and materials
- 7) Co-ordination of the national launch of SourcelT
- 8) Assistance with project reporting and planning

MG will be supported [particularly in relation to 5)] by the finance team which is headed by Magali Bolger, also a permanent employee of Macroom E.

The Advisory Group consists of a number of key stakeholders including:

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- 1) Boomerang Enterprises (Social Enterprise initiative)
- 2) Cork County Council (Civic Amenity Sites)
- 3) Macroom E

Updates on progress and developments with the SourceIT project are presented to the Macroom E Board at all Board meetings also.

18.2.3 Key personnel

Michelle Green holds a Bachelor of Science in Government & Public Policy and a Higher Diploma in Education, both from University College Cork. She has a certificate in Business Management at Cork College of Commerce and a certificate in Supervisory Management. She has also completed a Professional Project Management Course. She is currently completing a Master's in Public Administration at the Institute of Public Administration. Michelle joined Macroom E in October 2010 as Project Manager for the SMILE Resource Exchange initiative. This initiative began as a pilot project in Cork and in 2014 was launched as a national project. Funded by public sector it offers a resource exchange platform to businesses where a waste in one company can be a resource in another. During this time she has developed a strong passion for the environment and sees the value in looking at waste as a resource from an environmental perspective but also a social and enterprise perspective. During this time she was part of the initiation and establishment of the Boomerang Enterprises, a mattress deconstruction enterprise project and currently sits on the Advisory Group. She has overseen the development of a number of websites and CRM systems during her time in Macroom E most notably www.smnileexchange.ie. She is also contributing to a European Project called Circular Ocean which seeks to find useful solutions for reuse and recycling of fishing nets.

Prior to her time in Macroom E, Michelle worked as a Programme Manager for over three years for a not for profit, educational organisation called Common Purpose which specialises in cross sectoral leadership development. During this time she co-managed a senior leader cross sectoral leadership programmes and developed a youth leadership programme in Cork which subsequently expanded into Dublin and Limerick. A strong interest in current affairs and the public sector, Michelle worked as a Parliamentary Assistant to a Member of Dail Eireann for a short while. Building on her strong interest in current affairs and combined with a passion for education, prior to this she practised as a secondary teacher for a couple of years mainly teaching CSPE (Civic Social Political Education) but also Business, Maths and History. During this time Michelle was also involved in a research project investigating the viability of growing miscanthus as an energy crop in Ireland, stemming from her interest in environmental issues and in particular energy. Most recently Michelle was appointed as a Board Member to the Sustainable Energy Authority of Ireland. Michelle has a passion for community development and community empowerment and holds a number of positions in community organisations i.e. Treasurer, Secretary and Chair. She also represents SMILE on the social enterprise project, Boomerang Recycling.

Maeve Bowen has managed Macroom E since it opened in 2004. From 2004-2013 she has had responsibility for the establishment of the enterprise centre and for running and developing a number of projects including: SMILE Resource Exchange, Green Shoots Incubation Programme, Eco Business Ireland Awards, CORKMEET, Wastematchers, the E Centres project and the CONNECT Business Network. Previous to taking the position in Macroom, Maeve has worked as operations manager with a start-up scientific company, with the multi-national Sun Microsystems, with the Enterprise Trust and with University College Cork. Maeve has a joint honours degree in English and Sociology, a Higher Diploma in Rural Development and an MSc from University College Cork. She has also completed modules from the masters in interactive media programme in UCC. Further qualifications include: Certificate in Public Relations (Irish Academy of Public Relations); Performance Management (HRM Consultants, Dublin); Conflict Resolution Skills (UCD); Teaching through Distance Learning (UCC); R&D Management (Enterprise Ireland, Dublin) and

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a diploma in Business Coaching. Maeve is currently undertaking a PhD in Social Sciences in University College Cork. Expected completion for her doctorate is 2016.

Eimear Cusack joined the Macroom E Team in 2015. She holds a BA in Philosophy & Psychology, an H.Dip in Psychology and an MSc in Consumer Psychology with Business. Eimear has worked in a number of communications roles within the not-for-profit and mental health sectors as well as, most recently, in the food industry. Eimear is particularly interested in behaviour change, digital technology and project management. For her Masters' thesis, she tested a communication intervention with the objective of reducing high-risk behaviours on construction sites. Eimear is working across a number of environmental projects at Macroom E including digital storytelling, tourism and recycling. She is also working as Project Assistant on the SourceIT project.

18.2.4 Partnerships, co-operations, and networks

The key partners of SourceIT are:

- Macroom E
- Cork County Council
- Boomerang Enterprises
- Eco Mattresses

Each partner has been instrumental in ensuring the effective design of the SourceIT software and will continue to be involved in the demonstration and roll-out phases.

Partnerships

Macroom E: has a wealth of experience and knowledge in successfully developing projects from seed phase, to pilot phase to full development phase. Macroom E is a wholly-owned subsidiary of Cork County Council and its Board comprises of Cork County Council (both Economic Development and Environment Units); Enterprise Ireland; Lee Valley Enterprise Board (local Organization); and Local Community & Business Rep (Apple) and South Cork Local Enterprise Board. Its experience in developing the SMILE Resource Exchange project and the networks it has developed through this, i.e. Environmental Protection Agency (Ireland), will be invaluable in terms of further development of this project.

Cork County Council: are a strategic partner given its network of 11 civic amenity sites around Cork. The software has been developed with the Council in mind ensuring that its needs are met in terms of inputting data into the software, ease of use etc....at each of their civic amenity sites. The overall manager of the civic amenity sites participated on the Advisory Group throughout the software's development and demonstration phase. The software is due to be trialled at these civic amenity sites.

Boomerang Enterprises & Eco Mattresses: both of these organisations are social enterprises whose business model centres on deconstructing post-consumer mattresses. Both provide up to 20 training and development places for the long-term unemployed and are diverting a combined total of almost 800 mattresses from landfill per week. As both enterprises are growing, it is becoming more unsustainable for them to manually identify where the mattresses are to co-ordinate efficient collection and to track numbers collected and recycled. Both Project Managers of the enterprises (Paul Kelly, Boomerang and John Scally, Eco Mattresses) are on the Advisory Group and have been involved in the testing of the wireframes and are now involved in testing the demonstration version of the software. Their feedback has been very positive, particularly on how it will reduce the administrative time involved in organising collections and also in tracking and reporting. Further suggestions for the second phase of the software have also been put forward and documented for future reference and implementation, pending available budget/funding.

Networks

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Waste Regions: Macroom E have advised the three waste regional authorities in Ireland, i.e. Southern Region, Eastern-Midlands region and Connacht-Ulster region, about the project and, similarly, they have all been kept informed of the projects progress. The Waste Regions have also been involved throughout the development phase and are now also part of the demonstration phase. Involving our waste region contacts throughout the development of the software is essential in terms of ensuring that the SourceIT software's end result fully meets their needs.

Cork Chamber: Macroom E is a member of Cork Chamber, a large business network group therefore Macroom E has access to a large network to promote the software once the demonstration phase has been completed and the software is ready to launch. . Promotional opportunities with Cork Chamber include featuring in a weekly Business eBulletin which is circulated to over 3,000 business contacts in the region, as well as bi-monthly Chamberlink Business Magazine which is distributed to over 2,500 Chamber members.

EUR-ISA (European Industrial Symbiosis Association): Macroom E through the SMILE project is a member of EUR-ISA. Again, once the software is ready to launch, this will be a useful organization for disseminating information and for identifying other potential opportunities for the software in terms of other waste streams.

Industrial Symbiosis Working Group: Macroom E through the SMILE project is a member of this group which has representatives from the Department of Environment & Local Government; the Department of Jobs Enterprise and Innovation; University College Cork; Local Enterprise Office Network and the Irish Environmental Protection Agency. Again, this group has received updates of the progress of the project and will help identify further development opportunities and applications for the software. Michelle Green is Secretariat of this group.

Community Reuse Network of Ireland: Macroom E through the SMILE project is also a member of CRNI, a network of social enterprise sin the reuse/recycling space. This will be an additional useful network to promote the project and to identify end users.

18.3 Implementation of the solution approach

18.3.1 Solution approach

SourceIT aims to increase levels of reuse and recycling of materials/waste by supporting social and commercial enterprises with GIS tools to allow them to geographically locate materials/waste, to share data and to collaborate and in the short and long term to become more sustainable therefore safeguarding jobs and training places for the long term unemployed. SourceIT aims to provide this opportunity for all social and commercial enterprises operating in the reuse/recycling sphere with an initial focus on mattresses in the pilot phase. SourceIT is an innovative solution as it uses digital technology to present data on resources/waste materials which are geographically mapped, allowing different stakeholders to collaborate and which is likely to speed up the process of identifying solutions for the reuse and recycling of such resources/waste materials. In the case of the mattress recycling enterprises, they source all their mattresses by telephoning, emailing and visiting the premises of mattress retailers and civic amenity sites who take them from the public. This is a very time consuming process followed by an inefficient and ad hoc collection and delivery system of mattresses from different locations to the recycling facility. SourceIT allows for a much more efficient geographic locator system and transport system whereby collections for delivery to the recycling facility can be made when sufficient volumes are available in particular locations with this being visible on the software system. This in turn will support the sustainability of such enterprises which are necessary in order to increase the reuse and recycling of materials which are currently going to landfill. The data available on SourceIT i.e. geographically mapped volumes and types of materials, offers the

opportunity for innovative ideas to be developed based on solid data and thus also increases the likelihood for increased reuse and recycling of resources/waste materials.

18.3.2 Target groups

The target groups for the demonstration stage of SourceIT are mattress recycling social enterprises, local authorities, civic amenity sites, waste management companies and private companies who have waste mattresses, e.g. hotels, university campuses and retailers. These can be divided into three types of target groups:

1. Social Enterprises: Both mattress recycling social enterprises identified above, i.e. Boomerang Enterprises and Eco Mattresses, participated in the development phase and are participating in the demonstration stage. This ensures that the system meets their needs in terms of visually mapping where the mattresses are in Ireland in order to create more consistency of supply and more efficient transport systems. Macroom E, through the SMILE project are a member of the Community Reuse Network of Ireland (CRNI), www.crni.ie, and through this medium have developed relationships with the majority of social enterprises operating in this space in Ireland. Once the software is completed, a presentation will be made at an upcoming CRNI network meetings to promote the software to its members. The social enterprise network in the recycling, reuse space is currently small, however it has grown significantly in the last few years and it is expected to be a fast growing part of the economy in the future as we move towards the circular economy, i.e. it has been identified by government that social enterprise has a significant role to play in the economy but also in meeting environmental needs and social needs. Macroom E is also involved in a European project called Circular Ocean which seeks to increase the levels of fish net recycling and reuse through the development of social enterprises. The software could also be very appropriate for the mapping of fishing nets; therefore there are multiple options available for the project to grow and to generate other income streams. The more waste streams the project is used for, the more potential users, which ultimately should drive down the cost per individual user. The Circular Ocean project aims to aid the development of social enterprises in the recycling and reuse of fishing net space so we will have direct access to these groups setting up such projects across Europe through involvement as a partner on this project.

2. Commercial Enterprises: Like social enterprises, the viability of commercial enterprises that are in the recycling, reuse and upcycling space, getting a sustainable supply of material for reuse etc. is essential. There are many enterprises who are members of the SMILE network, www.smileexchange.ie, also managed by Macroom E, that need to map specific waste streams and plans are currently underway to target these organisations through the SMILE Network, once the software is ready to launch.

3. Public Sector: It is suggested that local authorities, given their function of running local Civic Amenity Sites will be an end user. Given that the Advisory Group will have a strong public sector presence, i.e. local authority, this will aid buy in from this sector from the outset. As the public sector civic amenity sites collect other items outside of mattresses, they will be able to see from an early stage the benefits of the software for other waste streams. Cork County Council and one of their civic amenity sites have been involved throughout the project in both the research and development stage. This is to ensure that the system also meets their needs in terms of a user-friendly software system that will help them to find an alternative option for their mattresses, as opposed to landfilling them. A demonstration is planned before the official launch of the software for Cork County Council and their use of the software in their Civic Amenity Centres will be encouraged. Initially local authorities and civic amenity sites in the Munster and Leinster regions will be approached to upload their volumes of mattresses onto the software once developed, given the location of the two enterprises, Boomerang Recycling and Eco Mattresses in Cork and Dublin, respectively. This would be then followed by an approach to local authorities and civic amenity sites in Connacht and Northern Ireland.

18.3.3 Activities and work performed

Work Package Number : WP1 Research & Information Gathering
Actual Starting month : September 2015
Predicted / Actual End month : November 2015
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> • D1.1 Undertake research of similar software in other parts of the world • D1.2 Discussion with identified stakeholders (mattress recyclers, civic amenity sites, local authorities, private and waste management companies) to ensure that all needs would be met by the software design • D1.3 Writing software specification • D1.4 Tendering software development • D1.5 Appointing software developer • D1.6 Assemble Advisory Group
<p>Description of work this period:</p> <p>Main achievements:</p> <p>This work package was completed in the previous reporting period so as such, is not described in this report.</p>
<p>Summarise any problems you have encountered, and how they have been overcome</p> <p>This work package was completed in the previous reporting period so as such, is not described in this report.</p>
<p>Description of planned activity for next reporting period</p> <p>This work package was completed in the previous reporting period so as such, is not described in this report.</p>

Work Package Number : WP2 Software Development
Actual Starting month : December 2015
Predicted / Actual End month : May 2016

Work Package Objectives:

- **D1.1** Developing the software with the software developer
- **D1.2** Testing the software with stakeholders and identifying snags

Description of work this period:

Main achievements:

- The software has been developed and currently a demo version is being tested by stakeholders.

Detailed description of work performed to reach the achievements listed above:

During this period MG and EC held meetings with the software developers to ensure the software was being developed in line with specifications and in line with user needs. In the previous period the developers had created Wireframes which were used for consulting key stakeholders on the software ensuring a bottom-up approach to development. During this period the demo version was created. It is worth noting at this point that the SourceIT software is powered by [Wordpress](#) with a [React](#) front end for the logged in users of the waste management application. WordPress is a very flexible and scalable open-source content management system (CMS) based on PHP and MySQL. It's a mature technology with significant market penetration and is used by more than 23.3% of the world's top 10 million websites as of January 2015. It's one of the most popular systems in use on the internet powering more than 60 million websites and is used by brands such as The New York Times, CNN, Forbes & Reuters. SourceIT uses Wordpress to handle access control, content management and categorisation. React is a JavaScript library for creating user interfaces. It was developed by Facebook and Instagram to help solve the problems of building large applications with data that change over time. SourceIT uses this technology to give a fast responsive interface. Using React means that actions are handled in the browser session rather than having to post back to the server for each action. This allows the user to map waste availability and collections in a fast "App" like environment. React facilitates SourceIT's responsive design, which is optimised for Desktop, Tablet and Mobile Devices.

Once this demo was ready it was tested internally by MG and EC. Additionally, demonstrations were given to key stakeholders, including Boomerang Enterprises. A snag list with screen shots was drafted based on feedback from the internal software testing and testing with the key stakeholders, with the software developers then carrying out the necessary corrections to the software. Final changes are currently being implemented.

Summarise any problems you've encountered, and how they have been overcome

- **Transferability of the Project**

As outlined in the interim report, the project team wanted to create software that could have wide application across different enterprises, as well as across different resources. However, it was imperative to also offer a tailored approach to the user, so that the software best fit their specific needs. This was challenging as tailoring too much, according to the particular needs of Boomerang Enterprises for example, would result in a limited tool, whereas offering a broad, general piece of software does not optimise the tool for individual usage. Based on this, and in discussion with Aonach, a flexible, stepped approach has been implemented into the software meaning that currently the software meets the needs of both Boomerang Enterprises and Eco Mattresses however, it is also applicable to other resources and can easily be scaled up or edited according to the needs of future users e. g. adding another waste stream to monitor. Having tested the version of the software the project team believes it should be easily adaptable to other types of waste resources such as tyres, furniture, fishing nets etc. Similarly, following discussions with the software developers, in their experience with previous software platforms that they have built, the transferability of SourceIT to other waste streams is something that is very achievable, given that a comprehensive "template" has already been created in SourceIT. This model can be replicated to

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monitor additional waste streams and their associated characteristics e.g. Tyres – number of tyres, size of tyre, type of tyre etc...

Description of planned activity for next reporting period

MG will continue to work with the stakeholders and the software developers to ensure that the software is sustainable post-project and adapted to other types of waste resource as required.

Work Package Number : WP3 Promotion to Stakeholders

Actual Starting month : October 2015

Predicted / Actual End month : June 2016

Work Package Objectives:

- **D1.1** Engagement with relevant stakeholders across Ireland i.e. local authorities, civic amenity sites, private companies and waste management companies
- **D1.2** Promotion of software and also participation
- **D1.3** 10 Users registered with SourceIT software

Description of work this period:

Main achievements

- *Promotional materials* - finalised
- *Website* – will be completed June 2016
- *Press release* – next one to be issued in tandem with launch
- *Newsletter* – issued May 2016

Detailed description of work performed to reach the achievements listed above:

In this period, MG has been working with Doodle Creative (Graphic Design Agency) to create promotional materials for the project including a brochure and pop-up stand (Appendix A). These are in line with the branding for the SourceIT project which was established in the previous period (Appendix B). The brochure outlines who the software is targeting, why the project has been undertaken, the challenges being addressed by the project and what the benefits of the software are to end-users.

The social media pages for both Facebook and Twitter created in the last reporting period have been populated and regularly updated over this project period. They are available at the following links:

- **Facebook:** <https://www.facebook.com/sourceitproject/>



- **Twitter:** <https://twitter.com/sourceITproject>



A basic website is currently being developed with a log-in facility for the software users, an overview of the project and its funders, an outline of who the software is for and the benefits of it to them and finally examples of the types of waste resources it can be adapted for. The domain name is <http://www.sourceit.ie> and we expect to launch this website along with the software in Autumn 2016.

A press release is also currently being prepared to be issued once the software is ready to launch. This provides a background to the project and it's financing, whilst also outlining who the software is targeted at and the benefits of importance of SourceIT. Plans are under way to issue this press release through a PR company to both local and national media in Ireland, and to all stakeholders.

A communications timeline was created in order to ensure that all of the activities are undertaken in a strategic way, optimising engagement levels and participation in the software. Please see Appendix C for further details.

<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> • 10 User Sign-ups <p>As mentioned in the interim report, it may be difficult to achieve this target. Some key stakeholders have indicated that it seems as though paying to recycle the mattress and to have its parts repurposed, is simply an additional cost for our target groups. To resolve this we aim to move from a project to a product approach with support from our software developers Aonach. Our project brochure, press release, roll-up etc will be impactful in demonstrating how the benefits of using the software outweigh the costs.</p> <p>Our aim is to create a new business model for the software that involves one larger user e.g. Repak ELT, who would then give access to the software on a license basis. This would be both a faster and more streamlined approach to increasing our memberships with relevant parties. This business model, we believe, is an improvement on the previous suggestion of charging users individually.</p>
<p>Description of planned activity for next reporting period</p> <p>The project's social media accounts will be continually updated and maintained with relevant news, information and facts surrounding the environmental issue of waste and encouraging recycling. Updates on the status of the project will also be promoted through the social media sites, which will be particularly useful when launching the finalised software. We will also issue a newsletter announcing the launch of the software, which will be disseminated to all stakeholders and contacts on our database. Also, workshops will be held with key stakeholders involving demonstrations of the software and the project team are currently seeking opportunities to engage with IT/Technology oriented conferences and seminars.</p>
<p>Work Package Number : WP4 Implementation, Launch of Software and Report</p>
<p>Actual Starting month : May 2016</p> <p>Predicted/Actual End month : June 2016</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> • D1.1 National launch of software (initial focus on mattresses) • D1.2 Promote awareness of software • D1.3 Complete final report
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • This work is due to begin in May 2016, with a view to a national launch in Autumn 2016. • We will be targeting and involving our key audiences also including the Local

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Enterprise Office, waste management companies, local authorities etc...
Detailed description of work performed to reach the achievements listed above: As part of the launch of SourceIT, a press release is being prepared for dissemination to relevant stakeholders and local and national media outlets. Similarly, all social media channels and the SourceIT website will promote the launch of the software. The Advisory Group will also meet to discuss their relevant partners/links who would be interested in the launch of SourceIT. It is anticipated that through implementing a strategic plan for the launch, this will result in some sign-ups to use the software. The final report will also be completed and submitted in June 2016.
Summarise any problems you have encountered, and how they have been overcome n/a
Description of planned activity for next reporting period The project team will continue to work with the software developers to finalise the demonstration version and ensure that it is meeting the requirements as outlined and agreed in consultation with stakeholders throughout the development and demonstration phase. This work is on target for completion within the proposed timeline of June 2016.

18.3.4 Sustainability of the solution

As addressed in WP3, it is anticipated that there may be a potential problem with signing-up users to the software. Having spoken to some key stakeholders and general 'market research', it seems as though paying to recycle the mattress and to have its parts repurposed, is simply an additional cost for our target groups. In terms of sustaining the software, it is important that the software moves from being a pro-ject to being a pro-duct through effective commercialisation of SourceIT with support from Aonach. Communication and dissemination of information about SourceIT will be impactful, highlighting that the benefits of using the software outweigh the costs. In order to support the uptake of users throughout the project and beyond, a 12 month maintenance contract has been agreed with Aonach, and has also been factored into the budget. This provides the project with more stability in terms of the future development of the software, post-June 2016. Similarly, as we have anticipated some potential issues with the sustainability of the software, a number of strategies are being implemented to mitigate the risk of this occurring; namely building relationships with key stakeholders and promoting the software, as outlined in WP3 and WP4.

The software is initially being piloted on the mattress waste stream. Therefore, the next stage is to develop a user base in Ireland. Much of the pilot stage, i.e. 10 months, is being taken up with research, design and testing of the software system and liaison with the relevant stakeholders identified to ensure that the system is fit for purpose.

Concurrently, an approach is being made to all local authorities, civic amenity sites, private companies and waste management companies to promote and encourage participation in the software. An example of this is the planned meeting with Repak ELT in May 2016.

Based on learnings throughout the development of the software and through liaising with key stakeholders, our aim now is to create a new business model for the software that involves one larger user e.g. Repak ELT, who would then give access to the software on a license basis. As discussed on page sixteen, this would be both a faster and more streamlined approach to increasing our memberships with relevant parties. This business model, we believe, is an improvement on the previous suggestion of charging users individually.

REPAK End of Life Tyres (ELT) provides the tyre industry in Ireland with an independently operated waste compliance scheme, using the expertise in waste compliance from one of the leading

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compliance scheme operators in Europe. Repak ELT has been approved by the Minister for the Environment, Community and Local Government to operate the only waste tyre compliance scheme in Ireland. A review identified the fact that the volume of waste is being generated annually by the Irish Tyre industry, is unknown. In order to have an effective end of life tyre management system, with environmentally sound handling of waste, there must be accountability and traceability through the distribution chain. The application of SourceIT here would enhance the monitoring, management and quantifying of used tyres in Ireland and would further fill the waste tyre knowledge gap.

The software also has international application i.e. it is relevant for the same end users across Europe and internationally, as well as Ireland. Therefore a third step will be to target European markets. A fourth step would be targeting international markets or both stages 3 and 4 could be undertaken simultaneously. It is suggested that to develop the software on a mass scale and to develop users across Europe, an appropriate European funding programme could be explored. For example, the ICT calls under Horizon 2020 have a number of different suitable calls. Alternatively a partnership could be developed with the software developer appointed to develop the project to take it to the next level. They may be interested in being a partner themselves or other venture capital funding could be sought for further development and deployment of the software internationally. Initially, it is essential to prove the concept and to develop a user base in Ireland.

18.3.5 Risks

Risk: The main risk for the sustainability of the project is that the potential users of the software will not want to pay for the service, which would make it difficult to keep the software updated and current and in constant development. This risk was identified at an early stage and so has been considered from the outset by the Advisory Group. This can be categorised as a medium-level risk.

Similarly, there was a low-risk that some deliverables would not be completed in line with the proposed timeline, given that there was a delay with the project starting on time. The project was initiated in late September 2015, as opposed to early September 2015, and given the subsequent additional time required to submit new H2020 LEAR documents it has been challenging to get the project to this stage. Despite these setbacks, the project team as a whole have worked effectively to bring the project forward and position itself within the original proposed timeline, with the exception of the launch, which will take place in Autumn 2016.

Risk Mitigation: Discussions took place early on with developers to assess potential maintenance costs and these were factored into the budget in the short term. From the outset, a key focus of the project was to get buy in from the end users. The end users were involved at an early stage of the process to ensure that the software met their needs and therefore very relevant and necessary for their business models and processes.

There are two types of end users:

1. *Commercial and Social Enterprises:* Every effort was made to ensure that the users saw the software as indispensable to their business model. Upon demonstration it was clear that it would reduce human resources' hours and therefore contribute to the business' bottom line. This has made it an attractive and desirable software solution for the business. In addition, the price of the software will also be kept at a reasonable and affordable cost.

2. *Public Sector:* It was suggested from the outset that local authorities, given their function of running local civic amenity sites would also be an end user. Given that the Advisory Group had a strong public sector presence i.e. local authority, it was hoped that this would aid buy in from this sector. As the public sector civic amenity sites collect other items outside of mattresses, they will be able to see from an early stage the benefits of the software for other waste streams. Macroom E is also involved in a European project entitled Circular Ocean which seeks to increase the levels of fishing net recycling and reuse. The software could also be very appropriate for the mapping of fishing nets, meaning there are multiple options available for the project to

grow and to generate other income streams. The more waste streams the project is used for, the more potential users that sign up for the software, which ultimately, we anticipate will drive down the cost of the software per individual user.

18.3.6 User-based evaluation of the concept

Since the last report, MG and EC have been working with the software developers to ensure that the system is thoroughly tested and suitable for mapping and tracking the availability of waste mattresses but still possible to adapt to other waste resources. This is to ensure that the future viability and development of the software will be easily replicable.

During this reporting period a demonstration version of the software was developed. This was tested extensively by MG and EC and demonstrations were given to stakeholders including Boomerang Enterprises. MG and EC noted the speed of the software which the developers explained was due to the fact that the “React” technology (see. Work Package 2) was used for creating the user interface which gives it an “App” feel.

A qualitative analysis was carried out by Boomerang with EC noting comments, assessments and suggestions for improvements. **(Appendix C)** The feedback from Boomerang Enterprises was extremely positive with the initial assessment that it would really improve their business processes in general. The software was fast moving and will provide them with a sense of security that their tracking and reporting is held in a safe repository. Queries such as the visibility of data between waste providers and users were clarified with the hierarchical nature of the software being explained. They were very impressed with how the data for clients was collated and the ease of use. The software creates a work plan for collection and Boomerang were impressed with the clarity of the plan and the two-click print process! Work plans were always developed manually and involved creating dockets for accounts etc. The software eliminates most of the manual preparatory work, speeding up and streamlining their systems. The reporting element of the software eliminates the need to pull together a variety of physical documents from folders and excel sheets and the download to excel option means they can search and filter as they require.

This evaluation also provided the opportunity to brainstorm on how the software could evolve over time. This included suggestions such as incorporating a way of recording sales and invoicing, pre-calculating prices, estimating fuel costs etc.

All of this feedback was reported back to the software developer along with the snag list developed by MG and EC.

18.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 34.

Table 34: Snapshot of project "SourceIT"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
SourceIT aims to increase levels of reuse and recycling of materials/waste by supporting social and commercial enterprises with an innovative digital solution incorporating GIS tools to allow them to geographically locate materials/waste, to share data and to collaborate,	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Undertook research on existing solutions, discussed software requirements with key stakeholders and appointed an advisory group. ○ Wrote software specification and tendered for lead software developer. ○ Developed the software in collaboration with the appointed 	<ul style="list-style-type: none"> ○ Dedicated project website: http://www.sourceit.ie/ ○ Organisation/project social media: Twitter (144 followers) and Facebook (28 likes) ○ Created project promotional materials: brochure and pop-up stand. ○ Project presented to regional and national audience at a seminar: “Sustaining Business through the Green Agenda”

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<p>which is likely to speed up the process of identifying solutions for reuse and recycling, so that in the short and long term they can become more sustainable.</p>	<ul style="list-style-type: none"> ○ developer to produce an MVP. ○ Tested prototype with stakeholders to identify issues for refinement. ○ Developed bespoke branding and made preparations for a national launch in Autumn 2016. <p>The project successfully delivered 10 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Agreement with PR firm to distribute a press release for the project's national launch (in Autumn 2016) ○ News article about the project's progress on the CHEST website: http://www.chest-project.eu/sourceit-increasing-reuse-recycling-materials-mapping-software/ ○ 328 interactions in the project's section on the CHEST Community Forum.
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Table 35 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on environment) and secondary (impact on information) impact area as well as its economic impact area (impact on the economic values generated by the project) are provided in D2.3 (Monitoring and Impact Analysis).

Table 35: Mandatory KPIs for SourceIT

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	0	4	4
		Ratio between men and women involved	0	6:4	6:4
		Ratio between young, adult and old people involved	0	0:1:0	0:1:0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	0	6	6
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	3	2 (Website near completion)
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	1	4
		Number of comments / replies on project blog entries on CHEST	0	3	0

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		website			
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, Facebook friends, etc.)	0	250	129
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	200	152

19 TenderIT⁵⁹

Tender-IT has recognized the lack of performance from either high-level portals or fragmented initiatives in procuring commodities by Local, regional, national and EU government. Tender IT wants to develop a digital market place (a knowledge co-creation multi-sided platform) that processes and unifies existing European tender sources, making the market transparent for all organizations and especially small SMEs and self-employed professionals. The envisaged solution is a portal to publish tenders that are Accessible, without (local) borders. The platform will have a partnering mechanism based on competences, sector etc. in which these smaller firms can join forces by forming consortia and enable collaboration (co-creation).



Figure 24: Screenshot of TenderIT prototype

19.1 The societal problem

19.1.1 Description of the problem

European and national legislation prescribes that public commodities and projects should be procured by tenders. While research shows that at least 4% of the EU GDP is transferred through government bodies to contractors by tenders.⁶⁰ These tenders present a wide range of social needs. Due to ever increasing digitization of governmental procurement, this figure is to rise dramatically over the coming 5 to 10 years period.

Most of these tenders however, are not fulfilled by small SMEs and self-employed professionals because they do not meet (complex) tender criteria or simply don't know of the existence of these tenders at all. This results in a sub-optimal macro-economic situation. Several governments throughout Europe are experiencing monopolies that are known to have led to a rise in prices and degradation of quality of tendered services or products.

Tender-IT wants to develop a digital market place (a knowledge co-creation multi-sided platform) that processes and unifies existing European tender sources, making the market transparent for all organisations and especially small SMEs and self-employed professionals.

The platform will have a partnering mechanism based on competences, sector etc. in which these smaller firms can join forces by forming consortia and enable collaboration (co-creation). This results in better projects and small SMEs and self-employed professionals, who jointly are enabled to meet substantial tender criteria.

⁵⁹ Chapter contributors: Mathias Becker, Elmar Krack, Joeri Achterberg

⁶⁰ Public procurement in Europe: Cost and effectiveness, A study on procurement regulation, performed by London Economics, Ecorys and PwC. Prepared for the European Commission, March 2011.

Tender-it therefore helps to empower SMEs and contributes to a Digital Single Market, the initiative launched by the Commission in 2015,⁶¹ in order to also bring the advantages of a European single market for goods and services to the Digital space.

The rise of the Internet, means a first real step into unlocking the full potential of the crowd for public procurement. It effectively boosts the number of participants within the platform on the one hand and the sheer amount of public procurement sources on the other. Further digitization of public services will lead to more public procurement data and additional online public procurement sources. Further fragmentation of this information online seems inevitable. That's why we are building Tender-it. We want to centralize all this online procurement data at one single platform. Available to all interested parties.

Also the Internet facilitates the use of connecting multiple tender databases and enables the learning and matching algorithms (based on machine learning principles) that are used for developing our platform. The semantic relevance of the search profiles and search results will improve when the number of users of the Tender-it platform increases.

19.1.2 Scale of the problem

The Tender-it platform focuses on SMEs and SoHo businesses. It is geared towards the 23 million SMEs in the EU represent 99% of businesses, and which are a key driver for economic growth, innovation, employment and social integration. Nine out of ten SMEs are actually micro enterprises with less than 10 employees. Hence, the mainstays of Europe's economy are micro firms (= SoHo, or Single office, Home office), each providing work for two persons, in average – according to European Commission data (2011)⁶².

Most of these tenders are not fulfilled by these small SMEs as we learnt in our previous interviews and feasibility studies. However, no solid & statistical research is available on this matter. Just yet, because Tender-it also aims to provide a technical solution (algorithms) in order to be able to analyse general European tender information. This is basically one of the problems that we are addressing. With a solid amount of sources of tenders, Tender-It will be able to develop a solution that can provide statistical information regarding:

- ratio between SMEs/larger firms who win tenders
- solid information on public spending
- comparison of public spending between governments, business sectors, or countries

This results in an analyses portal (opentenders.eu/nl – secured domains) that will enable civic society (those generally interested in public spending as NGO's, scientists, journalists, but also local and national governmental bodies and political parties) to review and compare public spending between (local) governments for the first time. This is currently impossible. Obviously these types of information will help societies to improve transparency towards taxpayers. The Chest project will provide the inlet of information from several tendering databases and sources. After the Chest project Tender-It will develop a GUI for the described analysis.

19.1.3 Previous approaches to solving the problem

Tender-IT has recognised the lack of performance from either high-level portals or fragmented initiatives. An example would be the TED Europe database of the EC – which has very limited functionality: it lacks transparency, optimal search functions (no or irrelevant tenders as search results), it lacks prioritisation/making a tender a 'favorite'-functionality. Tracking tenders and its outcome, or using the tender data for analysis purposes is not possible. Furthermore TED has an old-fashioned and non-intuitive user interface, which is destructive for the user experience of the

⁶¹ [Ec.europa.eu/priorities/digital-single-market/](http://ec.europa.eu/priorities/digital-single-market/)

⁶² <http://www.globalsmallbusinessblog.com/2011/03/how-many-smes-in-eu.html>

website. In fact the website makes it very time consuming to search and find relative and matching search results, when looking for tenders.

This situation causes a suboptimal result for multiple groups of stakeholders (governments, policymakers and companies). Our previous research has shown that small entrepreneurs start searching for tenders, but cease their actions due to overload of results, lack of possibility for cooperation, and even with the technological developments of today, the fragmentation of information through different regions and nations within the EU.

We believe the aforementioned items are needed to secure a properly functioning tender marketplace for public to private procurement, and provide for a fair level-playing field and enhance European competition with better price-quality levels.

Tender-it will also increase transparency around public tendering, as it enables a more effective proliferation of tendering information across Europe. Secondly stakeholders will be enabled to investigate into money flows of public spending and hold governments accountable for this.

19.2 Implementation of organizational structure

19.2.1 Maturity of the project

Due to late acquisition of sufficient funding Tender-It was only able to attract an additional front-end developer in March 2016. The serious planning and financial issues at the CHEST core partners caused considerable delay in achieving all objectives as well as a technical and economic disadvantage towards competition. The owners have heavily invested their own funds (originally meant for marketing and scaling up) to keep the project alive. Serious amounts of time were spend on PM/communication with core partners of the CHEST consortium, as well as on providing additional information, reading large documents etc. The project management activities have multiplied if compared to the budget and to comparable project sizes. Even though these issues the Tender-It team has delivered top-notch prototypes, that can be implemented after the CHEST phase.

Tender-It currently is in the pilot phase. Some solutions have been developed and will be tested in the upcoming months. The final solution has not been implemented yet. The Tender-It team is currently still developing back-end solutions and is finalising the front-end in Q3 2016 (please find some movies previously send for testing of some solutions). Tender-It focused on the development of finalisation of prototypes of the data processing structure and a solution for unlocking various public procurement sources. Currently one (1) source is connected and works. Also research has been finalised into contextual search of big data sets. Several solutions are developed in MVP and currently technically tested amongst others:

- The matching engine and contextual search software for the platform;
- API layer: solutions for unlocking more sources and analyse the information in these sources;
- Tools for metadata analysis;
- Dashboard;
- Subscription system;
- User profile page;
- Tenders store in profile scripts;
- Tender detail page;
- Tender import script;
- Search Algorithm;

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- Payment system;
- Subscription stop functionality;
- Engine e-mails relevant tenders;
- Production Server deployment.

Next quarter (probably end of Q3 2016) Tender-It expects to be able to start the functional testing (with its Focus Group). At the time of writing this report Tender-It is implementing the test suite and server so development and testing can be carried out dis-synchronously.

19.2.2 Organizational structure

Currently working on Tender-It:

- Elmar Krack (NL): Co-owner of Tender-It BV, General Management, Technical and non-technical Project Management, Sales & Marketing, market analysis, functional requirement engineering, communication with CHEST consortium.
- Joeri Achterberg (NL): Co-owner of Tender-It BV, General Management, Technical and non-technical Project Management, Sales & Marketing, market analysis, functional requirement engineering, communication with CHEST consortium.
- Rik Wanders (NL): Employee. Lead-Engineer, researching, developing and architecting the Tender-It platform. In his capacity as lead-engineer, he has lead and continues leading research on how to develop deep and contextual search within in the Tender-it framework. Next to that Rik has also been spending his time on developing a scalable back end data base of Tender-it. Lastly he has been developing the first mock-up version of user interface design of Tender-it.
- Haiko de Jong (HUN): front-end developer focuses on front-end platform development. Amongst others developing the user interface and user experience design of our platform.
- Michael de Groot: consultant responsible for review of prototypes, solving scalability issues.

The Tender-it project is managed using the Scrum methodology. The Tender-It team produces a 'stand-up' at least three times a week, 'grooming-sessions' are held at least bi-weekly in order to keep the technical, social and business development on track. Furthermore, Tender-It works with tools such as Jira, Github, Slack, a staging-website for developments (staging.tender-it.com), and Trello.

19.2.3 Key personnel

The purpose of this section is to provide the reader with an overview of the key individuals involved.

Tender-IT is owned by Elmar Krack and Joeri Achterberg. They have experienced public tendering through their employment at respectively Liberty Global and Twynstra Gudde. Both were involved with public private cooperation and consultancy in tendering processes by different levels of governments (Both 8y of experience). Joeri has 10y of experience in developing and managing innovation projects. Joeri was responsible for sales and (social media) marketing and management of a branch office. Elmar has 4y of experience in developing and managing innovation projects. Elmar and Joeri focus on PM, market analysis, functional requirements engineering from focus groups from their network and the commercialisation strategy of the platform.

Rick Wanders is lead developer and engineer. He has over 11y of experience working on complex web applications, mainly as PHP Web Developer. The extensive experience with open source and multiple data sources, ElasticSearch and specific language semantic challenges are valuable. Rick is candidate to co-ownership of Tender-IT, playing a pivotal role in the development process.

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Haiko de Jong is a seasoned front-end developer and designer with 6 years experience UI/UX and development of intuitive solutions. His creativity provides Tender-It with intelligent look & feel of the Tender-It UI.

Michaël de Groot (consultant) – multi-disciplinary in several start-ups (and accelerated) companies, specialised in affordable scalability using open source solutions. Michaël dreams big data and internationalisation and scales the technical side of Tender-it to become a global player from its inception.

19.2.4 Partnerships, cooperations, and networks

Contractor:

- Michael de Groot: external consultant and specialist: he performs, as an external consultant, a technical review on the prototypes. He will solve specific scalability challenges that may occur when the platform is upgraded from Alfa to Bèta-versions and when additional tender source data platforms will be connected to Tender-it. His experience with globally operating applications provides the security of a platform that is even accessible through low-tech systems.

Focus Group members (unpaid, voluntary), all responsible for input on functional requirements, input on early prototypes, input on user experience, user interface and acts as a testing group. This group will provide the tender-It team with crucial and valuable information regarding the further development of its platform.

- Municipality of Zoetermeer (public authority) – Mr. Verburg PhD - Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically interested in the analysis possibilities of Tender-It for public spending.
- Technical University Delft (knowledge institution) - Mr Verburg PhD - Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically interested in the analysis possibilities of Tender-It on the field of the value of municipal public expenses in order to create a better checks and balance mechanism for public spending.
- STIG - Onno Roelofs – Managing Director (harbour development firm): Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically responsible for the tender search functionalities and business validator.
- Bussman Medical & Research / SIMED - Mark de Vries - Procurement manager MEA (designing and constructing hospital buildings and equipping medical facilities worldwide – mainly turn-key solutions). Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically responsible for the tender search functionalities and business validator.
- Oelan Group - Eric Schuurmans - Director Operations (software development for (semi) governments). Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically responsible for the tender search functionalities and business validator.
- **Marmoles Aguilera** - Shanna Wanders – Marketing and Foreign Trade Manager. The company is dedicated to the extraction and manufacturing of natural stone. With its own quarries and more than 35 years of experience in the marble sector, the company is one of the leading and renowned providers of natural stone. With original and innovating concepts, the products are unique in both colour and quality) responsible for input on functional requirements, input on early prototypes, testing group. More specifically responsible for the tender search functionalities and business validator.

- Masters in Payroll - Jos Achterberg – Manager of Payroll technology provider, enables group of independent professionals to provide services to larger organisations. Focus Group member (unpaid, voluntary), responsible for input on functional requirements, input on early prototypes, testing group. More specifically responsible for the tender search functionalities and business validator.

19.3 Implementation of the solution approach

19.3.1 Solution approach

The Tender-it platform (tender-it.com) will increase transparency of tenders: collecting all tenders providing better and automated search results, more complete information by creating a tender management dashboard. Tender-it enables SME / SOHO and freelancers to get more insight in public tenders published by governments, but also of purely national and local tenders published in the countries around us – and finally globally published tenders. This will also work vice versa; companies from abroad will have more and better access to the supply of EU public tenders. We believe that increased transparency through the use of the Internet will lead to an increase in competition on the tendering market and as a consequence thereof: better value for money for government and thus a better way of spending taxpayer's money.

The platform will use the incredible reach of the Internet and combine it with smart search and matching techniques in order to connect 'Seekers' and 'Solvers' of tenders in a more effective way. Furthermore Tender-it will build an online environment to manage, track and monitor public tenders, by creating a first ever online tender management dashboard.

The analyses portal (opentenders.nl/.eu) will enable civic society (those generally interested in public spending as NGO's, scientists, journalists) to review and compare public spending between (local) governments for the first time. This is currently impossible.

Tenders are hard to find. There are numerous databases in different languages and finding the right tender is complex. This results in smaller companies not even visiting current tender-platforms. Only large firms have dedicated specialists, who search the current supply manually. This is an economic problem: research from the forum of independent professionals predicts a continuing strong growth of small SMEs.

Objectives of Tender-It:

- Create improved search modules that provide quality matching and increase the information provisioning for entrepreneurs. A true level playing field will result in economic empowerment & prosperity.
- Create partner option: especially small SMEs need to partner up by matching competences. This leads to high quality tender-winning partnerships.

It all starts with the technology. Results:

A prototype that parses tenders from existing portals to a uniform, complete supply. By A) direct access to these databases or a scraping bot. The resulting fragmented supply will be processed by B) translation of the original text, incl. syntax, to uniform English. The module C) parses every tender-format into a uniform data-sheet. The back-end solutions D) to search and filter the total supply (open-source engine with framework). This enables users to specify their interests in a semantic way; this increases the chance of appropriate matches. E) A back-end for the public tenders analysis website publicly accessible, with aggregated and in-depth information on public tenders.

19.3.2 Target groups

Tender-It focuses on three target groups with the aim of creating a true and transparent tender marketplace:

1) Entrepreneurs

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Entrepreneurs, more specifically SMEs, SOHO (Single Office, Home Office) and Freelancers:

They experience a fragmented supply of tenders and other issues described under 2.1 of this report. In the EU alone this group comprises over 23 million legal entities. From our preliminary investigations and feasibility research: These companies experience amongst others

- i) a fragmented supply of tenders throughout Europe
- ii) poor tender search functionality on existing websites/sources (even newspapers are still common in some outposts of the EU)
- iii) no possibilities to team up to apply jointly (in a consortium) for tenders and
- iv) simply miss tenders and thus business opportunities, because of the lack of information and reminder functionality

In other words these companies experience a non-efficient and non-effective market place for EU-wide tenders. We are developing Tender-it in order to remove these barriers for these entrepreneurs and create a level playing field.

One of the insights that actually increases the need for a platform as Tender-it is going to be was: that the SMEs in our test panel, indicated when we interviewed them, that they were even spending more time on searching for tenders online than had anticipated at first. One of the companies SIMED had freed up one FTE to go online and search for tenders at several hundred sources for public procurement.

2) Governments, journalists and researchers:

From local to national governments and other (semi-governmental) institutions. Several thousands of them, from nation states to municipalities, from public companies to governmental collaboration bodies. They also experience the issues described under 2.1. An important issue remains the decreasing trust of the general public in both politics and civil servants as representatives of the public part of our societies. The current spending of tax money remains not transparent which partially causes lack of trust towards our political and public representatives. The Tender-it platform will enable researchers, journalists and the wider interested public to research aggregated public procurement data. It will also enable civil servants of the governmental tendering institutions to go online and compare spending amongst each other. One of the municipalities that showed a lot of interest is already in our test panel (municipality of Zoetermeer).

3) General Public:

The general public, almost 500 million Europeans are paying taxes, have paid taxes, or will pay taxes. It is unavoidable in our societies: as taxpayers they deserve transparency on their government spending. The Tender-it platform will make public procurement more transparent for a wide online public. A wider interested public is able to go to an online platform and inform themselves about public spending (tenders) in their specific county/province, or country and compare it with other EU countries' spending. As a result transparency of national public spending will increase in absolute terms.

Democratisation and transparency will positively influence trust in public entities. A factor that should be of very much concern in this open information society.

These groups are reached through a thorough social media strategy:

- 1 Created LinkedIn-groups that try to activate to use the platform by:
- 2 Publishing facts/figures about public tenders, from PhD research and transactions performed by the platforms.
- 3 Posting tenders on social media (LinkedIn/Twitter/Paper.li), inviting contractors & civil servants to participate.

19.3.3 Activities and work performed

<p>Work Package Number : 1 Tender collection other portals</p>
<p>Actual Starting month : M1+9 = M10</p> <p>Predicted / Actual End month : M3+9 = M12</p>
<p>Work Package Objectives: (Output)</p> <p>1 TED EU FTP synchronisation & parser: Tender-IT accesses FTP account daily for chronjob and parse the updated info. TED already granted Tender-IT access to FTP-server</p> <p>2 TenderNed (NL)/SEAP (RO) crawler & parser: Every portal gets designated bot to crawl and parse found info.</p> <p>3 Elasticsearch (ES) database: All parsed info is placed in ES (advanced text-analytics, searching platform).</p> <p>4 General admin. module: Monitoring system for availability of sources. Logging all actions taken in the above processes.</p>
<p>Description of work this period: Tender collection TED EU</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Importing tenders from the TED FTP into our database • Set up a search engine to efficiently search our database for tenders through a tender import script. • Set up a admin module to inspect and coordinate the imported data • Detailed description of work performed to reach the achievements listed above: <p>We started by creating a script that downloads XML files from the TED FTP server which contain information about the notifications for tenders. We made a script that parsed these XML files and extract out the data we are interested in. We created a database to import this data into. Then we made a script that placed the data from the XML files into our database. We also made a script that detects if a notification is related to an earlier imported notification and if so, will be categorized under the same tender in our database.</p> <p>Then we have developed a search engine to be able to search the data in our database efficiently. We chose to use ElasticSearch toolkit because it's very effective way of organizing search results and it's open source. We've set up the search engine to index the data every time we import data into the database, so the new items in the database are directly searchable.</p> <p>Also we created an admin module to be able to manage the import and analyze the imported data.</p>

Summarise any problems you have encountered, and how they have been overcome

There were big challenges involved with importing the data from the TED FTP. Firstly we needed to get accustomed with the way the directories and files are structured and named on the FTP server and the times the files are updated. Then we had to get to know how the XML files are structured.

Also there is no logical structure in which the different notifications are pushed to the platform, i.e. sometimes multiple notifications from one tender are published over time, sometimes this is limited to only 1, or 2. We need to have them all together.

Parsing the XML files was also a challenge since XML is not used very often anymore these days for structuring data, so tools and documentation for parsing XML files is scarce. However, by researching and experimenting, we were able to make a script that efficiently parses the XML. However, the structure of the XML files varies a lot, so we had to put in a lot of exceptions in our script to be able to be compatible with all the variations in the XML documents.

Developing & setting up the search engine was something new to us. We didn't have a lot of experience with search engines like ElasticSearch, so we have to put a bit of time into learning about how these search engines work.

Description of planned activity for next reporting period

- Improve search results: There's still some room to improve the search results. Some results are not expected, and some expectations are not satisfied. We will address these.
- Connect additional sources to the platform: development of scripts for information collection through our API.

Work Package Number : 2 Data processing matching

Actual Starting month : M1+9 = M10
Predicted / Actual End month : M3+6 = M16

Work Package Objectives: (Output)

5 Translation module: non-English text is dually translated (Bing/GoogleTranslate). Outputs are compared. With a discrepancy of +5% in results, original text is posted on POEditor for manual translation

6 Semantic text analysis: Identify synonyms & keywords (title/summary/full description)

7 Learning & matching algorithms: Better matching based on user feedback by caching of search/user profiles. Matching algorithm by tender profiling and existing database

Description of work this period: Data processing matching

Main achievements:

- Smart matching of results for given search terms.

- Filtering search engine - Develop interactive search engine filters. Results loading without page refresh, and crawlers ensure that the results are also shown without javascript interactions.
- Filtering of search results based on sector and area.
- Learning & semantic text analysis: Search Algorithm Development of the search algorithm, that will improve results of tenders on our search page
- Tender import script. A script that runs periodically to import new tenders in our database.

Detailed description of work performed to reach the achievements listed above:

We wanted our data to be very easy and efficiently searchable. For this we want our search engine to be smart in a certain way. We achieved this by matching words in the title, summary, description and certain other types of data. Tenders that have a matching title will be more relevant than tenders that only have a matching summary, which are more relevant than tenders that only have a description that matches.

For this we had to improve the structure of the data we put in the search engine's index. Different kinds of data we have about tenders are indexed in separate fields in the search engine's index. This way the matching of tenders for certain search terms was improved.

We also made it possible to filter the results based on a chosen sector and area. This way the user is able to search for tenders in a specific sector and area of his/her interest. We had to add these filters to our script that queries ElasticSearch.

Summarise any problems you have encountered, and how they have been overcome

Since we are new to ElasticSearch framework, it took us a while before we understood the steps we had to take to make it work the way we want. Fortunately there is good documentation about ElasticSearch and also some community tutorials that helped us out.

There was a weird problem with some results we got back from ElasticSearch. When we used the search term "it", documents we expected that would match didn't - we didn't get any results. We tried a lot of things but couldn't get it to work. At some point when we were looking for help, we got a tip to update ElasticSearch to the latest version before troubleshooting any further. And to our surprise, this actually solved our problem. It seemed there was just a small bug in the version of ElasticSearch we used for our search engine.

Search algorithm improvement using ElasticSearch, a very comprehensive search engine that we use to index our data and search. ElasticSearch has incredibly many options and possibilities. It was a challenge to find out which option was suitable for our service offerings. After that it was a challenge to implement this option in an efficient way in your system. Because the option sometimes need to be 'on' and sometimes 'off', depending on what the user has to search. Some search refinements may also not be combined with each other and some need to be properly combined with each other.

We had to experiment with structuring the data in our search engine's index. This was a lot of trial-and-error work.

Translation module seems very difficult from a technical perspective. It remains a 'nice to have' and we will definitely work on that in the future when additional (local language / non English)

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sources are connected. We will further investigate translation needs through our test panel.
<p>Description of planned activity for next reporting period</p> <p>Further improve search results and automatic tender recommendations</p>
<p>Work Package Number : 3 Network/admin</p>
<p>Actual Starting month : M (X) +9 = Mz</p> <p>Predicted / Actual End month : M (x)+ y = Mz</p>
<p>Work Package Objectives: (Output)</p> <p>8 Deployment into cloud hosting network: Implementation in cloud hosting system</p> <p>9 User management interface: Admin interface to manage user accounts. Admin of payments & invoicing. Technical support: ticketing system, CMS for copywriting, automated messages (registration confirmation/expiration warnings)</p> <p>10 Scalability: Configuration optimization to manage traffic spikes. Benchmark tests to simulate high traffic</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Deployment of the Tender-It platform in a cloud-hosted environment has been successful. • Admin, payments accounts finalised. Development of the payment system that is used to allow people to activate a subscription. • Subscription system: Ensure that people can take a subscription you will have access to more parts of the site. • Subscription stop functionality: Functionality to stop the automatic renewal of your subscription. • Preparations of scalability (additional sources) by means of the development of an API. • Production Server deployment script. A script that automatically tests the production server and update to the latest version. <p>Detailed description of work performed to reach the achievements listed above:</p> <p>Both database, platform and front end have been deployed in a staging environment in the cloud. First scalability tests have been performed and were successful, the API seems to work properly. Internally each co-worker started a subscription, seems to work properly. But a subscription 'stop' was also necessary. Furthermore, work has been done to create interfacing with payments handler in order to set up paid account system.</p> <p>Payment engine works, tested on both one or multiple payments. Due to further improvements we created webspheres for different functions (staging, testing, production). This allows Tender-It to continue developments, (AB) tests, and improvements in order to fine-tune the service offerings</p>

Summarise any problems you have encountered, and how they have been overcome

Exponentially increase of CPU usage in the cloud environment have been causing problems with the handling and processing of the tender information. Tender-It had to investigate its self-developed Celery environment (replacing Haystack) and fix a certain amount of bugs and misconfigurations. In view of future up scaling of tender sources, Tender-it mitigated future CPU capacity platform failures by acquiring additional CPU core cloud capacity to prevent this problem going forward.

Scripts to automatically configure, manage and deploy the platform. We use many different systems for the entire platform. Python, Django, virtualenv, Celery, MySQL, Elasticsearch, NPM, Webpack, Gulp and Bower to name but a few. All systems needed to be managed easily. It was difficult to make these scripts so that it is successfully carried out in any situation. Sometimes the database or search index became corrupted, or there were some other things not updated properly. We have therefore developed some scripts to enable automatically configure, manage, and deploy the platform for us.

- This includes a script to automatically update to the latest version of the Web site (deploy).
- A script which initializes the Elasticsearch indices (often necessary if something goes wrong during development).
- A script that automatically sets-up the database (often needed during development).

Management of periodic tasks via Celery, a system that interacts with the Django framework that we use as a backend for the platform, is a technical difficulty. Celery can automatically start separate processes. To streamline and start these processes another system had to be deployed: Supervisor. To perform periodic tasks via Celery there were two types of processes started, 'the workers' and 'the beat'. The workers handle the tasks received by Celery, and the beat enables new tasks to be assigned to the workers. It was a challenge to find out how these systems were going to work together synchronically. But we managed to get the systems working properly.

Implementing Adyen, a comprehensive payment system. We have chosen Adyen because it's one of the only payments service providers that provides the possibility of recurring payments without additional software (which is expensive). In addition to the standard implementation of a normal payment system, we also had to implement the system in our (and adapt our platform) for recurring payments. For recurring payments we needed to set up some sort of contracts that refer to the next billing period when the payment is made. Of course we needed to develop encryption for communication with Adyen.

The manner of operation of the subscription system. It can be implemented in different ways. For example, you may consider a subscription as one product and then withdraw the product if a month is not paid. But a subscription can also be seen as an automatic payment for the same product every month. The product extends the term of your subscription, and if the product is not paid – so not bought – the subscription stops automatically.

Description of planned activity for next reporting period

Technical support: ticketing system, CMS for copywriting.

<p>Actual Starting month : M (X) +9 = Mz</p> <p>Predicted / Actual End month : M (x)+ y = Mz</p>
<p>Work Package Objectives: (Output)</p> <p>11 User Interface design: web design, copywriting, registration, login forms</p> <p>12 Search/results dashboard: Tender profiles builder (user defined search profile, search profile for matching with tenders, tool to manage favourites and feedback)</p> <p>13 Payment system & invoicing: contractor will perform payments and view their invoices.</p> <p>14 Email notifications</p> <p>a Mail to contractors if newly created tender match the search profile</p> <p>b External newsletter service to manage this module</p> <p>c Automated messaging to administrator in case of errors</p>
<p>Description of work this period: Development client side</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Created an interface for searching and navigating through our database • Laid the foundation for user accounts that will be used to provide personal services for our users. • Wireframes - Design of the customer journey or flow of visitors to the different pages. Visualising the site by building wireframes and flowcharts. Pages: - Frontpage - Countries page - Country page - Industries page - Industry page - Pricing page - Tender search page - Tender page - Personal Dashboard page - Profile page • Visual design Tender-it - Design of website elements. The pages are composed of modular elements such as navigation, footer, Typography, full-screen images, etc. • Seo Structure - Structural design of generic landing pages to get visitors as soon as possible on the right page. • User profile page. A profile page where you can change your personal settings, such as business data and preferences, interests tenders. • Tenders store in profile. Your favorite tenders you come to save your profile so you can retrieve it easily. • Tender detail page. The page where you can see all the details of a particular tender. • E-mail engine for relevant tenders. A system that automatically sends new relevant tenders daily to subscribers. Outbound email engine & styling - technical lay-outing and structure for generic emails.

- Preparation for testing: drawing Personas - Creating personas that we can empathize better in the end user of our product test & test plan drafting for both in-house technical testing and external user testing.

Detailed description of work performed to reach the achievements listed above:

Now that we have data in our database, we started making an interface to intuitively search and browse our data. As an interface, we chose a website, because it's the easiest way for people to access information these days and it offers the functionality we want to create. We created a search page where a user can search for tenders using keywords and filter on sectors and areas. After a search command, the user is presented with the results, which are little summaries of the tenders that matched the given search term and filters. The user is able to click on each result to view more details about the tender. This takes the user to a new page with all the details we have about the tender, like full description, contact information, and all the notices that were published about this tender.

Then we started laying the foundation for our user account system. We want to give users a personalized experience. For this, users need to be able to create an account by registering with us. We created an interface where the user is able to register, a database to save the registered users, an interface where the user can edit his profile (that will later be used for the personalized experience) and some interfaces for account management (email validation, login, password recovery). Several examples of test movies have been send to the Chest consortium as proof of our developments. Also outbound communication works properly as previously send an example to Chest consortium.

Summarise any problems you have encountered, and how they have been overcome

It took us a while to think of an intuitive interface to present and navigate through our data. But we used a technique called Wireframing to iteratively build, discuss and improve a kind of blueprint of an interface. After we agreed on the blueprints we could start on the real development of the interface.

We had to create an interface for the user to be able to filter on sectors and areas. This required us to make intuitive simple to use widgets. These widgets also had to include all possible options (all areas and sectors). These are matching the CPV and NUTS codes on the tenders, so we had to import a list of all existing CPV and NUTS codes to present as filter options in the widgets. The widgets allow for searching for areas and sectors too, and we wanted to have this search functionality to be as good as the general search functionality. So we also used ElasticSearch for this. However, we got into problems when we used multiple sorts of data in the same index. We would get results for both tenders, areas and sectors. We learned that it would be better to save these in separate indexes, however, the search-engine driver we are using (Django Haystack) doesn't have a straightforward way to use multiple indexes. However it does have a way to filter the results based on the type of indexed data. So we are using that now. It might prove not to be the best solution in the future, but for now it serves our purpose.

Creating user accounts is in principle pretty straightforward. However, we wanted to integrate it with the existing user account functionalities that are present in the web framework we are using (Django). To make this compatible we had to set-up some special things. Fortunately Django is a well-documented (and also open-source) framework so we were able get it working relatively fast.

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A challenge is to make everything work fast, yet beautiful animations and create a super-UX:

- Reactjs + MobX: For direct interactions in the browser we are using a new open source software which is called Reactjs (developed by Facebook). The software has a very promising technique that loads re-renders or if these documents should show new information only parts of the website. Not having to reload a page provides a very user-friendly human-machine interaction. Waiting for information from the machine leads often to churn (leaving the site), and is therefore of great importance for the success of the product of Tender-it. In many cases reloading a page does not take long, but in the case of a search engine - as in our case - we ask for more power from the server than a typical online product. A user often makes a variety of ways a combination of search terms and filters in order to achieve the expected result. It's important to have a user not to wait for new results for an optimal user experience.
- CSS3 Animations: Animations can provide the magic touch or X factor of a product. But in any case this may have a negative influence on the speed of the web site. CSS3 offers suitable opportunities. CSS3 not only uses the power of the browser, but also of the device where the browser is running. So all animations can continue to do their work completely independent of the Reactjs interactions, without influencing the important functions of the product.

Description of planned activity for next reporting period

- Improve user interface

The user interface we have now is an MVP. We think it contains a nice and matching style. Though testing with the Focus Group we will check this preposition and will also improve on the usability of the interface

- Paid subscription accounts

We are at this moment working on expanding the user accounts system to include a paid subscription. This is the core of our business model. Users without a subscription will have limited access to certain data and functionality. When a user registers he/she will get a month free subscription, after that he will be presented with the possibility to extend his subscription. This includes system testing with live accounts.

Work Package Number : 5 Social Report

Actual Starting month : M (X) +9 = Mz

Predicted / Actual End month : M (x)+ y = Mz

Work Package Objectives: (Output)

15 Statistics social impact: report, filter, graphical presentation (geo maps) & algorithms (industry/country/region)

16 Social Impact Report, Interim report, Final report.

Description of work this period:

Main achievements:

- Interim social impact report has been set-up September 2015
- Final report has been set-up in August 2016

Detailed description of work performed to reach the achievements listed above:

Quite some effort has been put into compiling the reports. The results from this assessment have been duly taken into account and have been used as input for further discussion within the team to improve our service offerings

Summarise any problems you have encountered, and how they have been overcome

Algorithms and filters are ready. For measuring the impact additional sources like national/regional tender information sources need to be connected through our API. We secured the opentenders.eu/.nl website for this matter. Rough sketches for this site are made. After finalisation of Chest project we're starting the development of a prototype.

Description of planned activity for next reporting period

Statistics social impact: report, filter, graphical presentation (geo maps) & algorithms (industry/country/region).

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

Project & General Management concerns:

The project was delayed for a substantial period due to the indistinctness regarding the Chest funding. This has caused substantial damage to the Tender-It initiative. A Finnish competitor has gained a substantial market share with roughly the same ideas. It has attracted approx. 3 MLN USD in seed funds and attracted a substantial amount of human capital. They do have traction – which proved the viability of our service offering in the first place, but Tender-It had to reinvent their Business model and pricing model radically.

In order to make Tender-It a success the current shareholders have also refrained from their own wages. Instead, these funds will be used for pre-financing Chest funds, the development, marketing and other publicity cost.

Regarding dissemination we have previously managed to add two more international operating companies to our focus groups. We intend to engage more through the online channels as soon as we have completed the development of our MVP. In the meantime we have our placeholder website, which provides information and background materials on the Tender-It project to potential clients and other stakeholders.

Uncertainty on FP7 partnership or subcontracting (root cause: poor financial en project planning of Chest core partners) caused a high burden on the Management. Serious amounts of (contradictory) documents had to be read, written or produced. Which caused overspending on project management time.

Detail any publications, publicity or other dissemination activity.

Tender-it improved their current placeholder website and started a dedicated LinkedIn group, Twitter account, Paper.li account. When the MVP is tested through the Focus Group, we will use these channels for gaining traction (publications on tendering, announcements of new tenders etc). Besides that we involved 8 user group members in our activities. Further more we will place some announcements on the Chest community website.

19.3.4 Sustainability of the solution

After the CHEST project, which will develop and demonstrate a minimal viable product (MVP) other national and regional tender sources are to be connected to the platform in order to create a solid information base. As a true European tender-platform Tender-It continues to grow nation-by-nation, region by region. Each new tender source needs their own designated bot, crawler, or API that's needs to be developed, tested and deployed.

In order to finance this next steps tender-it will go (commercially) live in The Netherlands with its MVP. It will also serve potential customers from outside of the EU, who have shown interest in Tender-It and in European tenders in general. We have observed quite some traffic on our placeholder website from potential interesting clients originating from the US, Brazil and Russia. The company reserved approx. € 30k for marketing activities (of which most is spend pre-financing the project due to planning and financial issues of the core members of the CHEST consortium – this amount will hopefully be recovered) and will attract two trainees to develop a substantial marketing and social media strategy.

Recurrent revenues from the scalable business model are anticipated through contractors by affordable subscriptions. Prices start at €25/month and rise to slightly under €50 when more tendering sources are connected. The uptake in a negative scenario consists of 2k users in y1. It will rise to 3,5k users (y2), to 6k (y3) and 12k (y4). Break-even point will be reached in y2. In a medium risk scenario break-even point is expected in the end of y1 (5k of users). After this point 3FT jobs are created.

Other sources of finance that can be used:

- Dutch wage tax deduction on R&D (approx. € 5-10k yearly)
- Possibly a position in an Open Data oriented incubation centre (€ 100k)
- Capital injection from founding shareholders (total up to € 40k, currently € 30k invested)
- First moving launching clients.
- Foundation Internet Domains Netherlands (SIDN Fonds), grants for further develop prototype of software in the social domain (unsecured, currently in preparation phase).

19.3.5 Risks

Risks WP1:

- *Communication with external host fails (1), this means that the tender-it platform will not be able to communicate effectively with the TED EU FTP server to get its daily updates.*
 - o *Level: LOW.*
 - o *Mitigation proposed: we will make sure there is an alarm mechanism that will inform us if communication with TED EU server is not possible. From there will be a direct link to inform the EC services in charge of the FTP service in order to recover/ restore the FTP service.*

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- *Source connected tendering sites get different layout (2), this means that, if the websites that the Tender-it platform uses a source to get its daily tender updates from, change in lay-out, it will be hard for the crawling engines to get the data from the source, which will result in a web-service error.*
 - o *Level: MED.*
 - o *Mitigation proposed: Crawlers have to be rebuilt to suit the new content structure of the source. We will research if it will be possible to build in some additional intelligence that could check if items in the source website have changed and that will find the changed information by itself.*

Risks WP2:

- *Automated translation quality poor (3), means that matches and search results will be sub-optimal, which touches the one of our core USPs.*
 - o *Level: MED.*
 - o *Mitigation proposed: Find other translation modules. There are a great many of different translation modules providers out there (Google/ Microsoft, but also open source). We will investigate whichever provider will provide the best results within the Tender-it platform.*
- *Additional developments on algorithms due to feedback of peer groups/community (4). As we are developing in scum sessions, we will work towards a minimal viable product (MVP) as soon as possible. In order to stay as close to demands of the target group as possible we need to test this MVP directly with the target group. Chances are that the target group will indicate that further development, or our at that point in time developed MVP needs to be adapted.*
 - o *Level: HIGH .*
 - o *Mitigation proposed: Learning loop is incorporated, risk is calculated in budget. This risk is inherent to the development process we follow (which is the most common way of developing internet platforms today).*

Risks WP3:

- *Type of hosting limits the required computation power (5), as we want to develop the Tender-it platform in the cloud, there might be a small risk of limits to required computation power to analyse automated portfolio matches.*
 - o *Level: LOW. Mitigation proposed: Promptly before we reach our limits with the current provider we will investigate other cloud hosting provider options, or will switch to SSD hosting providers, with a shorter routing to our servers.*
- *Email notifications routed to junk folder (6),*
 - o *Level: MED.*
 - o *Mitigation proposed: We will investigate ideal structures of email compositions to ensure matching emails are delivered directly to our clients, without ending up in the junk e-mailbox.*

Risks WP4:

- *Communication with payment gateway fails (7),*
 - o *Level: LOW.*
 - o *Mitigation proposed: Develop new communication protocols to reassure communication with payment gateway is re-established. Also develop our gateway together with third party payment handler.*

Risks WP5:

- *Algorithms fail to show impact (8),*
 - o *Level: MED.*

Mitigation proposed: Chest and other development community will be requested to provide open source solutions.

- *Consortium communication will cause delays (9),*
 - o *Level: MED.*

Mitigation proposed: none, outside sphere of influence of Tender-it.

- *Consortium poor financial planning will cause delays (10),*
 - o *Level: MED, impact: HIGH*

Mitigation proposed: i) use reserved marketing budget for pre-financing the project; ii) owners Tender-It didn't get their modest salaries paid for their efforts, iii) refraining from external cost & travel abroad.

19.3.6 User-based evaluation of the concept

We have decided to involve potential users of our Tender-it platform as soon as possible. Therefore we have held a series of interviews during autumn last year with our focus group members (Municipality of Zoetermeer, Technical University Delft, STIG, Bussman Medical & Research / SIMED, Oelan Group). Where we have explained the idea behind the platform and the way it would work. During the Chest project we added [Marmoles Aguilera SL](#) and Masters in Payroll to the focus group. These two companies have shown their interest in helping Tender-It with review of their prototypes/MVP and providing valuable feedback for further development. One of the insights we gained that actually increases the need for a platform as Tender-it is going to be: that the SMEs in our test panel, indicated in our interviewed, that they were even spending far more time on searching for tenders online than had anticipated at first. One of the companies (SIMED) had freed up one FTE to go online and search for tenders at several hundred sources for public procurement.

Regarding which sources to connect to the platform another insightful comment was that we also needed to enclose Worldbank, UN and European Investment Bank tenders – as they present interesting opportunities to our target audience. Another insight was that companies actually use a lot of different systems to manage the different tenders, that they take an interest in. We want to our users to be able to manage all the tender related activities online via our platform. An additional pointer would be that companies are very interested in some kind of recommendation function. 'If you are interested in this particular tender, how about these...' Especially interesting as companies have the tendency to put their searching filters to narrow, which means that they would miss out on certain tendering opportunities.

A final learning would be - Linking of tenders throughout time – there are a lot of projects that are tendered in parts: expert advice/project management/building of object/ equipment etc. is done in sub-tenders. Our target groups indicated that they would highly regard the linking / combine of these tenders through a new solution. From our previous research: Usually they do have the same project code/tender number. This would probably also be of interest when taking tenders from TED, as there you will find this cutting tenders in pieces, to make it easier manageable, as well.

In total all three target groups are involved helping Tender-It in our development and design of a structural improved tendering platform. In total seven potential users (clients) are currently involved in the development of our solution.

Next months (Q3-Q4 2016) we hope to test the prototypes through our Focus Group and start involving the Chest community with questionnaires/request for trial sessions.

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Besides that our social media strategy will be materialised: Tender-It is aiming to attract two trainees on the field of marketing and social media. These trainees will be recruited from Amsterdam University of Applied Sciences. We started initial conversations with this institution in order to get the best trainees as possible. These measures will increase user involvement and community building. Our MVP is aimed to be live for free trials for Chest community (1 month free) and target groups. We request the Chest community users to test our MVP and provide feedback through the Chest community website.

Other target groups will get one week for free, and can earn an additional three weeks freemium usage (full functionalities) in exchange for their opinions on the usability (intuitiveness, user friendliness), view on the technology (search results) and ideas for optimisation.

Tender-It will provide its services to every entrepreneur, civil servant, scientist, or interested general public. Transparency and democracy is the cornerstone of our initiative. Tender-It values equality between woman and men. Regardless of religion, age, background or educational level, Tender-It will provide its services to all target groups. However, we don't see how we can influence the ratio as described in the question.

19.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 36.

Table 36: Snapshot of project "TenderIT"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop the Tender-It platform, which will increase transparency of tenders: collecting all tenders providing better and automated search results, more complete information by creating a tender management dashboard. This platform will combine smart search and matching techniques in order to connect 'Seekers' and 'Solvers' of tenders in a more effective way and have an online environment to manage, track and monitor public tenders – a first ever online tender management dashboard.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Successfully imported tenders from TED EU FTP and inspected the data. ○ Set up a search engine to efficiently search the database for tenders. ○ Enabled smart matching of given search terms and filtering of search terms by area and/or sector. ○ Developed interactive search engine filters, a tender import script and learning and semantic text analysis. ○ Deployed successfully in cloud hosted environment. ○ Developed payment engine and subscription system. ○ Created user interface, email engine and website, as well as designing wireframes for customer/user flow. <p>The project successfully delivered 10 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated project website: http://www.tender-it.com/ ○ Held a number of focus groups with stakeholders/potential end-users, including 2 international companies. ○ News article about the project's progress on the CHEST website: http://www.chest-project.eu/tender-making-online-tendering-easy-intuitive-effortless/ ○ 200 interactions in the project's section on the CHEST Community Forum.

Table 37 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on users' economic empowerment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

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Table 37: Mandatory KPIs for TenderIT

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	0	5	7
		Ratio between men and women involved	0	6:3	6:1 ⁶³
		Ratio between young, adult and old people involved	0	0:3:3	0:3:3 ⁶⁴
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	0	6	3 (in Q3/Q4 2016 this will be increased to 4-6 dependable on connecting additional sources).
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	2	1 (open tenders initiative will start after connecting additional sources)
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	5	4
		Number of comments / replies on project blog entries on CHEST forum	0	5	0
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	1000 (twitter, paper.li & LinkedIn)	57
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	100	1

⁶³ Tender-It values equality between woman and men. Regardless of religion, age, background or educational level, Tender-It will provide it services to all target groups. In case of any form of discrimination, Tender-It will suspend it's services, and will warn the respective authorities to prevent future discrimination.

⁶⁴ Tender-It values equality between woman and men. Regardless of religion, age, background or educational level, Tender-It will provide it services to all target groups. In case of any form of discrimination, Tender-It will suspend it's services, and will warn the respective authorities to prevent future discrimination.

20 TransforMap⁶⁵

TransforMap is a timely effort to bring together a wealth of scattered resources to advance transformative social innovation. To the challenges posed by the current mapping environments and barriers preventing the sharing of data and knowledge, TransforMap proposes a savvy solution by integrating current existing open source mapping technologies into an innovative collaborative effort. Get Active and Ecobytes take enabling roles to create collaborative momentum, propulsing a commons-oriented and open multidisciplinary collective of engaged contributors to create an ecosystem of exchange, learning, producing and co-developing infrastructure for collaborative open source mapping, map-aggregation and interoperability for mapping social innovation.

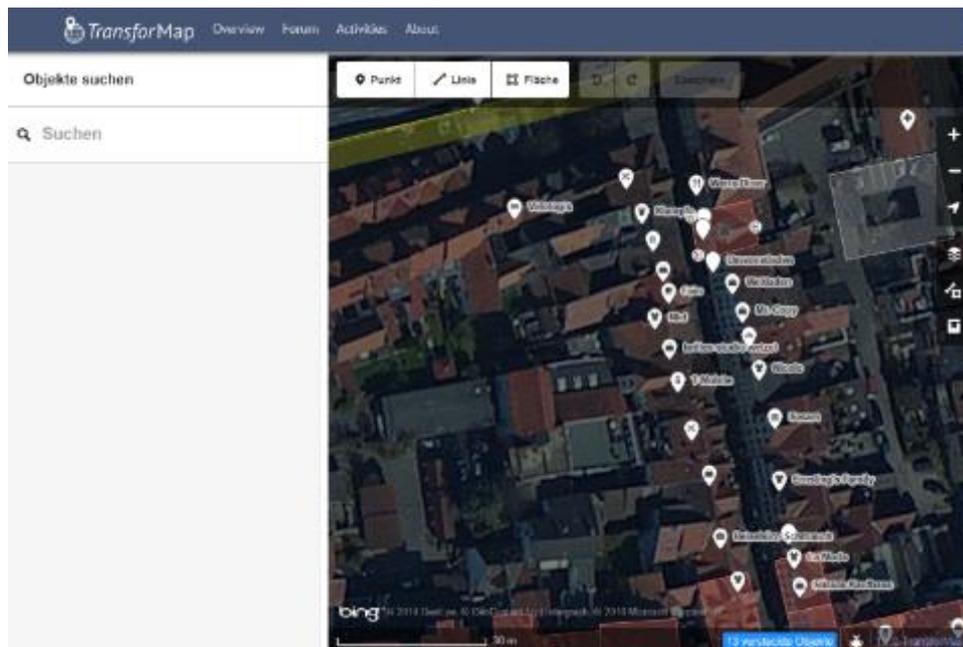


Figure 25: Screenshot of Transformap prototype (editor)

20.1 The societal problem

20.1.1 Description of the problem

1. There is a big interest in the practical visibility of social innovation initiatives. Any bigger networking project / organization in the area of Social & Sustainability Transformation undertakes an effort to produce an online-map. Any EU-research project on that topic is required to produce an online map. These efforts go uncoordinated and there are many maps out there, with very little value, as they just present very small geographic areas or thematical subsets. The information is being stacked in thousands of (sometimes) cryptic websites and the maps are based on often just slightly different filter categories. TransforMap enables the interconnection of mappings and builds an ecosystem worth co-developing and engaging together to build good quality user centric applications.

2. For citizens in the streets or for researchers, the many existing initiatives are often invisible. There is no map that allows anyone to identify transformative social innovations both in their neighbourhood and globally. No app or other user-friendly service is established to allow easy navigation, as there is no relevant source of data.

3. There is a high compatibility between the different actors, as the ethical motivation behind the production of these maps provides a big overlap in values and interests. From the standpoint of an organization, that is dedicated to sustainable development, the magnitude of the communicative possibilities provides substantial reason for engaging in the effort (see the list in the supporting

⁶⁵ Chapter contributors: Mathias Becker, Josef Kreitmayer

organization section). We found, that earlier meta-approaches to enabling interoperability of the data shows very little interest on the user-side. The users are interested to see the data displayed in categories, they can relate to. Therefore we changed our approach towards categorizing the data and combining a prior followed meta-approach, which aims towards interoperability with a more user-centric approach of displaying the data.

4. Online-Mapping is a quite young phenomenon with growing application since about 2010. Almost every mapping initiative is currently mapping in non-connected layers. The current setup leads to the creation of silos and does not enable synergies in a distributed, collaborative mapping effort. Huge potential for the very urgent Social and Sustainability Transformation is wasted, if the current situation of uncoordinated geographical visualization remains.

5. A main cause is based on the easy availability of non-interoperable mapping technology; limited funding and technical expertise for each mapping initiative to develop more elaborated and interoperable systems; the very new field of linked open data is not well explored; the different communities vary slightly in values, languages and approaches; as well as there is a gap to bridge between technicians, political economists and activists; proper online communication infrastructure to enable distributed collaboration is also a quite young and fast developing field, as the field of decentralized online collaboration in general.

20.1.2 Scale of the problem

1. In open conversations with partners, we identified more than 600 relevant maps on sustainability-related topics, of which almost none are compatible, or interoperable. About 50% of them are constructed with Google Maps Engine, which prevents the usage of data within any other framework. That data licence lock-in is one of the major problems identified. Each map is connected with either an individual, a group of individuals, or a formal organization.

A pattern that is reoccurring in each of our many public workshops, is the “you are doing exactly what I am dreaming about” response to our presentations. We get very little response, who else would be undertaking such effort.

The number of the supporting partners in the partner section above shows the big interest in the topic. It also shows how many Initiatives are affected by it. We estimate, that in Europe alone, there is several hundred (250 – 500) mapping efforts with relevance for Social Innovation, that go uncoordinated and do not reach the full potential they are aiming for, which is the promotion of a Social and Sustainability Transition.

2. We get aware of more and more existing initiatives, as we reach out into the European landscape.

3. In the awareness of the general public, there is still a status quo of a big variety of unsustainable practices, products and services as the main sources to fulfil daily needs. There is very little awareness of the fast growing field of alternative social and sustainable approaches to organizing economic activities and social processes in order to fulfil the needs in a society. Even early adopters, that are interesting in engaging in this field, are not able to get an overview of the mushrooming activities and possibilities.

If that awareness does not change, as the digital and communicative representations of that emerging field are missing, we are very unlikely to meet defined political sustainability goals. Without the mainstream realization of corresponding new institutions and patterns, currently in a niche, there is big likelihood of growing social tensions in the European countries, which are based on the (partial) failure of trusted institutions and formerly stable social patterns without respective alternatives at hand.

20.1.3 Previous approaches to solving the problem

The broad usage of online-maps is a quite young phenomenon. Around the year 2010 the respective mapping tools developed such maturity, that it became common knowledge to easily set up own

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maps without profound technical knowledge. As the phenomenon is so young, it is just about now, that aggregation efforts become tangible.

ESS Global

The RIPESS int. Network for Solidarity Economy in partnership with 7 other organizations started a successful attempt to aggregate their maps in the area of Solidarity Economy in the Project “ESS Global” (ESS standing for Economia Social Solidaire). We are in conversations for a partnership, especially for developing a common standard together and develop towards Linked Open Data.

ESS Global put a lot of energy into a centralized tagging approach. As we also initiated with a similar approach from another perspective (ESS Global based on macro-economic meta-categories and TransforMap with a needs-based tagging scheme), in our test-mappings we found out, that communities would not like to map in an unfamiliar and quite academic/meta-oriented schema, but in tags, that are meaningful to them. We also found out, that we can assign some of the meta-tags to those descriptions, that are meaningful for the communities, e.g. community-garden in itself very likely incorporates the topic “food”, so that does not need to be specifically assigned.

Digital Social

Digital Social aims at the mapping of Digital Social Innovations initiatives, focusing on the online-development in the area of Social Innovation. TransforMap differentiates to Digital Social, as it is mainly focusing on Social Innovation onland “(onland” as “on physical ground”, proposed as better term than “offline”, which would reduce real life interaction to “offline” as “not online”).

Ecozoom

The Spanish project Ecozoom is an aggregation of several maps in Spain. They describe an application called "macadjan" as the bases for their map aggregation. As we found the project just recently, and there is just little activity in the last year, we are curious to find out more and get in contact with them.

Semeoz

Semeoz is a French initiative we recently got in contact with. They also started a collection of mappings under creative commons license and are very interested in collaborating with us.

20.2 Implementation of organizational structure

20.2.1 Maturity of the project

Pilot phase: Various solutions have been tested and are running operations; some solutions are in test case preparation with external partners.

20.2.2 Organizational structure

The organizational structure is comprised of several layers, which are: legal bodies, organizational structures beyond the legal frameworks (named the commoning structures, circles and workflows) and a huge and diverse group of contributors involved to various degrees. Activities are undertaken by core contributors and further contributors, comprised by individuals employed, freelancers and volunteers.

The legal bodies Get Active and Ecobytes e.V. are responsible for the majority of the work packages, where Get Active is focused on governance structure development, taxonomy-development and overall project development as lead partner, and Ecobytes is mainly focusing on technological development and scrum based product development.

The key personnel is as described below, not including a big variety of volunteers, contributing knowledge, community work, data and code. Currently there are 5 people employed and several more contracted for specific contributions as freelancers.

Employments:

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Get Active: Josef Kreitmayer, Michael Maier

Ecobytes: Gualter Baptista, Jon Richter, Adrien Labaeye

Freelancer: Kei Kreutler, Maxime Lathuilière, James Lewis (CLSTR), Martin Raifer

20.2.3 Key personnel

Get Active:

Josef Kreitmayer

Sustainability- Communities & Project Developer

Vienna, Austria

j@getactive.org

Founder and Director of Get Active

Master degree in Sociology, University of Vienna

Specialization in Sustainability Transition Education, Human Ecology and Social Innovation

I commit my abilities to exploring, developing and fostering pathways towards Sustainable Development. In TransforMap I compile and dissect streams of activity to enable composition, translate between technical and non-technical communities and juggle tasks, scopes and numbers.

TransforMap, is one of the most promising approaches to enable a scaling visibility for leading edge Sustainability Transition and Social Innovation Practice.

I am fascinated by the convergence of likeminded communities as well as by the technological possibilities to generate synergies and enable big scale cooperation as well as small scale local development, enabled by technology.

Communities I co-developed:

www.dragondreaming.org (int. Trainer Network on participatory project design)

www.tiefenoekologie.at (deep ecology network in holistic sustainability engagement)

www.transition.at (Austrian branch of the int. Transition Network)

For further information about me:

<https://at.linkedin.com/in/josefkreitmayer>

Michael Maier

OpenStreetMap Expert

Graz, Austria

Michael.Maier@mailbox.org

My main goal is to stop the fragmentation of maps, and to bring Open Data principles into TransforMap. As an Open Data and Free Software advocate, I am one of the "Founding members" of TransforMap.

OSM consultant since 2011 (e.g. BikeCityGuide, City of Munich)

- * Setting up OpenStreetMap infrastructure
(Map rendering stack, geocoder, enhancing map editors, building web map portals)
- * OpenStreetMap data analysis and imports
- * mapping and geo-coding workshops

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Student of Telematics at Graz University of Technology.

Guest lectures at Graz University of Technology, University of Graz, University of Applied Sciences Graz, University of Applied Sciences Carinthia.

*Coordinating the OpenStreetMap community in Graz/Styria since 2011.

*Organising "Linuxtage Graz" since 2014, the biggest Free Software conference in Austria.

Ecobytes e.V.

Gualter Baptista

Agile Project Developer

Chairman Ecobytes e.V.

Dr. Gualter Barbas Baptista holds a degree in Environmental Engineering and a doctoral degree in Environmental Sciences, specialized in Ecological Economics and Political Ecology. He is actively engaged in civil society movements around environmental, climate justice, food and economics discourses since more than 15 years and has accumulated experience in agile methodologies by working with grassroots communities on hybrid techno-social projects. As the Director of Ecobytes he works as project, events manager, scrum master and consultant for several non-profit organisations. He teaches at the University of Kassel on "The Limits of Growth: Perspectives for Agriculture" and is a member of the Editorial board of the journal "Ecología Política" (**Fehler! Hyperlink-Referenz ungültig.**

Ongoing projects:

* co-munity.net (Drupal architect and lead development)

* TransforMap.co (process maintainer and scrum master)

Prior projects worth mentioning:

* GROWL adult education partnership (int. coordination and project management) [2013-15]

* Fourth International Conference on Degrowth for Ecological Sustainability and Social Equity (core organiser, IT coordinator) [2013-14]

* UnvergEssbar Konferenz (project management and fundraising) [2013]

* Beyond Our Backyards (international coordination and fundraising) [2011-13]

Jon Richter

Technical Strategist

Berlin, Germany

I am working in the context of the TransforMap programme, to visualize alternative economies and social innovation, based on Linked Data, OpenStreetMap and Wikidata.

Our work is especially relevant, as we are a community of communities (Solidary Economy, Commons, collaborative economy, commons-based peer production, welfare economy, degrowth, etc.) that does not have any legal status. Yet, our aim is compellingly complex, to build a federation of data Commons.

I am working for civil society initiatives since 2009, primarily the id22: Institute for Creative Sustainability from Berlin, the critical urbanist's collective quatorze from Paris and only recently in an advisory role for the young urbanist's network stadt:gestalten and Technical University's Project

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Seminar "Soziale Initiativen 2.0", both from Berlin again. By touching the circles of TransforMap, I have been involved with many other organizations, like OuiShare, Edgeryders, Ecobytes and the Anstiftung & Ertomis foundation. Non-institutional work included urban appropriations like Spreeacker or Funkhaus Grünau next to critical mapping with orangotango and Georilla plus the media arts collective circus homo novus.

My personal involvement into the process touches questions of communication + mapping infrastructure, community building, organization of events, communication and exchange, information architecture as well as a counselling role to transform our data modelling process from OpenStreetMap to Linked Data.

Current positions:

- * Technical Strategist, TransforMap (2014-)
- * DevOps Engineer, Ecobytes (2014-)
- * Collaboration Advisor, id22: (2009-2013) + quatorze (2011-)

Former assignments:

- * Spatial Data Warehousing & Synchronization, anstiftung & ertomis foundation (2014)
- * Frontend Developer, racken GmbH (2011-2015)
- * ICT Administrator, PPM GmbH (2010-2015)
- * drupal Product Manager, Wohnportal Berlin (2010-2014)
- * online & print cartography of Community Gardens in Berlin (2012-2013)

For further information about me:

<https://almereyda.de>

Adrien Labaeye

PhD Action researcher, activist

adrienlabaeye@gmail.com

Berlin, Germany (French)

As an action researcher focusing on digital commons for sustainability I'm interested in supporting the process of federating existing map commons. I bring scientific knowledge in conceptualizing and governing digital commons. As an activist, I wish to make alternatives more accessible. My main involvement with TransforMap so far has been in bringing our target communities into the process as well as acting as a caretaker of the commoning process.

Relevant experience in initiating activities and organizations:

- * PhD researcher on the role of digital commons in sustainability transitions.
- * Co-founder of transition>>lab: collective of researchers and practitioners exploring sustainability transitions through research and practice.
- * Co-founder of Thinkfarm Berlin: self-organized co-working space gathering around 70 professionals working towards a degrowth transition. As member of self-organized co-working space I have developed skills in collective decision-making. Organized several workshops around mapping in Berlin, Paris, Strasbourg. Founding member of TransforMap.

Past positions:

*2012-2013: Junior Researcher on socio-ecological transitions, University of Applied Sciences Jena.

*2010-2011: Project assistant, ICLEI-Local Governments for Sustainability.

freelance contributors:

Kei Kreutler

Researcher, Web Designer, Community Organiser

kei@ourmachine.net

Berlin, Germany (American)

As a researcher, designer and community organiser, I am interested in how contemporary technologies expand networked participation, and create new forms of connection beyond the digital sphere, in commons-driven initiatives. Over the past year and a half, I have been working as a main contributor to the social innovation project unMonastery, focused on sustainable and open source place-based production through establishing a network of living spaces in Europe. As technical support and coordinator for the project, I have extensive experience in managing distributed work processes, collective decision-making, and managing budgets.

Bringing my experience from developing mappingthecommons.org, as the front end designer for TransforMap, I am helping to build an accessible interface for the project and to bring in a diverse group of communities to test and prototype innovations in alternative, solidarity economies.

Experience

2014-2015 unMonastery, Coordinator and Technical Support

2015 Space Studios Art and Technology, Artist-in-Residence

2013-2014 Rhizome.org, editorial fellow

Relevant links

keikreutler.cc

unmonastery.org

imity.io

Maxime Lathuilière

Programmer

After a master in management concluded by a master thesis during which I studied the [toxicity of the marketing](#), I wanted to explore the alternative possible paths to access information on resources, namely through open knowledge and libre software. To make this exploration real, I got to learn web programming and started the inventaire.io project, a web application to map books with open knowledge. Being in discussion with contributors of TransforMap since a few years, collaboration came naturally given the overlapping of our missions.

James Lewis

ETL Development Lead

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James Lewis is a technology entrepreneur of 20 years, having most recently worked with 3 tech startups in the UK and US to successful exits, and worked in roles from product management and software architecture to departmental leadership and CTO. He has broad experience of Internet technologies, full lifecycle project management, and deep knowledge of managing software development teams and processes. He is skilled at working at the interface between technical and non technical sections of organisations, and now focuses on high level consultancy and tech advisory work and management and board level. After a successful career in commercial tech, James is now focusing on projects using technology for social good, which also provides the motivation to be part of the wider TransforMap team.

Martin Raifer

OpenSteetMap und User Interface Expert

further experts:

Mariana Curado Malta – Linked Open Data

Ellen Friedman – Commons

Silke Helfrich – Commons

Giuliana Giorgi - Forum Solidarische Ökonomie

Alessa Heuser – Solidarische Ökonomie

20.2.4 Partnerships, cooperations, and networks

The partnerships and cooperations in which your project is involved are key parts of your positioning

Funded Project-Partnerships

contract-based

SSEDAS

Consortium for the EU FP7 Project “Social & Solidarity Economy as Development Approach for Sustainability (SSEDAS) in EYD 2015 and beyond”.

The 26 partners from 23 EU countries are represented by the Mapping Work-Package responsible NGO Inkota e.V. (Germany), in coordination with the main responsible steering committee comprised of the 4 partners, COSPE (IT), Fairwatch (IT), Südwind (AT) and BILS (BG).

The TransforMap consortium is building the map for the overall project of SSEDAS, and by that combining the strength of 2 development streams. The SSEDAS development stream brings some mayor advancements in the taxonomic development for sustainability related initiatives, as well as some CHEST-relevant technical features. The CHEST development builds some of the main infrastructure required to fulfil the SSEDAS mapping development. SSEDAS is the first usecase of the agnostic Taxonomy Server, Translation Management System, Map Menu-Generator, Map Interface Generator generated for the CHEST project.

Non-funded Project Partnerships

based on verbal agreements

ESS Global

ESS Global is a project consortium lead by RIPESS, one of the mayor networks in the area of Solidarity Economy. It is described futher in the section about earlier approaches. We are engaging especially in the field of Linked Open Data – vocabulary development, to see where we can build on their already existing vocabulary. In the first working iteration, we did not find common ground, as we saw, that it is required for our development stream to develop from a more user centric perspective in developing the first standard vocabulary/taxonomy/filter categories.

3 ETL prototype test-cases

For the ETL map data aggregator, we start with 3 projects, which are currently in an onboarding process. The first prototype implementation with those aspired partners will be completed by end of September. Aspired partnerships for prototype implementations:

- Environmental Justice Atlas <https://ejatlas.org/>
- Grünanteil <https://beta.gruenanteil.net/>
- Redeconvergir <http://redeconvergir.net/>

Network, supporting partners

written informal declaration of involvement

- sharing city Berlin - CONFIRMED
- Sinnwerkstatt - CONFIRMED
- Commons Institut e.V. - CONFIRMED
- Leadership³ - CONFIRMED
- Cool Ideas Society - CONFIRMED
- Ideenwerkstatt Bildungsagenten - CONFIRMED
- TESS - CONFIRMED

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- Forum Solidarische Ökonomie . CONFIRMED
- Anstiftung & Ertomis CONFIRMED
- Allmendekontor CONFIRMED
- Mutmacherei - CONFIRMED
- transition>>lab CONFIRMED
- Gemeinwohlökonomie (GWÖ) - CONFIRMED
- Förderverein Wachstumswende e.V. - CONFIRMED
- Grünanteil - CONFIRMED
- OuiShare - CONFIRMED
- Kunst-Stoffe - CONFIRMED
- Research & Degrowth - CONFIRMED
- Transition Town Witzenhausen e.V. - CONFIRMED
- Transition Initiativen.de - CONFIRMED
- Transition Graz - CONFIRMED
- Orangotango - CONFIRMED
- Konzeptwerk Neue Ökonomie - CONFIRMED
- "Degrowth-Webportal" – CONFIRMED
- Shareable – CONFIRMED

The community process engages stakeholders from more than 20 European countries, as well as contributors from North America and South America.

Some further contacts are maintained with the following projects:

- Value Flows
- Encommuns
- pixelHumain
- IndieHosters
- OpenStreetMap France - uMap
- Leerstandsmelder
- BenE
- Semeoz
- Collaborative Software Technology Alliance

20.3 Implementation of the solution approach

20.3.1 Solution approach

TransforMap is a collaborative answer to the challenges (mentioned above) and complex reality. It aims to co-develop with users a set of tools and standards for free and open crowd mapping that allows for aggregating all those mapping initiatives in the field of social innovation in one map, which can be navigated by neophytes.

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Connecting maps has not only the potential to break data silos but also spark new synergies between distinct communities, and initiating a far-reaching (however slow) socio-political process of discourse alignment around the definition of transformative social innovation and a New Economy.

The foreseeable potential impacts are manifolds. The process of collaboratively mapping assets and initiatives make communities smarter and more self-confident by showing what is “already there”. By connecting existing maps, TransforMap will from the start display thousands of POIs and visualize the magnitude of activity in the field.

But the greatest potential impact is that TransforMap is about creating an effective data standard for location-based socio-ecological resources, with buy-in from scores of people and eventually uptake and provision of data in that standard by multiple data providers (the crowd, mapping initiatives, but also more traditional data curators).

TransforMap is building a small but transformative ecosystem. We believe that providing an open platform, a set of Open Source tools for mapping the transformation, and a linked data standard ontology will enable other innovators to build upon and contribute to our work to come up with services and innovations that we haven’t even dreamed of.

By ensuring that the bounty of data in our TransforMap is open and machine readable we create a resource and its ecosystem that are a potential game-changer for (citizen) scientists, specialized journalists, and social entrepreneurs innovating new business models based on digital information and providing new services to citizens willing to engage in the transformation of our economy.

We have identified the following objectives:

Community and standard development:

Fostering and visualizing an international community of mappers (Mapping the Mappers), nurturing and expanding the group of contributors who provide the open infrastructure and facilitate the TransforMap community process.

Aggregating and enabling to converge a wider community of mappers who are currently mapping social innovations in a dispersed way.

Start co-developing an interoperable standard ontology for structuring databases of local social innovations, to be fit for linked data by building upon existing efforts, serving as a common denominator to map, search and interchange data categorized by different taxonomies.

Technical development:

- Developing a user-friendly map editor that allows tagging with relevant machine-readable denominators, along human readable descriptive denominators relevant to areas of sustainability, social innovation and solidarity economy.
- Structuring a website (<http://transformap.co>) where users can visualize TransforMap data and filter along their interests.
- Developing a visually appealing and easy to search map that can be integrated in other websites.
- Developing an open reference database enabling the development of advanced interoperable mapping scenarios.
- Developing an Open Source back-end infrastructure allowing to connect different databases, and map different taxonomies or ontologies based on common denominators.
- Developing an technical infrastructure to query and exchange data from different databases as well as a reference implementation enabling advancement in linked open data.
- Providing necessary supporting documentation for developers and users.

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- The first set of an open source prototype-ecosystem, as well as interoperability taxonomy 1.0 is to be ready by September 2016.

Outreach and sustainability:

- The strength of TransforMap comes from its collaborative nature. It is essentially the result of multiple organizations, networks, and activists who joined forces to address a common challenge.

- TransforMap is about triggering further synergies across various social innovators' communities through light and peer based organizational structures, by generating buzz among the diverse communities targeted by TransforMap and arouse interest from the social science community, social networks and mainstream media; engage an outstanding number of different organizations and initiatives in the development of a widely accepted descriptive taxonomy for Sustainability related topics ensure financial sustainability of the TransforMap process without concession on its non-for-profit and open nature.

- Our ultimate goal is to make TransforMap the reference for mapping local social innovation globally. This will be achieved by focusing on engaging instrumental networks in strategic regions.

20.3.2 Target groups

1. In its initial development phase, TransforMap is primarily targeting groups, initiatives and organizations that have initiated cartographic mapping efforts focusing on social innovations and community assets. Some of these initiatives and organizations already show clear interest and are stated in the partner section (1.4.) above.

2. We estimate about 250 – 500 initiatives/organizations with mapping efforts in the field of social innovation in Europe. In general we can distinguish 3 main target groups:

- Initiatives that have a running map system they want to expand.
- Initiatives that want a map of their interest.
- Initiatives as well as individuals, that want to contribute via individual mapping.

3. A central issue is the development of shared standards and taxonomies, to allow interoperability and aggregation. These taxonomies/categories need to be defined in a broad community approach in order to gain momentum and acceptance. There is also a lot of interest in meaningful visualizations and user-friendly interfaces, which allow editing, updating and deletion of data.

The initiatives are therefore critical stakeholders in the process of taxonomies' alignment towards the co-creation of a standard ontology for sharing linked data across maps, as well as for testing the user interface segments of the application.

4. We gained the insight, that it is especially relevant to involve the target groups in the development of filter categories / a taxonomy system, that they perceive as useful in their work, and that usability is a crucial point in order to make editor and platform successful.

20.3.3 Activities and work performed

<p>Work Package Number : WP1 Taxonomy and Data workshops & online-process</p>
<p>Actual Starting month : 11.2015</p> <p>Actual End month : 06.2016</p>
<p>Work Package Objectives: WP1 realize workshops and set up an online communication process that aim at initiating and structuring a mid-term social process of aligning various existing data taxonomies into a joint standard to be used as a common denominator for cross database search, aggregation and data interchange.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Version 1 Sustainability Initiatives Taxonomy with over 140 items completed. • Ecosystem decisions clarified and requirements specified. • Allignment process with ESS Global started. <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> • In a Kick off Call on Jan 13th, 24 people from the SSEDAS project joined the instructions to develop their own filter categories via Skype. With the deadline 5th Feb, about 18 contributions came in with various degrees of complexity, a multitude of interest and very genuine ideas to develop on. In a work meeting in Florence on 18th Feb, the next steps were presented as convergence, feedback with the partners and other communities, and final preparation to be accepted / amended by the SSEDAS steering committee. The convergence process included a feedback phase after the convergence and consultancy with external partners as ESS Global. At the final presentation and feedback meeting, about 10 partners contributed. The Taxonomy with more than 140 items was then presented and accepted by the SSEDAS steering committee, representing 26 int. NGOs from 23 European countries. In a later process it was translated in a majority of the native languages of these countries. • Our “Federating Civic Data” event happened as a frtinge event to the final Share-PSI 2.0 workshop in Berlin end of November 2015. The workshop and further online and onland conversations, helped us to develop clarities for critical infrastructure decisions concerning database, Json as data exchange format, taxonomy-server Wikibase, requirements for the API, Editor and ETL Hub. • The ESS Global categories, that were already encrypted in skos LOD-language with translations in several languages, were extracted to be easily digestible and discussable. From that we got the impression, that the approach does not fully fit a user-centric approach, as it is very much oriented towards macroeconomic meta-categories, rather than on user-centric “what do I search for”-categories. However, we concluded, that some of the qualifier-categories could be helpful in the 2nd iteration of the taxonomy, which is planned by end of the year.

Summarise any problems you have encountered, and how they have been overcome

- The taxonomy development process took much longer as expected, and the work with a huge amount of contributing partners is also quite time-consuming, but worth it.
- It took us quite some time to take crucial decisions, as some of the possibilities needed to emerge in onland and online conversation, and needed to be taken for longterm development. We managed step by step, but also have to deal with slight delays.
- It is sometimes quite difficult to converge an online-process with several contributors, and it helped us a lot to take decisions back into the team instead of making it open community decisions.
-

Description of planned activity for next reporting period (period after CHEST)

- Development of version 2 of the taxonomy.
- Comparison and interlinking of different taxonomies in Wikibase.
- Further engaging with SSEDAS and ESS Global.
- Integrating taxonomies of other partners.
- Patterns Workshop in December to develop patterns for an interlinked interoperability and map commoning network.

Work Package Number : WP2 Technical Development

Actual Starting month : 12.2015

Predicted / Actual End month : 09.2016

Work Package Objectives: WP2 focuses on the development of backend, frontend and open source toolsets for end user data entry as well as data integration, exchange, research and visualization.

Description of work this period:

Main achievements:

- Workflow establishment
- Database CouchDB and Web-API prototype written in Nodejs.
- Wikibase as Taxonomy Server running.
- Map Interface running.
- Prototype Editor, Specifications for 2nd iteration.
- ETL Hub Specifications and Assignment

Detailed description of work performed to reach the achievements listed above:

- We established a scrum process from Oct 2015 on, which helps to shape the collaboration. In addition to mostly remote work, there were 5 in-person work meetings over one or more weeks (at Solikon in Berlin; November, Februar, April Witzenhausen; and in August short before and during int. Degrowth Conference in Budapest).

- The CouchDB Database is running and delivering to the API, which feeds Ge-data to the map viewer user interface.
- Wikibase got deployed as taxonomy server. It feeds into the Map User Interface and already enabled translation of the human readable definitions in several languages.
<https://base.transformap.co/wiki/Special:AllPages?from=&to=&namespace=120>
- By end of 2015 we already had got a first non-agnostic and hard-coded prototype of a Map User Interface running <http://demo.transformap.co>, for which we got good feedback. For the SSEDAS partners we developed a first visual map interface to be integrated in their website by end of September 2016 and subsequently in the websites of more than 15 partners in the project. The user Interface is responsive for desktop and mobile.
- A running first prototype was constructed, based on the OpenStreetMap ID-editor. <http://editor.transformap.co> It was tested in the Global Alpha testmapping in 2015, and showed several design requirements. The approach to further iterate on the prototype editor was abandoned, and several open source editors to build on came into consideration. The requirements for the further development of the 2nd prototype editor can be found here:
requirements editor <https://github.com/TransforMap/edit.transformap.co/wiki>
- The requirements for the ETL Hub were specified and we found a capable freelance contractor to produce the work for and with us: Assignment and specifications for ETL Hub: <http://bit.ly/2c2KTFq>

Summarise any problems you have encountered, and how they have been overcome

- With the drop-out of the core contributor responsible for the Editor he brought into the project, but showed incompatible, based on closed source technology, we had to switch to a different framework than originally planned, and build on a pre-existing solution, which we tested in the Apha testmapping. As the current editor prototype proved unfit to iterate further, we evaluated several options for the 2nd iteration, and already found a suitable solution from an actively developing open source community we will fork from.
- Remote work with a team coming for very different directions is sometimes difficult; therefore we strive for more in person meetings, and also intensified the life online communication.
- The initial UI developer of the Map User Interface dropped out with a solution delivered, that subsequently proved unfit for the further development of the ecosystem. Based on our good contacts in the field, we could find replacement within very short time, and now also changed our patterns of subcontracting, as described in the overall management summary.

Description of planned activity for next reporting period

- Building the 2nd iteration of the Editor, based on our requirements and a fork of the “KartevonMorgen” Editor.
- Integrating the frontend map framework into the CMS of some partners and further develop the prototype.
- Run the thest-cases for the ETL Hub.

Work Package Number : WP3 Community building
Actual Starting month : 02.2015
Predicted / Actual End month : 09.2016 / ongoing
Work Package Objectives: WP3 contains outreach activities to test and gather early feedback about the practical usability of the tools in development and to build up a community supporting and contributing to TransforMap.
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • Conducting the alpha testmapping process in 2015, with partners in more than 9 countries. • Engaging with the SSEDAS project and its 26 partners in 23 European countries, developing the taxonomy and Map User Interface. • Gaining competent and engaged voluntary contributors to the overall development, engaging in the online-forum. • Mapping of Maps organized in semantic mediawiki and first geographical visualization. • Regular newsletters. <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> • We conducted testmappings in the months May to July 2015, which involved partners from more than 9 countries, that mapped around 300 initiatives with our mapping tool. It helped us with user-feedback on the tools, lead to a pivoting in the taxonomy approach and helped to generate new tag-categories for the taxonomy development. It also generated a lot of attention and broadened our networks. • We were present at more than 10 public events in more than 6 countries. • The website and especially the forum is an active and very important tool for the development of the community. In “Discourse” we up to now have over 200 people involved, which generated more than 550 topics and in total over 4000 posts up to now. Each week we have 3 – 5 new contributors coming in. http://discourse.transformap.co • The mapping of maps is now organized in a semantic mediawiki https://wiki.transformaps.net/wiki and allows contributors to individually integrate new maps, that they get aware of. A visualization of the geographical distribution of the maps is currently in an early prototype visualization: http://umap.openstreetmap.fr/en/map/transformap-mappings-of-mapping_67563#1/35/-40 • As we already have a big audience of partners, interested contributors, and potential future partners, we concentrate on Bi-Weekly community update via discourse, and the german-speaking and english-speaking (global) lists. https://discourse.transformap.co/c/communities/communication

Summarise any problems you have encountered, and how they have been overcome

- Written online-Discourse is sometimes difficult to finally converge, whereby online-meetings are very helpful.
- With a project with 26 partners it is sometimes difficult to have everyone understood the current process at that time. We invite to online-meetings and also to write a short email, anytime a question comes up. It is quite challenging to work with 26 partners towards an aligned goal. The SSEDAS Steering Committee proved to be a very important part in overcoming that difficulty.
- Events and public communication is quite time-consuming and we currently want to focus on development with the communities already out there, so reduce the outward facing communication, and intensify the process with the people, that are already there.

Description of planned activity for next reporting period

- Engage the community for further taxonomy development and especially cross-merging of different taxonomies.
- Engage the community for further usability testing, especially concerning the public visualization of the map.
- Engage the community for the further development of TransforMap beyond the scope of SSEDAS and CHEST, to further expand the circles, fundings, and relevant contributions.

Project Management and Dissemination

Summarise any management concerns and activities to recover the situation.

In general it took us quite some time to get into internal contracting and planning, as we are operating as collective, there were much more open questions and aspects to consider, as e.g. the contract with the partner Ecobytes and the integration of people, which were further free collaborators. We managed quite well, but it cost us some weeks to figure that out.

The fact, that we are distributed, sometimes gives us problematic situations of mis-communications and difficulties in alignment with several people involved in separated, but connected development-streams. The practice to have 2 weekly standup calls, as well as a weekly coworking session helps us a lot to stay focussed and aligned with each other. Also pair-programming has proven to be very effective.

The community approach of the project is sometimes difficult, as partners have different styles of communicating, different timespans to react, and varying opinions to integrate. So far we are managing quite well. For crucial decisions we use sociocratic consent decision making.

One sometimes problematic aspect of the project is the capacity of the team to solve specific problems in a given timeframe. Given the complexity of developing an interoperable microservice-ecosystem, which non of the partners did before, with tools, the contributors are familiar to various extents, we noticed, that it is very helpful to 1. be clear to partners, about what we can achieve in a given timeframe, and what timeframe we need for certain achievements. With the co-funding partner SSEDAS, we needed to reset timeframes with a delay of about 2 months, which was not pleasant, but gave a realistic perspective to deliver

long lasting quality.

We had 2 freelance contractors quitting their assignment midway, or one even before starting the CHEST project. The first one dropped out due to friction with unfit programming practice, as closed source and open source programming have very different styles, and his closed source style conflicted with the rest of the team. With the second contractor, we run into problems, as it was an assignment to a single individual, which at some point noticed, that the skillset was not matching, but kept on going, with request of help is needed ignored, and delivering an unfit solution. That development cost us about 3 weeks development time with the viewer interface on one hand, on the other, from there we noticed, how important the following to practices are for our development, and in the end we found an inexpensive and very competent consulting freelance contractor.

In working with freelance contributors we noticed, that either 2 ways are helpful for us. Clear work-package oriented deliverable with very specific goals, and pair-programming as part of the assignment, or a more consulting-oriented approach, where the freelance contractor is more of a consultant, enabling one of the core-team-members to easier understand, and develop new and probably later on required skills inhouse.

Another very important organizational aspect is the enabling/funding of community meetings. TransforMap is very much a distributed project with a lot of the relating communication happening online. We noticed, that very many relevant decisions need to be discussed and taken together as a community and in person. Especially for community members, that are not digital natives these meetings are important. The semi-public offline meetings also gives credit to the broad network-based background and support TransforMap is grounded in.

Detail any publications, publicity or other dissemination activity.

a. To mention some of the activities:

- Book chapter (author Ellen Friedman) in *Patterns of commoning* (ed. Silke Helfrich)
- Article in magazine in Graz (online-preview: <https://cms.falter.at/falter/2014/10/21/zuerst-denken-dann-handeln/>)
- Monthly Event "Mapping the Commons" at Wikimedia in Berlin
- Workshop in Berlin within OSCE Days and MakeCity Festival – 20 participants: <https://transitionlab.wordpress.com/2015/06/03/mapping-the-urban-commons-by-bike-experimenting-offline-mapping/>
- Workshops in Graz: <https://discourse.transformap.co/t/austria-graz/253>
- Workshop at Ouishare Fest with 40+ participants: <https://ouisharefest2015.sched.org/event/4f25a2dd07aab08cff31e35c66b7ff>
- Workshop at Solikon with 30 participants: <http://www.solikon2015.org/en/transformap-or-mother-many-maps-making-alternatives-visible>
- Mention of TransforMap by Paul Mason in his keynote speech at Solikon Conference.

Link to keynote: <https://medium.com/@paulmasonnews/keynote-speech-solikon-berlin-f0e2caeff8d8>

- Mapping Session, Workshops and networking at the World Social Forum in Montreal, Aug 2016: <http://jon.2016.wsf.federated.wiki>
 - Workshop on infrastructure and organizational patterns for communing projects at Degrowth Conference, August 2016, Budapest: Academic Special Session: Infrastructure and organisational patterns for socio-technical commons <https://scriptum.degrowth.net/en/DG2016/public/events/36>
- b. Several new partners could be engaged. The partnership with the SSEDAS project was generated during the networking activity in 2015. The regular event at Wikimedia opened a conversation with Wikimedia Germany around the use of Wikidata and brought up Wikibase as a possible taxonomy and translation server.
- c. For the next phase we want to make use of the network of the SSEDAS partners to use their massive event program for communicating the beta-toolchain to a relevant audience of interested individuals in the field of socio-ecological awareness. We especially want to concentrate on feature generation, further design insights, and possible spin-offs.

20.3.4 Sustainability of the solution

Viewer:

The viewer is ready to be installed in the first live-website by September. It is running in test and bugfixing stage on <http://viewer.transformap.co> and will be integrated in the Website www.solidarityeconomy.eu unit end of September 2016. Subsequently it will be integrated in the websites of the SSEDAS partner network. The viewer, as well as the taxonomy server are built in an agnostic way, so that they will further server for plug and play development of maps with other data, filter and themes.

Editor:

As CHEST will close, we will not fully have concluded SSEDAS, which is interrelated. The map-editor (which is required in prototype-stage within CHEST <http://editor.transformap.co> and as running system within SSEDAS) will just be working in a very early prototype-stage, which is not yet ready for open web publishing, but will be made available to the SSEDAS partners internally by October 2016 in a testing-stage and ready for publishing by November 2016. The experience with the prototype within CHEST will help to deliver for SSEDAS, as well as the experience in the closed SSEDAS environment will help to prepare the editor for full open publishing by latest mid 2017 to be ready for use in the Shareable Map Jam in Q2/2017. We will also make use of the event program of the 26 SSEDAS partners to invite people to test and give user-feedback to iterate and generate ideas for further Spin-Offs and applications. Once the editor is viable to be published to the general public, we will engage in promoting it to the very many contacts we collected, which are interested in mapping / bringing existing data into one bigger infrastructure.

ETL-Hub and Map aggregation:

Currently we are in the preparatory phase of testing the ETL Hub with 3 prototype-testcases, with each of them needing different specifications and approaches to fetch the data, and to allow regular updates. By end of September we want to have completed the tests with those partners (see partner section above). Once we got those experiences, which include the technical, as well as the institutional part of preparing the ground to go into that partnership, we will build on that to further

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rollout the process. The visualization of the first test-cases will provide enough leverage to engage partners of the wider network to take the next step for an interconnected and federated mapping system, allowing to combine the various data sources into one visual interface, and leading the user back to the initial data-provider for the detailed information.

Social Innovation -Taxonomy:

With 26 institutional partners of the SSEDAS project, we developed a Taxonomy (filter-set) for about 140 different types of Sustainability initiatives. That taxonomy is now loaded in the Wikibase Taxonomy server, and from there visualized in the life Map interface, which will be integrated in the main-project website of SSEDAS, as well as subsequently the partners in the project. That taxonomy is currently version 1 and was generated in process over several months, based on converging inputs from the partners, following several consultations with the partners, and the wider network (ESS Global). A version 2 until end of the year is already in planning. During that time the version of the taxonomy stays stable, and feedback is integrated for the next release. With the deployment of the Taxonomy Server from Wikidata (Wikibase) and the application of data transfer conventions, we already engage with the Linked Open Data universe right from the beginning. As we cooperate with ESS Global and SSEDAS we get a leverage effect of already starting with relevant partners implementing the taxonomy. Besides creating the taxonomy itself, we also host the conversation of its future development, and about the interaction with other category systems out there. One major piece of development is the Wikibase taxonomy server with the agnostic Map User Interface, which allows us to mix various taxonomies, and generate individual filter-sets from the loaded taxonomies and data with very little technically skilled work. Especially for small initiatives, that could not afford data-collection, map-programming and taxonomy-development, that can offer possibilities to develop maps of their interest with very little resources, time and skills.

Social & Sustainability Developers + Open Source Developers community development:

TransforMap is already mentioned by many communities as a space of convergence for the various attempts to use the World Wide Web and related technology to leverage a Social and Sustainability Transition. We want to expand that field of collaboration and convergence by connecting people online and onland and with the common denominator / narrative of building the TransforMap(s) displaying the Social and Sustainability movement, enable new spaces of socio-technical collaboration. There is several ideas for enabling convergence in 2017, and a workshop coming up for December 2016, in which we will focus on the patterns to establish for fostering this collaborative space.

Sustainability of the project results

Commercialization of the outcomes of the TransforMap process as a commons by TransforMap as a community / possible legal entity to be found is very unlikely in itself. It should in any case be seen as a commons. However as it is a free commons, it is open to be also used for commercial activity. That commercial activity will be enacted by some of the partners within the network, but needs to be compatible with the ethical values of the project, and contribute to the resources that go into the commons. There is an elaborated thread on that topic to explore:

<https://discourse.transormap.co/t/separate-commons-and-commerce-to-make-it-work-for-the-commons/625>. As TransforMap is a commons, all licenses will be open source.

For the further funding of the project, there are several sources, based on a non-profit understanding and the understanding to create meaningful value.

- After CHEST, the SSEDAS assignment is still running for some time, and that outcome will deliver value, that is meaningful for the SSEDAS community and beyond.

- A service agreement for maintaining the representation for SSEDAS in the future is very likely.

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- Some of the foundations that initially kick-started the financial resource-flows to enable TransforMap indicated to further back the project, especially for times interim bigger fundings and assignments.
- Some of the institutions, which are currently involved might very likely be willing to engage in small fundings, once they see that we can deliver and provide value to their goals.
- We will engage in several EU grant applications as a minor partner to develop the online-maps for the projects, as geographical online-representations of the projects is a very common feature of research and education grants.
- We estimate, that a substantial number of partners that want to integrate their maps are able to make small reoccurring contributions on annual bases.
- Small municipality, state and federal state funding are viable to apply for, once the mapping system is running and we can display Sustainability data from different regions of the world.
- Crowd funding and donations based on the contribution of private individuals is also one possible resource to implement certain features. Some of the contributors already have positive experiences with crowd funding.
- Apart from financial resources, we also want to enable a development environment, where private individuals are able to contribute on voluntary bases and further the advancement of the project. Already at this moment, the general development would not be possible, if it would be just monetary driven.

We estimate further funding of about 60.000€ for the current year and an annual turnover of about 120.000€ for the next 2 years.

20.3.5 Risks

Relevance and probability rated with 1 (small) to 5 (big)

- The interoperability much depends on database infrastructure and the technical skills available to partnering organizations and networks contributing their data /data pipe. There might be more funding needed, to help them to improve their existing systems for interoperability.

Relevance: 4 | Probability: 3

Respective funding strategies are mentioned in the sustainability strategy above. We also noticed, that it is a good strategy, to hire consultants, which train our developers and contribute little code, instead of hiring coders to do full packages. By that, we generate further capacity in our team, save money to spent externally, and produce good quality, that we internally understand from scratch.

- In the cycle of technological development and it's respective funding, there is an upwards-spiral interaction between funding and proof of concept. Each new funding unlocks the potential for a further elaborated proof of concept and maturity, which then enables to leverage further funding. That cycle must be completed until a certain maturity is reached, and the viable product turns into running operations. One of the biggest risks is, not to deliver, in one iteration of this cyclical proof of concepts stages.

Relevance: 5 | Probability: 2

To cope with that we follow a pattern to reduce down to a minimal viable product (MVP), that is just good enough to deliver specific value and generate expectation towards the next iteration and by that build in small tangible steps and organic growth to maturity.

- Very often organizations fail, as the complexity of the tasks to process is growing much faster than the ability of the individuals, and the organizational body to handle that complexity.

Relevance: 4 | Probability: 2

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Constant development in our processes and workflows, as well as acknowledging the limitations of given time and resources, we focus, build in small steps and process just a reasonable number of items at one time.

Another common cause of failure is also to follow development paths that do not adequately address the problem in a way suitable for the target group, and or try to solve too many problems at a time and by that do not provide well for any of them.

Relevance: 4 | Probability: 2

Sticking to scrum based agile development, we build infrastructure based on elaborated user stories, which matter most to the respective target group and stay in close contact with the potential users.

- In the process of community building it is of paramount importance to ensure that TransforMap is perceived as a non-profit and collaborative effort. Failure in ensuring this will considerably undermine the whole TransforMap process by deterring non-profit communities to participate. The project, the core motivation of TransforMap needs to be a community effort based on shared values and mutual transparent agreements, which provide the frame of the partner's interaction.

Relevance: 5 | Probability: 3

The community is integrated in core development of the project, and is vital for ensuring a broad array of perspectives contributing. We maintain close contact via online written and audio-visual communication as well as and onland events to interact and integrate with the process, as well as enabling comprehensive understanding of where the project is currently developing towards, and what qualities are needed for the next step of development.

- As the set of intertwined efforts to generate the overall ecosystem is quite complex and interrelated, there is a substantial risk in delay, as agile and leading edge development can be planned in waterfall perspective, but needs to be agile in the actual technical development.

Relevance: 4 | Probability: 4

As we already see in our current development, there is a high potential for delay based on the distributed nature of our collaboration. That given difficulty as well as the results of our first Scrum sprints, where we could not finish all the stories, we set out to process, are considered in the development process to focus and narrow down our activity to the most important parts of the development that are the viable next step of development, nothing more and nothing less. Regular meetings, collaborative online working sessions and peer programming help us to stay focused and deliver piece by piece.

20.3.6 User-based evaluation of the concept

- 30 institutional stakeholders involved in the codesign-process. Especially from

www.solidarityeconomy.eu

- The individuals in the organizations are the first test-users.

- The female:male ratio is 70(female):30(male).

- The median age is around 30 – 55.

Testmapping process:

We connected especially with community leaders from Austria, several places in Germany, US (Austin/Texas and Asheville), Hungary, Finland, France, and UK. They contributed to a testmapping, based on the categories prior developed by the TransforMap taxonomy circle and the possibility to also enter their own ideas.

We learned that there is a strong wish from communities to map with their own taxonomies & identities, and there is not so much willingness to use an abstract taxonomy system, that allows the integration of a lot of different types of data, but does not directly display the communities' interest.

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Many communities are willing to engage, as they find the overall effort compelling. The first prototype of the editor needs much more improvement to be publicly used without prior explanation. It is a fork of an OpenStreetMap ID editor (<http://editor.transformap.co/>), and during the further development process we realized, that it would be difficult to strip it down to what we actually need, a smaller editor, that is focussing on Points of Interest. Therefore we specified our needs and researched for potential alternatives.

requirements editor: <https://github.com/TransforMap/edit.transformap.co/wiki>

Taxonomy development:

With SSEDAS we work with 26 partners, of which a big number (around 18 partners, some with several individuals) is actively contributing to the development. The outcome of the testmapping is integrated in the approach to work with the partners.

We provided a process to understand their own taxonomy (what do they want displayed on the map) as a preliminary condition to engage in collaborative taxonomy development.

After a phase of converging and testing that converged taxonomy with experts in the relating fields and engage in a convergence process with other projects mentioned in the partner section, we integrated them in our taxonomy server, successfully implemented the translation process, enabling already more than 10 partners to translate the items in their native language, and enable automated 3-tier menu-generation from the Taxonomy-Server export json file.

Translation management:

Feedback for the translation management for the categories was generated by the partners using the life-system. With a very simple 2 A4 page description, the majority of 26 partners were able to translate into their native languages within a few weeks' time, and about 1 – 3 hours of time to invest. Most of the contributors in this process are web-technically non-skilled female. We see the results and the conversations with very little to none (apart from content-relating topics) requests for help as a successful test, that the system is applicable in lay-cartographer's environments.

Map Interface testing:

The map interface was first presented with simple mock-ups (https://media.taiga.io/attachments/8/2/3/d/511b30cd70f8eca801c04e83bfc2a7f4f87e4d2145133ba28ac4c4201f66/mockup_p2.png) and later tested and refined via life-beta-testing and issue-tracking.

Life-test-Site: <http://viewer.transformap.co>

Issue-tracking: <https://github.com/TransforMap/transformap.github.io/issues> the issue-tracking is often channelled via email-conversation, as we noticed, that the partners are easily overwhelmed with too many channels to interact with, and prefer email as a main communication media.

Some of the feedbacks are easily implemented right away in an iterative process. Some are thought through and dropped, based on arguments. Some of the feedback is framed as a feature request, evaluated and conceptualized for future integration. We were very eager to stick to the MVP of the product, to have the map itself running well, based on the agnostic design, and will enter further and broader testing from September to November 2016. From the further testing, we want to generate further and more detailed feature request and distinctive use-cases in the various segments of the main target groups (small and medium ngos, initiatives and socio-ecologically aware individuals).

20.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 38.

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Table 38: Snapshot of project "Transformap"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
<p>TransforMap is a collaborative answer to the challenges of mapping social innovation. It aims to co-develop with users, a set of tools and standards for free and open crowd mapping, that allows for aggregating all those mapping initiatives in the field of social innovation in one map, which can be easily navigated by anyone.</p>	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Specified ecosystem requirements and started alignment process with ESS global ○ Created v1 of Sustainability Initiatives Taxonomy, with over 140 items completed. ○ Database and web-API written, map interface and Taxonomy server setup, ETL Hub specified. ○ First prototype constructed and tested. ○ Conducted alpha test mapping process with partners in 9 countries to gain feedback. ○ Engaged with SSEDAS project (over 20 partners in over 20 countries) for taxonomy and map interface development. <p>The project successfully delivered 13 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated project website: http://transformap.co/ ○ Project social media: Twitter (362 followers) ○ Dedicated Transformap community forum: https://discourse.transformap.co/ ○ Transformap featured in a chapter of a book: "Patterns of communing" ○ Monthly event: "Mapping the Commons" at Wikimedia (Berlin) ○ Workshops held in Graz: https://discourse.transformap.co/t/austria-graz/253 ○ Workshops at a number of other events, including Open Source Circular Economy Days/Make City Festival 2015, Ouishare Fest 2015, Solikon 2015 (mentioned in keynote speech), World Social Forum 2016 and Degrowth Conference 2016. ○ 106 interactions in the project's section on the CHEST Community Forum.

Table 39 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on information) and secondary (impact on environment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 39: Mandatory KPIs for Transformap

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	2	3	3
		Number of users involved in co-design process	30	40	40
		Ratio between men and women involved	Women : Men 30 : 70	50:50	Development – Team 90% Men Taxonomy contributions 70% Women
		Ratio between young, adult and old people involved	Age-Span from 23 – 60	20 – 60, strong especially around 25-40.	Currently 30 – 55, especially strong around 30 and 50

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ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	1	6	3
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	3	15	9
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST forum	0	1	1
		Number of comments / replies on project blog entries on CHEST forum	-	-	-
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	Twitter: 150 Discourse: 100	Twitter: 300 Discourse: 200	Twitter: 353 Discourse: 204
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	Tweets 250	Tweets: 480	Tweets: 711

21 User-centered Energy Management for Social Housing⁶⁶

This project will deliver a proof of concept user centric collaborative demonstrator, which will allow social housing residents to express their energy management preferences through the use of digital devices in the home. These real time preferences will be captured and transmitted to a cloud based computer analysis system. This system will use the data to calculate the optimum energy use time plan (heating) and the comfort level (temperature) preferences for each dwelling. It will also calculate the optimum energy consumption load balancing for the building as a whole, leading to energy savings.



Figure 26: Screenshot of BMSHome prototype(interactive heating plan)

21.1 The societal problem

21.1.1 Description of the problem

Residents in Social Housing settings often live in multi-occupancy buildings, eg blocks of flats. Typically, these buildings are electrically heated for safety reasons, employing off peak electric storage heating.

These scenarios have no facilities for either a heating plan (time clock equivalent) or temperature control (thermostat equivalent). Therefore, residents cannot adequately influence their own environment to achieve comfort and economy.

In particular, these (often older) systems exhibit a number of issues:-

- Residents need to manage the balance between off peak heating and on peak heating manually, often leading to an inefficient and expensive mix of energy use.
- Changes need to be made to the system settings every night, typically later in the evening, allowing for the weather for the next day. This is often forgotten, is inconvenient or is incorrectly implemented, resulting in the wrong energy settings for the next 24 hours.
- Once the heating system is out of balance it can take a number of days of corrections to get it back to a balanced situation. Each iteration of change takes 24 hours to work through.
- Residents often fail to compensate for significant weather patterns swings (warm day followed by cold day, or vice versa).

⁶⁶ Chapter contributors: Mathias Becker, Mike Hartley

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- The long lead-time between cause and effect leads to residents making over large adjustments, which further exacerbates the problem.

These issues result in the Residents being unable to control the system adequately. This in turn leads to the following outcomes, depending upon personal circumstances:-

- Dangerous under heating of the premises, either through poor control, fear of cost, or actual fuel poverty.
- Expensive and wasteful overheating of the premises due to poor control.

By tackling these issues through the use of Digital Social Innovation, this project aims to address strong social needs, namely:

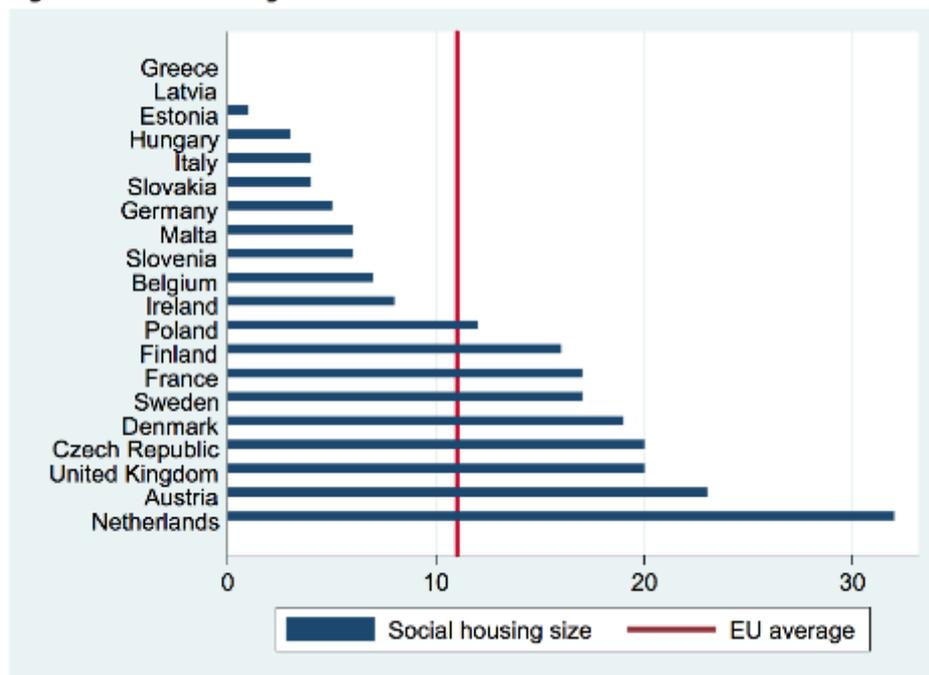
- (i) The reduction of fuel poverty
- (ii) The reduction in energy consumption and its associated emissions
- (iii) The empowerment of the elderly and vulnerable to manage their environment.

21.1.2 Scale of the problem

All members of the EU have Social Housing stock, varying from 2% (Spain) to 32% (Netherlands), with typical values in the range 5-18%. Demand for social housing is on the rise, and resident profiles are predominantly the elderly, vulnerable and low income individuals.

There are 503 Million people in the EU, in 216 Million Households. 10.8% of these households are in some form of Social Housing, ie some 54 Million EU residents. (Sources: Eurostat, Europa.eu, "Social Housing in the EU" 2013).

Figure 1: Social housing share



Source: CECODHAS 2012

Residents in social housing often have issues managing their energy consumption either through user ability/understanding or the availability of suitable energy control systems. This results in higher than average fuel bills for those who can least afford it.

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This demonstrator uses digital connectivity and innovation to provide Social Housing residents with the means to manage otherwise hard to control heating systems. The principle is applied at individual residence level, and at building level, delivering a mix of individual and collective action.

This project aims to give these populations a voice by forming them into a digitally connected cohort that can explore its desire and intent to manage its environment.

The demonstrator uses Electric Storage Heating, but the underlying principles can be applied across all energy systems, including aircon, solar, heat pump and gas.

21.1.3 Previous approaches to solving the problem

Resident training – helping the resident to understand how the electric storage heating system works, and how to control it to achieve comfort and energy efficiency. This approach has some limited benefits, however the requirement for the user to adjust the system every evening means that conformance drops off over time. Elderly and infirm residents often find it hard to implement the advice, or often implement it incorrectly.

Replacement equipment –

- 1) The use of new electric storage heating systems can improve efficiency, but still do not overcome the need for regular user control. These systems do not respond well to fluctuating weather conditions, and can only provide a time plan/time clock by the use of expensive peak rate energy.
- 2) The use of alternative heating systems – heat pumps, gas heating etc. These approaches are not always viable (safety in high rise properties) , or do not offer significant energy savings.
- 3) Replacing existing equipment is expensive, compared to applying retro-fit controls

21.2 Implementation of organizational structure

21.2.1 Maturity of the project

Pilot phase – Hardware and Software to be developed and trialled.

21.2.2 Organizational structure

BMSHome Limited will lead the project and is responsible for the concept design, software development, firmware development; electronics outline design, trial design, evaluation, reporting and commercial exploitation. There are four members in the team; all are permanent employees of the business.

Gentoo Green is a division of Gentoo, the fourth largest Registered Social Landlord in the UK and with the second largest concentration of properties in England. Gentoo is responsible for providing the test site(s), ethics oversight, user support and engagement. They will assist in the analysis and evaluation and provide insight and context for the commercial exploitation plan. Gentoo will provide up to three staff to support the project on a part time basis. All are permanent employees of the company.

GSPK Design Limited is an electronics design and manufacturing company. They will provide detailed electronics design and will build prototype devices for the field trials. They will provide three staff to support the project on a part time basis. All are permanent employees of the company.

21.2.3 Key personnel

BMSHOME TEAM:

Managing Director, Mike Hartley is a Chartered Engineer with 25 years business management experience, including leading a £1m Management Buy Out of a new product development company. Mike leads BMSHome and is the project leader for this project.

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Stephen Mitchell is a software engineer with experience in cloud based and embedded systems, and has been working on the Thermionix energy management system for the past three years. He specialises in communications, database systems and systems monitoring and control.

Dr Rowan Hargreaves holds a PhD in Computational Physics, and works on the adaptive control algorithm theory and its translation into practical software code. He will be using the resident feedback to tailor the energy control systems to provide safety, comfort and energy efficiency.

GENTOO GREEN TEAM:

Led by Nicola Scorer, Green Futures Manager, Gentoo are providing critical appraisal of the system, market knowledge, and input to BMSHOME's research on the customer need. Nicola is supported by a strong team who work with Gentoo's Customers(residential tenants)- Matthew Pitt: Green Projects Officer, Emma Pryke: Green Customer Relations Supervisor, and Dylan Hawick: Customer relations officer. Gentoo will also provide installation staff for the trial site as appropriate.

GSPK DESIGNTEAM:

GSPK has a twelve man team specialising in electronics design and manufacture for electronics hardware, with highly relevant experience in embedded and wireless systems. The company has in-house hardware development and electronics prototyping capabilities, and a medium volume manufacturing capability. BMSHome and GSPK have worked together for over 24 months to develop the Thermionix system hardware to its current stage. Work will be led by Paul Marsh, GSPK's Managing Director and Jim Needham, GSPK's Senior Designer. They will be supported by Chris Hooper: Electronics Design Engineer and Tim Chamberlin: Industrial Designer.

21.2.4 Partnerships, cooperations, and networks

BMSHOME: is the lead partner for the project. BMSHome is currently developing its energy management system, "Thermionix" and aims to bring this to market within the next 12 months. This CHEST project will add a much needed user feedback capability to the system, providing essential information and evidence to inform the development of the Thermionix product to meet the social need.

GENTOO GREEN: is the early adopter partner that is trialing the Thermionix system within their housing stock. Gentoo's interest is in providing better services to their customers, ensuring their safety and helping them to save energy. Gentoo has the know how, contacts and professional reach to bring Thermionix to the UK RSL market. Gentoo is not being paid for their work on this project.

GSPK Design: has the electronic production systems to develop and manufacture the prototype devices for the CHEST project trial phase. They are working on a subcontract basis.

21.3 Implementation of the solution approach

21.3.1 Solution approach

Residents in Social Housing often have to manage legacy energy systems, which display latency between time of generation and time of use, resulting in the need to store energy. Current control systems are poorly suited to managing this latency with energy regularly being wasted through poor control or user habit. This leaves residents with higher bills than necessary and exacerbates fuel poverty.

The BMSHome system uses adaptive software to predict forward energy demand and control energy storage and release for optimum efficiency/cost and user comfort/convenience.

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BMSHome has already produced a proof of principle demonstrator of the system, using electric storage heating as the latent energy system. However, this demonstrator lacks any form of individual or collective user interaction.

The objective of this innovation is to employ digital user engagement to augment the current demonstrator. With the data gathered from the system users, the system would provide a user heating plan, temperature control, and collective energy demand balancing. This would result in a system that not only made the most efficient use of energy, but which could overcome the practical issues surrounding the system latency and allow users to save costs and increase comfort.

The BMSHome system can subsequently be applied to the control of renewable sources with high latency between generation and consumption such as Solar Panels and Ground Source Heat Pumps.

The feasibility study will:-

WP1: User Interaction

- Devise or select a user interface device(s), which can be used to engage with the cohort of social housing residents.
- Explore the information exchange required between the system and the residents to gather the user input.
- Equip users with the interface devices
- Interact with users via the devices to gather their input
- Analyse the data to arrive at load balancing outcomes for the building as a whole.
- Test the load balancing scenarios using an office based demonstrator and subsequently with the live system.
- Engage users to establish opinions to inform the study and commercial exploitation.

WP2: Heating Plan and Temperature Control

- Consider how to adjust the system to provide a heating plan facility for individual residences.
- Gather user input via the user interface devices
- Simulate the heating plan facility using the office based demonstrator.
- Test the heating plan facility using the live system.
- Engage users to establish opinions on the methods of interacting with the system and to inform the specification of a commercial product.

WP3: Business Plan

Prepare a business plan to:

- Address the commercial development of the system.
- Identify funding requirements and sources of funding.
- Identify routes to market.
- Prepare an action plan for the exploitation of the technology.

21.3.2 Target groups

Social Housing Residents - Elderly and Infirm

Older people who live in social housing for economic or welfare reasons.

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17.8% of the EU population is 65 or over (89 Million EU residents) (Source: European Social Statistics, 2013), although it is estimated that a disproportionate number of the 54 Million EU residents in Social Housing are elderly.

The principle concerns in relation to this project are safety and fuel poverty: The target group all aim for safety, comfort and affordability from their heating systems. Electric storage heating can be difficult and costly to use. This can result in comfort and (ultimately) safety being compromised for affordability.

The benefits of the project to the user are:-

Economic:

- Reduction in fuel costs (10 - 25%) through the reduction in energy consumption brought about by improved control and reduced waste.
- Savings through the collective optimisation of energy demand for the whole building
- Potential for reduced energy tariff charges in return for load balancing which responds to energy supplier requests.

Social:

- Improved quality of life through better control and more responsive heating system
- Improved comfort
- Free up money to address other social needs of the resident
- Empower residents to regain control of their environment
- Reliability and early equipment failure warnings
- Potential to integrate with social alarms
- Temperature monitoring for vulnerable residents with Warden Call facilities

Environment:

- Reduced CO/CO2 Emissions through lower energy use and more balanced energy demand, avoiding use of more polluting generating systems.

Social Housing Residents - Health and Social issues

Individuals with medical or social needs who require additional support to live in the community.

18.3% of the EU population (92 Million EU residents) (Source: European Social Statistics, 2013) have a self-declared condition that leads to actual limitations in usual activities. Social Housing provides support for those with a greater need.

The principle concerns in relation to this project are safety and fuel poverty: The target group all aim for safety, comfort and affordability from their heating systems. Electric storage heating can be difficult and costly to use. This can result in comfort and (ultimately) safety being compromised for affordability.

The benefits of the project to the user are:-

Economic:

- Reduction in fuel costs (10 - 25%) through the reduction in energy consumption brought about by improved control and reduced waste.
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- Temperature monitoring for vulnerable residents with Warden Call facilities

Environment:

- Reduced CO/CO2 Emissions through lower energy use and more balanced energy demand, avoiding use of more polluting generating systems.

Social Housing Residents - Low Income Families

Families (and individuals) with low income that need access to affordable housing.

25% of EU households that rent their property are defined as being low income households. 24% of EU Population (119 Million EU residents) are at risk of poverty or social exclusion.

The principle concerns in relation to this project are safety and fuel poverty: The target group all aim for safety, comfort and affordability from their heating systems. Electric storage heating can be difficult and costly to use. This can result in comfort and (ultimately) safety being compromised for affordability.

Economic:

- Reduction in fuel costs (10 - 25%) through the reduction in energy consumption brought about by improved control and reduced waste.
- Savings through the collective optimisation of energy demand for the whole building
- Potential for reduced energy tariff charges in return for load balancing which responds to energy supplier requests.

Social:

- Improved quality of life through better control and more responsive heating system
- Improved comfort
- Free up money to address other social needs of the resident
- Reliability and early equipment failure warnings
- Potential to integrate with social alarms
- Temperature monitoring for vulnerable residents with Warden Call facilities

Environment:

- Reduced CO/CO2 Emissions through lower energy use and more balanced energy demand, avoiding use of more polluting generating systems.

Social Housing Providers

Social Landlords manage the housing stock that their residents live in. They are affected by a number of issues that this project is aiming to address.

Economic:

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- Reduction in fuel costs (10 - 25%) through the reduction in energy consumption brought about by improved control and reduced waste. (Social landlords often incur the costs for heating communal areas in social housing).
- Improved rent receipts – tenants that can afford their heating are less likely to be in arrears for their rent.
- Reduced maintenance costs
 - Social landlords often incur call out costs to residents who cannot get their heating to work as they would expect.
 - Equipment breakdowns and repairs would be simplified by an automated monitoring feature in the system

Social:

- Reliability and early equipment failure warnings
- Potential to integrate with social alarms
- Temperature monitoring for vulnerable residents with Warden Call facilities

Environment:

- Reduced CO/CO₂ Emissions through lower energy use and more balanced energy demand, avoiding use of more polluting generating systems.

21.3.3 Activities and work performed

Work Package Number : WP1 – User Interaction
Actual Starting month : September 2015 Predicted / Actual End month : September 2016
Work Package Objectives: This work principally concerns the design, development and implementation of a user interface system and its subsequent use to gather data from the cohort of residents.
Description of work this period: Main achievements: <ul style="list-style-type: none">• Finalisation of the prototype device design.• Manufacture of prototype devices.• Equip the cohort of users with a device each.• Gather information from the users via the devices.• Conclusions and next steps Detailed description of work performed to reach the achievements listed above: <p>The handheld user interface device, which communicates via the Zigbee wireless communications protocol back to a base station, has been completed. In the end a significantly simplified approach to the design was made, in response to user feedback that the devices must be ergonomic, simple and quick to use.</p>  <p>Completion of the firmware and hardware for the base station. The base station communicates to the cloud servers, and the resultant information is captured in a database.</p>

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Completion of the cloud software to receive data messages from the base station, and route the data to the appropriate database tables.

Manufacture of a set of interface devices to be issued to users.

Office testing of the interface devices and base station to ensure correct function of the whole system.

Issue to users and initial information gathering from the user feedback.

Summarise any problems you have encountered, and how they have been overcome

We have overcome the difficulties with the wireless communications employed within the system – a change in microchip design by the manufacturer had led to difficulties implementing the new devices (previous device has been withdrawn from sale).

Achieving acceptable battery life has proved challenging using this technology. Progress on this issue was not yielding the expected results, and so it was decided to use plug in power supplies in the short term, and move on to deliver the rest of the project objectives. We will return to the issue of battery power at a later date.

The time of year has been a significant factor in the volume of user feedback. Because this phase of the project has coincided with the summer months, users have not been running their heating systems. This has led to lower interaction rates than anticipated, and less meaningful data.

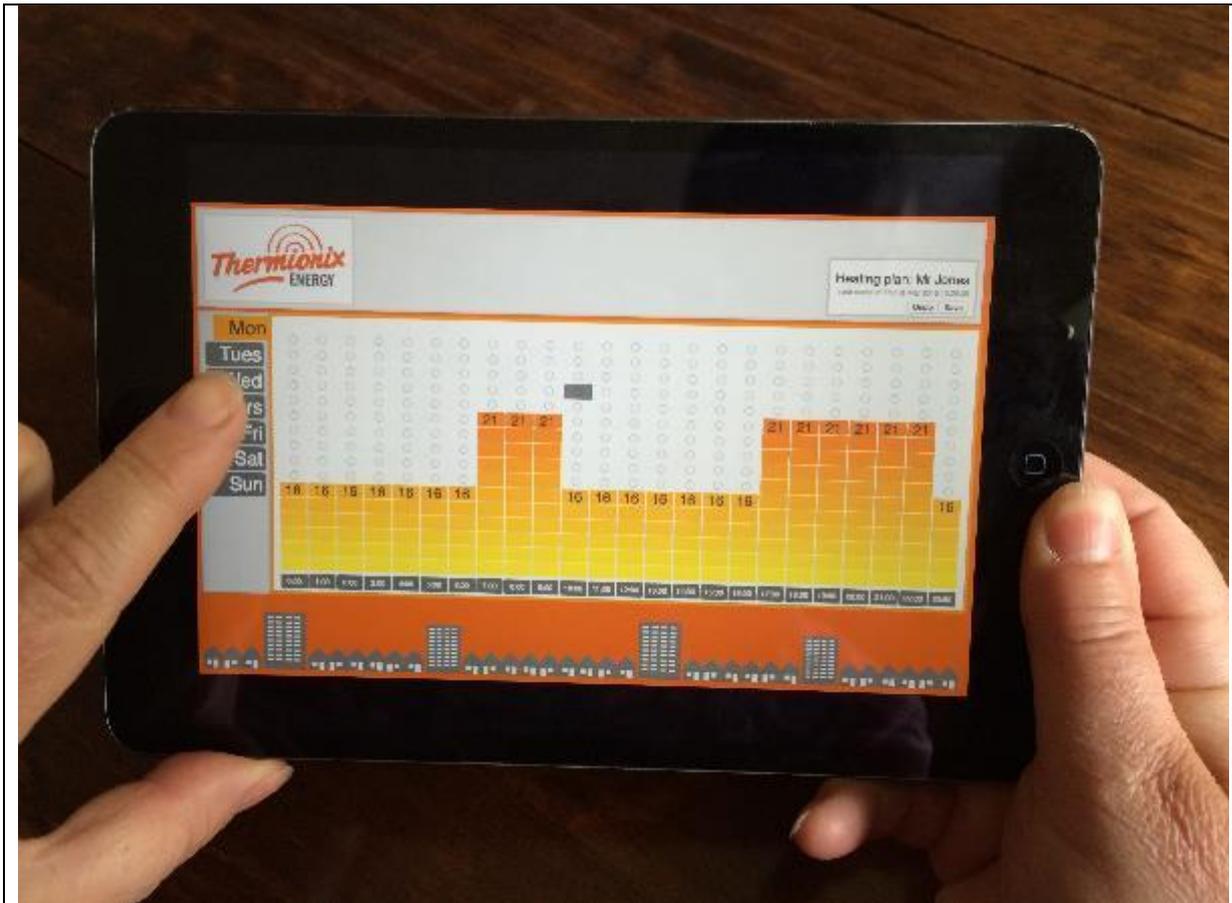
The activities of this project are key to the exploitation of the Thermionix technology, and to the delivery of the social and environmental impacts and outcomes. Therefore, BMSHome will continue to run the trial throughout the 2016/2017 winter and build a greater body of evidence. In effect the project will live on beyond the period funded by CHEST.

Description of planned activity for next reporting period

NA – Project Complete

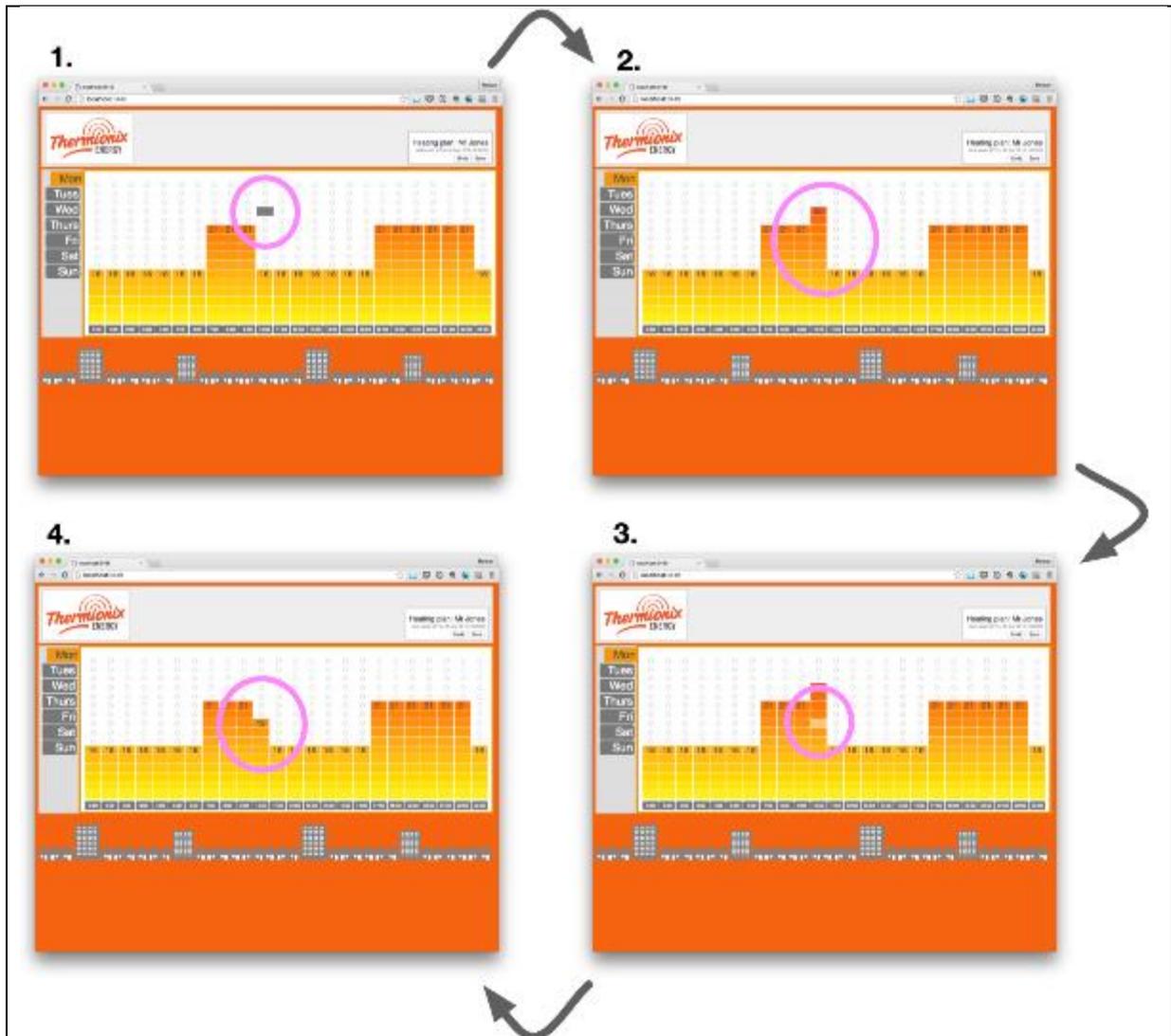
<p>Work Package Number : WP2 – Heating Plan and Temperature Control</p>
<p>Actual Starting month : September 2015</p> <p>Predicted / Actual End month : September 2016</p>
<p>Work Package Objectives: This work concerns the development and testing of control strategies for Heating Plans and Temperature Management.</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • Development of an SMS interface for remote user input • Deployment to the live test site – residents’ homes • System testing • Algorithm refinement • User feedback via user interface devices from WP1 • Conclusions and next steps <p>Detailed description of work performed to reach the achievements listed above:</p> <p>An SMS interface has been created to allow users to interact with the system via SMS messages. Users had mixed reactions to smart phone apps, and not all users possessed a smart phone – one must bear in mind the demographic of the target user base for this project. The SMS interface has been tested, and a simple instruction set devised for residents to use. Time will tell how readily users take to using the system (see comments in WP1 above re: summer deployment of the system). There is of course scope to further adapt the system in response to user interactions with the system and their feedback.</p> <p>The Heating Plan system was further developed to incorporate a web interface for use by the Thermionix team and for end users, should they wish. This allows simple access to the Heating Plan facilities. It should be noted that Heating Plans for Electric Storage Heating Systems are novel, as systems are typically governed by the electricity supply timed periods (eg Economy7 and Economy10). Thermionix uniquely offers this facility as a retrofit capability.</p>

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The interactive heating plan allows Thermionix staff, and /or users to create a Heating Plan and Temperature profile for the property. This information is then stored in the database and is available for the Thermionix heating control algorithms to establish the target temperature for any given period. The electric storage heaters are then controlled to achieve this profile, whilst taking the prevailing weather into account.

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We now have the tools in place to control resident's heating in line with their requirements, and to give them the ability to change those requirements either through the interactive Heating Plan, via SMS message instruction, or by providing feedback using the handheld Thermostat device. The use of the system will continue beyond the CHEST project, as these tools will be used by Residents whilst the Therminox system controls their heating throughout the 2016/17 winter.

Summarise any problems you have encountered, and how they have been overcome

None.

Description of planned activity for next reporting period

NA – Project Complete

Work Package Number :

WP3 – Business Plan
<p>Actual Starting month : September 2015</p> <p>Predicted / Actual End month : September 2016</p>
<p>Work Package Objectives: Development of a commercial exploitation plan for the outcomes of the project.</p>
<p>Description of work this period: Main achievements:</p> <ul style="list-style-type: none"> • Inform the process from WP1 and WP2 • Refinement of the offering and business model • Testing of the business model with potential early adopter customers • Refinement of the business model based upon potential client feedback • Completion of the exploitation plan <p>Detailed description of work performed to reach the achievements listed above:</p> <p>The team has built on the work undertaken in the first half of the project. The Business Model has moved on, and it is clear from our work that the business model needs to address two fundamental challenges:-</p> <p>1) Who Pays and Who Gains?</p> <p>Social Housing has an interesting problem where the energy user – the resident – pays the energy bill, but does not own the heating system that consumes the energy. The heaters are owned by the Social Landlord, and residents are not entitled to modify the heating equipment.</p> <p>This means that there are no financial incentives for a social landlord to install the Thermionix system, because they will not benefit from the cost savings. So, whilst social landlords may wish to install the system for the benefit of their users, a business model must be found which makes this a possibility.</p> <p>2) How to Deliver Environmental Impact?</p> <p>True environmental impact will be achieved by the Thermionix system, if it delivers both a reduction in the amount of energy used, and flexibility in when the energy is used. Smoothing out peak demand (known as Demand Side Response) has a significant impact on the requirements for electricity generation, allowing sustainable energy sources to be used (wind/solar/wave/hydro) rather than fossil fuel and nuclear energy.</p> <p>Delivery of Demand Side Response requires the use of Smart Devices, in conjunction with energy generation. Smart Devices have to respond to requests to reduce, or increase demand to match the prevailing energy generation capacity. The Thermionix System turns legacy electric storage heaters into Smart Devices, but the energy supply infrastructure does not currently provide for a mechanism to exploit these smart capabilities.</p> <p>Business Model Conclusions</p> <p>We have considered these challenges to the commercial exploitation of the Thermionix system,</p>

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together with the goal of delivering positive social, economic and environmental impacts. As a result of this work we have arrived at a business model that addresses each of the issues.

The resultant business model takes a novel approach: it combines the supply of electricity with supply and operation of the Thermionix system in a single product offering.

Under these arrangements, the resident becomes a customer for energy supply. This allows the company to provide a specifically devised tariff for the Thermionix system. With this tariff, it is possible to install the Thermionix System at the customer's property, without the Social Landlord needing to pay. The Thermionix system can then be operated in conjunction with the energy generators to deliver:-

- Reduced costs and increased control for the customer
- Resident warmth and safety
- Environmental benefits from Demand Side Response

Clearly, this is not a simple business model, as it has a number of commercial and regulatory hurdles to overcome. However, the concept is very much of its time, and the Thermionix system is in a unique position to deliver outcomes and impact.

Summarise any problems you have encountered, and how they have been overcome

None.

Description of planned activity for next reporting period

NA – Project Complete

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

We have had to recover time in the project due to wireless communications issues in the first phase of the project. This has been successfully achieved.

The testing period has fallen in the summer months, when heating is only required in modest amounts, and the prevailing weather is mild or warm. The Thermionix team will continue the work of this project throughout the winter of 2016/17, to build a larger data set and to establish the performance of the Thermionix system. Residents at the test site will remain fully engaged with the work throughout this period.

Detail any publications, publicity or other dissemination activity.

Use of CHEST forum posts. Thermionix Website.

21.3.4 Sustainability of the solution

BMSHome was created for the sole purpose of developing and exploiting the concepts behind the system described here.

BMSHome intends to commercialise the outcome of the project through its own products and services. The results of the CHEST project will be incorporated into the second generation of the Thermionix product in Q4 2016.

The first sales incorporating IP and know-how arising from this project will be made in Q1 2017 ie within 6 months from the end of the study.

Whilst the company is currently establishing a supply chain for the hardware elements of its product, it is not reliant on any third party to exploit the outcomes of this project.

BMSHome has estimated the key metrics for the product as follows:

Funding Requirements: £400k (€ 375k) Q1 2017 – Q4 2017. Self funding by Q1 2018

Growth Potential: The commercial version of the system is expected to add £1.5M (€ 1.9M) to BMSHome’s turnover within 18 months of the study.

Employment : Staffing will increase by 3 to 5 jobs within 18 months of the study.

Market Size: The total addressable market for electrical heating control is estimated at: UK - £912M (€ 1,140M), Germany - £700M (€ 875M). The total addressable market in the EU reaches into multiple €bn’s.

IP Management: IP arising from this work will be protected by patent where possible.

ROI: Estimated at 1700% within 3 years of the study.

Profit: Estimated at £3.8M (€ 4.75M) within 3 years of the study

BMSHome will sell and manage the system through its own resources within the UK. In mainland Europe, BMSHome will appoint territorially based approved installers, who will sell and install the system in residences and provide front line support within their territory.

21.3.5 Risks

RISK	GRADE	IMPACT	MITIGATION
System doesn’t deliver correct level of control and ease of use for users	Low	High	Experienced development team used to develop the system
User interface does not meet requirements.	Medium	Medium	Working with experienced electronics designers. Project leader (MH) is a Chartered Electronics Engineer. Hardware architecture is well proven.
Key staff member unavailable for large part of project	Medium	Medium	BMSHome system to be developed on a team basis against good specifications. Hardware drawings will be kept up to date. A hardware and software management system will be employed to hold key project information and technical source files. Weekly team meetings.
User interaction is poor	Low	High	Gentoo is a highly experienced social landlord and their customer services team has already been seeding the project to identify potential participants. BMSHome has already been working with the proposed cohort of

			users, and has received strong support to date.
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21.3.6 User-based evaluation of the concept

The project has used a number of approaches to ensure a user-centered design for the interface device and for the nature of the service itself.

Working with one of our target groups – Elderly and Infirm – we established a small group of users (8 – 7 female, 1 male) who were invited to meet in the communal area of their social housing building to discuss the project as an informal discussion group. The overall concept of the project was discussed and users expressed their opinions on the difficulties of using their current heating systems, and their ideals for a modified system. Issues regarding the cost of heating and the uncertainty surrounding their ability to manage their heating bills to a budget came to the fore.

A mockup prototype was presented, based upon our original concept, for the interface device, and was critiqued by the group. Very forthright opinions were expressed on the general complexity of electric storage heating systems and the difficulties in understanding and using them. Clearly, extremely simple interface devices are required with any complexity being hidden from the user.

Our original device concept led to confusion between the actual room temperature and the target room temperature (or set point). Residents do not currently have a thermostat type device with their electric storage system, but have past experience of gas fired heating systems where wall mounted thermostats are used to establish set point, but do not display current room temperature. Our proposed approach would not have addressed this issue and would also have used degrees Celsius as the temperature measure, whereas this age group has clearly been grown up with Fahrenheit as their preferred measure of temperature.

Based upon the feedback, the device design was changed and a revised physical prototype produced. This was tested once more with the target group, and then a number of units produced to work with a wider group of residents (20 – 40, including a control group).

Work on the system control algorithms was undertaken to ensure that user inputs can be simplified, but will allow the system to “learn” from the inputs that users provide. Such learning is based upon matching the user input with the prevailing conditions to develop a data set for the response (eg, an “I’m Cold” input is matched with the actual room temperature, time of day, room orientation wrt the sun, season and external weather conditions). By learning from the pattern of responses, the system’s response can be tuned to the preferences of the individual.

The performance of the Thermionix system will continue to be refined over the coming months. We will continue to work with the volunteer residents to receive their data inputs and match this to the response of the Thermionix system. We will hold another review of the system with the residents once the need for heating increases – October – and will then continue to liaise with this trial cohort throughout the winter to further improve the system and ensure that it meets their needs.

21.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 40.

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Table 40: Snapshot of project "BMSHome – User-centered energy management for social housing"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
The BMS Home system uses adaptive software to predict forward energy demand and control energy storage and release for optimum efficiency/cost and user comfort/convenience. The objective is to employ digital user engagement to augment the current demonstrator. With the data gathered from the system users, the system would provide a user heating plan, temperature control, and collective energy demand balancing, which could overcome the practical issues surrounding the system latency and allow users to save costs and increase comfort.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Developed a user interface device prototype, conducted a user evaluation to collect feedback used to revise and finalise the design. ○ Manufactured finalised prototype design, equipped users with them to collect required information. ○ Developed prototype heating plan and temperature plan facilities. ○ Conducted testing with an office-based test rig. ○ Refined algorithm ○ Developed SMS and web interfaces. ○ Deployed to live test sites for system testing and feedback via user interface devices. ○ Developed a business model and exploitation plan. <p>The project successfully delivered 13 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Project page on the organisation's website: http://www.thermionix.com/chest-project ○ Engaging users for field testing by face-to-face presentation, posters on a central notice board, meeting with resident's association and word-of-mouth (as the target group is not a frequent user of social media, etc.) ○ 42 interactions in the project's section on the CHEST Community Forum.

Table 41 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on ways of thinking, values and behaviours) and secondary (impact on environment) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 41: Mandatory KPIs for BMSHome

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	1	1
		Number of users involved in co-design process	0	20	8
		Ratio between men and women involved	0	M: 45% F: 55%	M:12,5% F: 87.5%
		Ratio between young, adult and old people involved	Y: 0% A: 0% O: 0%	Y:0% A:0% O:100%	Y:0% A:0% O:100%
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	0	1	1
	Number of tools/activities developed by the project for influencing information	Number of tools/activities developed by the project for influencing information asymmetries	0	1	1

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	asymmetries				
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	8	8
		Number of comments / replies on project blog entries on CHEST website	0	16	0
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	100	27
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	20	5

22 W4P – Crowdsourcing Local Social Innovation⁶⁷

W4P wants to tackle the problem of giving citizens with great ideas the resources, knowledge or network to develop and extend these ideas, by providing a platform to support the leveraging of funding, coaching, materials, volunteers and other resources for their projects. The platform will be built under an Open Source license, with extra services such as technical support and coaching.

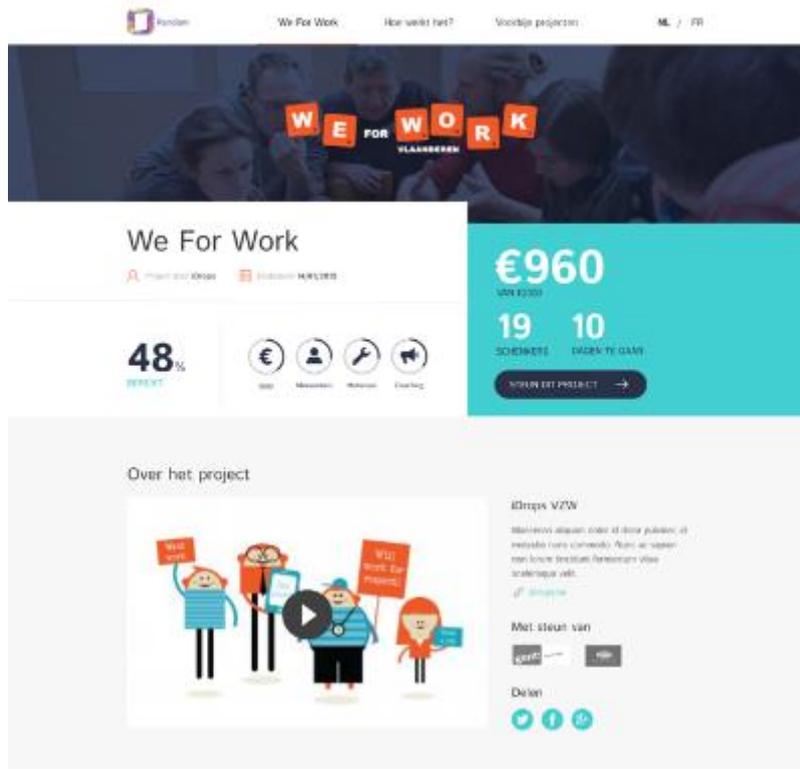


Figure 27: Screenshots of the W4P prototype

22.1 The societal problem

22.1.1 Description of the problem

The problem of today's financial climate and its backlash on citizen-driven and social profit projects:

Governments in Europe, including Belgium, have been dealing with budget cuts since the financial crisis in 2008. Non-profit and civil-society organisations are finding it harder to find sustainable ways of funding their projects. Governments and foundations have to decide whether they will fully subsidize a small number of organisations, or fund a lot of them but minimize the available budget for each and thus influence the overall impact of the projects as well.

Citizen developers on the other hand create digital applications, organise urban projects or co-create gatherings during their free time. Often without a lot of need for monetary funding, only they lack traction due to the lack of time, voluntary help and coaching. This basically means that there are many different projects, different needs and different aspects where these projects require help. That diversity in needed resources and assistance is what got us started with W4P.

The problem of today's crowdfunders for citizen driven and social profit projects:

⁶⁷ Chapter contributors: Mathias Becker, Pieter-Jan Pauwels

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Crowdfunding has been a solution to engage communities to invest in projects and products they believe in. Globally, there are dozens of examples of companies or initiatives that started as an idea funded on a crowdfunding platform and are still growing immensely. For citizen initiatives however, it is often very cumbersome to get their project noticed online. They are one of the many projects, often overshadowed by a new technology idea or teams with huge marketing budgets. Also, these citizen initiatives do not have certain marketing and communication skills, thus having a hard time reaching and convincing their target audience. That is why projects on popular crowdfunding platforms today only win when they have the loudest voice. Their skills in marketing transcends the quality of the project. We want to have a good balance between communication and quality of a project.

The problem of today's digital solution is being very closed or weighty:

Most platforms for crowdsourcing or crowdfunding are closed source. Which means that only the original creators can use or distribute the tool as well as determine the conditions and features of the platform. Exceptions are websites such as goteo.org, which is open source and social profit focused. But at the same time, it is such a huge project that local communities would never be able to copy the work for their own environment. There are also one-project platforms such as Selfstarter.us, but this platform is not fit for multiple projects and stripe, their payment platform, is limited to US market where everybody buys everything with credit cards. This shows that there is ample room for an adapted Open Source lightweight solution in Belgium and Europe.

What we learned during the project period

The idea of focusing on societal challenges with crowd efforts has just been emerging during the project period.

When we asked our primary target group about the issue they stated that it's very hard to find a decent platform template for their own crowdsourcing efforts. It's hard to find Open Source and even paid alternative platforms that fit their specific goals. And a next barrier is local focus. Because it is mostly a platform developed in another country, it emphasises different functionalities and often lack the necessary support. There is no way to compare platforms other than an outdated list on SeedingFactory.com with a last update somewhere in 2013.

A misaligned use-case that came up during our project period was that of HOTOSM, which stands for Humanitarian OpenStreetMap Team. They were using an international platform called Chuffed.org to crowdsource resources for a [Belgian based project in Dunkirk](#). Although Chuffed was a social engaged non-profit crowdfunding platform, it was in no way embedded in the local Belgian AND crowdsourcing context. The donations were in dollars instead of euro's and they had to find volunteers and laptops with arabic keyboards for this project through setting up a different Google form. It was no surprise this campaign didn't do so well. They asked us to be kept up to date as well.

This show both traction in the social project world and that there are still many challenges to face before we can support all of those.

22.1.2 Scale of the problem

1. It's very hard to measure how many citizen-initiatives or non-profit projects failed because of a lack of resources on a Belgian or European scale. What is being measured however, is the success

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and growth rate of crowdfunding itself which indicates indirectly the need for alternative financing and resources from a social profit perspective.

a. **The Belgium perspective:**

Crowdfunding revenue in Belgium had increased by 159% from 2013⁶⁸ to 2014⁶⁹ and is continuing to do so. In 2014, only 5 platforms were active in Belgium (not including international platforms) while in 2015 there were already 17 active platforms. This indicates that it is a suitable time to start a crowdfunding effort. In 2014⁷⁰ 4,35 million euros was invested through crowdfunding, of which 450.000 went to social profit projects, averaging 5300 euros per project. This indicated that roughly 84 social projects were successfully funded. A big increase when taking into account that in 2013, only 150.000 euros was invested in social profit projects through crowdfunding.

b. **The European perspective:**

Crowdfunding in Europe⁷¹ is huge, mostly thanks to the UK. In 2014, 2,5 billion was invested through crowdfunding of which 1,898 billion came from the UK alone. Still, if you apply that roughly 10% of that amount goes to social projects, this means that 250.000.000 euro is being directed to social projects. This has some huge potential for citizen initiatives and non-profits. If you average the budget for a social project to 10.000 euros per project and apply that to the amount above, we have an estimation of 25.000 projects crowdfunded in Europe in 2014. Again, this is a rough measure but indicates the potential of the crowdfunding market.

2. During the project period we did see some positive changes regarding crowdfunding platforms for social projects. In Belgium 1 out of 4 platforms is dedicated to projects with a social approach. There was even a 100% increase in 2015, bringing the total up to 4 platforms. Two of those platforms are focused on cities (Ghent and Brussels), one is a general one and one is focused on social loans. We do see this as a positive trend that there is a lot of potential for W4P as a product. We also found a first platform that is working from a more crowdsourcing approach. Idigap⁷² launched early 2016 ago and enables pretty much any project to ask for anything, from volunteers, to funding, to co-founders for startups. We estimate that the rise of these platforms will continue over the next few years and hope that amongst those will be a few W4P versions. The results of our desk research contains more information about the current crowdfunding market in Belgium⁷³ (measured in October - November 2015).

3. The fact that social profit and urban projects lack specialised channels does come with some unwanted social consequences. A lot of great initiatives fade away, others look for other funding opportunities such as subsidizing through government funding, but even there they have a lot of competition. The exact cost of not having specific crowdsourced networks for social innovation is hard to calculate, but having one would definitely mean an increase in successful funding or support climate for social projects.

⁶⁸ Douw&Koren 2014

⁶⁹ Douw&Koren 2015

⁷⁰ <http://douwenkoren.nl/crowdfunding-in-belgie-2014.pdf>

⁷¹ <http://www.douwenkoren.nl/crowdfunding-in-europa-25-miljard-euro-in-2014/>

⁷² <https://www.idigap.com/nl>

⁷³ <http://bit.ly/240LGs1>

22.1.3 Previous approaches to solving the problem

Voorjebuurt.nl⁷⁴: (literal translation: “for your neighbourhood”) Is a prime example of a platform that supports citizen projects for local neighbourhoods. This platform in the Netherlands has local version for the main cities in the country. It focuses on urban projects that are being funded on an award basis and provide supporters the opportunity to commit themselves as a volunteer to certain tasks. This last feature is a first entry to having a more crowdsourcing focused platform, that moves away from just monetary factors. In regards to the W4P proposal, voorjebuurt.nl has limited crowdsourcing features and is not Open Source. That prevents us from setting up the same platform in Belgium without any restrictions. It enables cities to make their own category, while our cities let us know that would like to setup an own instance.

Growfunding BXL: Is a platform started by the college-university Odisee (formerly known as Sint-KaHo). It is one of the few Belgian crowdfunding platforms that is focused on city projects, where citizens can support projects through donations and rewards-based funding. Although growfunding is gaining support in Brussels and has a very good platform, it is not Open Source, lacks other crowdsourcing abilities and is for now focused on our Belgian capital Brussels.

SoCrowd: SoCrowd is also focused on social projects in Belgium, but focuses only on giving loans without interest through crowdfunding. Funders can become shareholders of the organisation in order to provide a part of this loan. This severely limits their target group to social projects that have a monetary output when successfully funded. We believe a lot of projects have other outputs such as the improvement of the quality of life in certain areas, new recreational opportunities, and so forth.

Gingo Community: Gingo is a collaboration between a private bank and numerous foundations to set up a crowdfunding platform for social impact projects. It’s focussing on the whole of Belgium and has a pretty strong network. However they are platform owners and control what’s on the website (closed source) and have no crowdsourcing features available for project who need other types of resources.

Crowdfunding.gent: Crowdfunding.gent, is a just like growfunding BXL a local platform for Ghentian local projects. Their unique approach is that the city will co-fund successful projects, up to € 5.000,00. And it’s not about just donations or rewards, they also have a task section in which people can donate their time and effort to certain projects. The City of Ghent works together with the 1% Club⁷⁵ as a technical partner. We do love their local approach, only too bad this not something that other organisations and cities can copy-paste quite easily, as it was custom made for Ghent.

22.2 Implementation of organizational structure

22.2.1 Maturity of the project

We are now in the pilot phase. We validated our idea and translated it to a first technical prototype, which is now being tested by different real life pilot projects online.

22.2.2 Organizational structure

The project consisted of 3 consecutive work packages, excluding the overall project management package.

⁷⁴ <https://www.voorjebuurt.nl/>

⁷⁵ <https://onepercentclub.com/en/>

WP0, Overall project management

Administrative and financial management and reporting

Unit: OKFN Belgium - 1 permanent employee

WP1, Research and preparation

- Legal research

- Business research

Unit: iDROPS, innovation research, 3 permanent employees

- Short analysis of current local crowdsourcing platforms

- Technical research

- Create wireframes and overall user flow

Unit: OKFN Belgium, technical research, 2 permanent employees

WP2, Design and Development

- Design

- Front-end development

- Back-end development

- Software testing

Unit: OKFN-BE and Underlined - technical, 4 permanent employees, 2 interns

WP3, User and case testing / dissemination and valorisation

- Find potential use-cases

- Train test-case members and execute

- Organise end-user feedback sessions

Unit: iDrops, 3 permanent employees

-Communication & dissemination

Unit: OKFN-BE, 2 permanent employees and 1 intern

22.2.3 Key personnel

Pieter-Jan Pauwels, is the lead on the W4P project and the community coordinator for Open Knowledge Belgium. He has a background in innovation research and broad knowledge of open and social innovation. He believes W4P is the solution for local communities to find the resources to complete social innovation projects.

Pieter-Jan is also the lead on 'Datawijs', an interactive video series for youngsters on open data. He manages the Open Belgium community, a community of ambassadors striving for more openness in Belgium and hosts a yearly conference that gathers 200 researchers, government officials, open community members and industries influencers. He is also the organiser of 'open Summer of code', an open innovation camp for college youngsters to learn more about Open Source coding and open data implementation. Technical youngsters learn to go beyond just coding and think about user-experience, business modelling and communication strategies.

Pieter-Jan is an expert in social innovation, open innovation, open data, event management, user-experience, communication.

Thimo Thoeve

Thimo is the technical project manager for the W4P project and the Vice-Chairman for Open Knowledge Belgium. He is a computer scientist and has a broad experience with government data management. As a strong proponent of open data, Thimo has been involved in many activities engaging with interest groups, including engaged citizens. He has contributed to multiple Open Source applications and digital solutions and organised several citizen engagement programmes such as Apps for Ghent. Thimo is keen to see how crowdsourcing platforms might have the ability to bring citizens together to host localised digital products and improve the life of a neighbourhood or city.

Michiel Vancoillie

Michiel is an industrial engineer in computer science. He's the founder of Underlined, an agency specialised in web- and mobile applications and co-founder of We Open Data, a company that works with big/linked data. Michiel has worked for several non-for profits, including iRail and Open Knowledge Belgium.

For this project, he's going to be the project manager for implementation of the crowdsourcing platform, making the architectural decisions and steering the developers and designers that are going to work on the platform. The crowdsourcing platform will form a great opportunity for Underlined. The company could offer hosted instances and or SLA's to other cities/organisations. Which is an ideal solution for cities that have no IT service to rely on.

Bart Cornille

Bart has a broad experience when it comes to innovation. He developed and organised artistic and cultural events, workshops and seminars for the Business and Arts Club. After a year of working as a freelance copy-writer/journalist Bart took off to Africa. He became the co-founder of ZanzibART and worked as project advisor in a VVOB project. In 2005 Bart started working as a project advisor in the

IMI project in Hanoi, Vietnam. In 2008 Bart became an educational technologist at the University of Antwerp in Belgium. After a year Bart longed for Africa again and started working as a VVOB project advisor in Zambia. That's where he and Lukonga Lindunda established Bongo Hive, an innovation tech hub to build mobile apps and services for education, health, business etc. He is a project coordinator, with a background in collaborative processes, bottom up and disruptive innovation in Africa and e-learning processes. Bart is responsible for the client research, userlabs and the coaching of the use-case participants during the pilot.

22.2.4 Partnerships, cooperations, and networks

Voorjebuurt.nl / voordekunst.nl:

Both voorjebuurt.nl and voordekunst.nl are likeminded social profit focused crowdfunding channels in the Netherlands, aiming on neighbourhood projects and art projects. In a way they were the instigators of using crowdfunding for social profit projects in Europe and implemented other crowdsourcing features such as adding tasks that could be handled by volunteers in 'voorjebuurt'. The goal of the partnership mainly was knowledge exchange. They did help us leap over some practical challenges so that we are able to move forward with building W4P consistently. This partner also indicated to take a legal advisor for the Terms and Conditions and Privacy Policy. This was eventually done by Van Olmen & Wynant.

Trein Tram Bus and iRail:

Trein Tram Bus and iRail were our first pilot testers. iRail stimulates digital creativity in public transportation technology and Trein Tram Bus defends commuters and travelers needs as a non-profit by researching and writing advice reports for public transportation entities. As a team they helped us create a first pilot idea. Their input as a project owner was vital in many ways. As first pilot testers, they helped us iron out the final technical kinks that W4P had. On the other hand they enabled us to see how end-users interact with the project owners on W4P and what we could do better. Their input really helped us along in iterating and validating our idea for a crowdsourcing platform.

Caritas International:

Caritas International were our second pilot tester who together with iDROPS worked on the implementing the Housing4Refugees project on W4P. Caritas International brings a humane and individual response to each migrant's journey, defending their rights and supporting them in their search for durable solutions in our country or elsewhere: #housing4refugees. Caritas is a large international organisation that works at its own pace/in its own way and already had the campaign running through a Google Form where they gathered the information of donors. Crowdsourcing campaigns however require a more agile approach and new ways of communicating, so it was interesting to see how to work with a large organization and see how they cope. This provided us with new insights in how a crowdsourcing platform can be imbedded in such a big organisation and what risks you have to overcome during the implementation.

Crowd Angels:

Crowd Angels are a Crowd As a Service agency, providing tools for cities and corporations to build up their own crowdsourcing or crowdfunding platform. They use Open Source technologies to provide crowd platforms to their customers and found W4P to be a good entry model to provide to smaller cities and corporations interested in crowd sourcing. They want to create a sustainable partnership with the W4P eco-system and provide W4P in their portfolio of possible tools to adapt. This might be

a good partner to help us with the first distribution on W4P. For now it is just a verbal agreement, with a planned meeting in the summer to discuss a structural partnership.

22.3 Implementation of the solution approach

22.3.1 Solution approach

1. **Network of smaller crowdsourcing channels:** What we aim to achieve is that every city with a citizen engagement programme, every social foundation and every other party that wants to boost social innovation, has a W4P platform for their specific target group. By having a network of small no-nonsense crowdsourcing platforms, we make it easier for social profit projects to find relevant channels for their project without the fear of being buried under commercial projects. So we don't want to become crowdfunding number 17 in Belgium. We want others to make it number 17 to 60. So an increase in platforms specifically focused on their community or societal challenge.

2. **One at a time approach:** The one at a time approach makes it easy for locals to find and support a project and for platform-owners to communicate and support online projects. There is only one project per month available on per specific platform. This means that the main or homepage of the W4P instance is also the project page containing the project information. No need to look for the project on the platform, it's always right there on the homepage. By combining this technique with the network model mentioned above, we make sure every project gets the full attention and web space it needs. This does not mean that cities or foundation can't support multiple projects. They will however need multiple W4P instances to host multiple project at the same time.

3. **On their own initiative:** If certain third parties with a social project feel excluded from a certain crowdfunding/crowdsourcing platform, but have a big community which they feel they can reach on their own, they can use W4P to create their own temporary or full time crowdsourcing platform. In that way, project owners are less dependent from external sources and providers and get to choose themselves which fits best. The lower the barrier, the better.

4. **Turn funding into resource pooling:** Social profit needs are not limited by funding. They can have difficulties finding the right coaching, materials or volunteers. Our platform is not limited to funding itself. We do however enable projects to ask for either donations or provide awards for certain amounts. Equity and loans are not provided as too many monetary options burdens the user. There was also a lot of negative feedback during the project period on financial crowdfunding (loans and equity) with the forced selling of stock of the crowdfunded Newsmonkey⁷⁶. Many claimed it could have been the end of crowdfunding in Belgium, but later on focused on how equity crowdfunding has a failed business model⁷⁷.

5. **Give cities and foundations a say in the funding or support:** Governments and foundations who want to move away from having to fully fund projects a 100% and want to go to a model where community driven projects that have a lot of traction, can get additional funding from them as well. This requires less resources from those organisations and ensures that the project will be more successful when released.

All these features and conditions should enable third parties to implement W4P and provide this extra service to their target group and boost citizen engagement in the process.

⁷⁶ <http://deredactie.be/cm/vrtnieuws/binnenland/1.2662452>

⁷⁷ <https://techcrunch.com/2016/05/16/equity-crowdfunding-is-dead/>

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With W4P we want to help for create a better social cohesion, a better cost efficiency for cities who do not do the work directly, which in it turns frees up budget to support more citizen projects.

22.3.2 Target groups

Primary group / local governments:

Local governments have their own subsidy systems, targeted on local projects. Until today, projects are 100% subsidized by the government, which limits the number of applicants who can receive funding. Cities like the City of Ghent are looking for alternative funding where citizens are engaged to support projects, by donation. We believe our platform could benefit many cities enabling them to spread their budget and efforts over multiple projects. Regional and federal level governments could also use this platform, but there is more citizen-government distance which makes it harder to promote certain projects. During the project period we noticed that cities are very interested in our project and have mainly questions about technical implementation and maintenance. They would need partners helping them with setting up. One of the core needs for them is to overhaul and brand the platform to their branding.

B. Primary group / Foundations:

The second group of organisations we target are, foundations that support projects based on a theme, eg. health, culture, youth, environment, etc. These organisations can encompass multiple cities or regions and are targeted on a specific audience and type of projects. An example can be the Ernest-Solvay fund that who are providing monetary support in education of sciences and technology. Here is regionality is less of importance and the subject is key. The king baudouin foundation who also supports multiple foundations in their Call for product could also use this as a means to see which projects are being supported by the crowd and have some extra co-funding, eg. in other means such as volunteering, coaching and materials. We did find a serious interest from the people of the Majin Foundation, a foundation around cancer projects. The have similar needs as cities do namely: brandy capabilities and technical implementation and maintenance.

New target primary group / Non-profits and factual action groups:

The other organisations we target are, foundations and non-profit organisations that support projects based on a theme, eg. health, culture, youth, environment, etc. These organisations can encompass multiple cities or regions and are targeted on a specific audience. An example can be AllesKan.be which is a mix of both target groups. It is a branch of the youth department of the City Of Ghent who gives subsidies to youngsters who want to start new cultural or sport projects by and for other youngsters in Ghent. Their website and systems are already fine tuned to create a flow that possible projects might follow, only it does not match with using money from other sources or provide other means of support such as coaching or volunteers. We have several other leads that presented themselves during our launch presentation. De Tuut van Tegenwoordig, Victoria Deluxe, and more. Their needs are more on setup of the platform (technical and practical) guidance.

C. Secondary group (end-users):

Innovative citizens. Although we aim for the primary group to host this web platform, our end-users are citizens, not-for profit organisations and community groups who work on a social innovation project. We do not discriminate on age, sex or cultural background. But if we believe the statistics our target group will be between 18 and 45, who are actively involved in or want to be involved in designing concepts, products, ideas and organisations that extend and strengthen civil society. Projects entering W4P are screened for social impact, relevance and feasibility in the area and of

course the team which forms an important part of the process. It is important that we have defined this group so that we can implement their needs and provide a user-centered web platform.

22.3.3 Activities and work performed

Work Package Number : 1 - Business modeling, legal and technical research + preparation
Actual Starting month : October 2015
Predicted / Actual End month : May 2016
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> - Research of current Belgian crowdfunding/sourcing market - Technical research regarding features and limitations - Creating legal framework for Belgian projects - First user-survey regarding crowdsourcing readiness and adoption
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> ● We completed the desk research which serves as a snapshot of the Belgian crowdfunding scene in October - November 2015. ● We hosted two labs with primary and end-users and send out an online survey to primary users to have first feedback on the concept of W4P to get a better understanding of the existing ecosystem. ● We contacted the Belgian government about the new legal framework regarding crowdsourcing and see what will be needed. ● Together with an external legal team and our legal framework we created a terms of use and a privacy policy template in Dutch and English, focused on the Belgian Legislation. ● We used all of the above to create a solid technical briefing for the developers in WP2. <p>Detailed description of work performed to reach the achievements listed above:</p> <ul style="list-style-type: none"> ● We successfully completed our desk research to have a feel for the Belgian crowdfunding scene in October - November 2015. <p>Our desk research was needed to have a grasp on where we are right now regarding crowdfunding and sourcing for social projects in Belgium. Extending our research to the whole of Europe was not an option as there are too many local differences in approach and other situational elements. We also reviewed how platforms emerged on a timeline to see whether there was a positive or negative trend. We translated this information into an interactive</p>

infographic⁷⁸ that we shared through a blogpost⁷⁹ to announce W4P as an Open Source template.

- We hosted a few labs with primary and end-users and send out an online survey to primary users to have first feedback on the concept of W4P to get a better understanding of the existing ecosystem.

We hosted face-to-face meet-ups with cities that we work with in other projects (cf. 2.4 Genk, Roeselare) and engaged citizens during the iBar meetups⁸⁰ to see whether they are interested in a crowdsourcing tool (willingness) and what it would take to adopt one (readiness). The results of this survey is summarized in “3.2 User-based evaluation of the concept”.

- We have successfully contacted the Belgian government about the new legal framework regarding crowdsourcing and see what will be needed.

The federal government agency for economy⁸¹ is re-shaping the legislation regarding crowdfunding as there was no real mention of it in previous laws. There are now hosting roundtables regarding this issue and we have notified them about our template. It was a good reminder for them to not overlook social projects, as the current proposal for legislation was very focused on commercial crowdfunding conditions. They would keep us up-to-date regarding their progress and involve us when appropriate, but failed to provide us new information before the project period ended as the new legislation is still under discussion. They did let us know they will ask our input during the preparations.

- We used this information and knowledge to create a solid technical briefing as a way to introduce W4P to a broader audience.

As mentioned before we used this information to release a blogpost including an infographic to introduce our tool. Together with the first designs we used this information to setup a small landing page: <http://w4p.be>, which is targeted to our mainly cities and foundations and organisations (B2G, B2B).

- Together with a legal team and our legal framework we created a terms of use and a privacy policy template in Dutch and English, focused on the Belgian Legislation.

The terms of use and privacy policy are focused on the Belgian Legislation and will be added to the Wiki-page of the GitHub W4P page. Using these is not mandatory, but can be timesaver for small organisations that want to setup an own instance very fast. The only thing re-users need to do is adding their own company information in the text.

Work Package Number : 2

Actual Starting month : January 2016

⁷⁸ <https://magic.piktochart.com/output/10999207-crowdfunding-in-minimal-theme>

⁷⁹ <http://www.openknowledge.be/2016/02/11/introducing-our-crowdsourcing-template-and-why-were-building-it/>

⁸⁰ <http://idrops.be/ibar/our-services/>

⁸¹ <http://economie.fgov.be/en/>

Predicted / Actual End month : June 2016
<p>Work Package Objectives:</p> <p>Build a usable and bug-free Crowdsourcing template (W4P) for our pilot projects, based on our finding and conclusions in WP1.</p>
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> ● Translating the actionables to technical features ● Determining the location of the source code ● Determining the license under which the code will fall ● Determining the data model and the possible implications ● Creating mockups and first designs ● Building the Open Source template ● Implementing everything into a finished prototype. <p>Detailed description of work performed to reach the achievements listed above:</p> <p>We've translated the needs described in our desk- and user-researcher into practical technical features with our back-end developers. After technical issues and challenges were discussed amongst all partners, the graphic designers presented a first few designs which we're send amongst the project partners for feedback. After approval the technical team started to work on the Open Source template on GitHub⁸², which enabled us to review the code and the progress of the technical team.</p> <p>The repository was decided to be on the Open Knowledge Belgium account and we chose the MIT license (Cf. 3.3 sustainability for the reason why) to make this truly Open Source.</p> <p>Based on our research and a discussion with the technical team we decided whether we could make this template without a database, with a small database or with a rather complex database. No database was a problem for the functionality whilst a complex database would limit usability and set-up by beginners, so we chose a middle road. After the discussion on the back-end we've co-created a few designs with the W4P team, which will now be implemented together with the code.</p> <p>We released the first version in March and launched the first pilot in Mid-April. In the end the development team offered continuous support until the end of the project period. This was because many bugs and problems arose during the pilot phase.</p>
Summarise any problems you have encountered, and how they have been overcome

⁸² <https://github.com/openknowledgebe/W4P/tree/develop>

Tackling trade offs:

- Several projects per website vs. one project one website

As we've stated before, several crowdfunding platforms host all of their projects on the same website at the same time. This was an opportunity though it would mean that W4P does not put the focus on the active project. We decided that we are going for a template without a multiproject website, which means it is only possible for maximum one project to be online at all times (per domain). Other projects do not necessarily need to be on the front-page but shouldn't disappear either because end-users need something to link and refer to after the project.

This is why we chose for a one project website with a dedicated database (to the current project). It's somewhat heavier to setup, but has all the right functionalities. It allows us to dedicate our website to the project while still referencing to old projects (through having a static version of that project's homepage as an item on our database).

- Design recognizability vs. equality of requested resources:

In our first design we wanted to make it recognizable for the end-user by having a similar setup as those of established crowdfunding channels. During the design iterations we did notice we put a heavy emphasis on the monetary support, which is not desirable for projects who do not need any funding.

In new iterations we approached this from level-playing-field perspective and put all possible support resources on the same level.

Work Package Number : 3

Actual Starting month : March 2016

Predicted / Actual End month : June 2016

Work Package Objectives:

The objective of this work package is to user-test W4P in our pilot projects and process the feedback we get from users (through our test cases) into the application while it is being tested.

Description of work this period:

Main achievements:

- Finding appropriate and durable test cases
- Using our finished prototype to create these test cases
- Retrieve data from these test cases
- Hotfix bugs that are found during the test cases

- Use the feedback during the test case to write future features

Detailed description of work performed to reach the achievements listed above:

Finding appropriate and durable test cases

While we have several involved parties for W4P it was not easy to find a durable and achievable project to link W4P to with them. We wanted it to be meaningful projects while also having something that had a community behind it or tackled societal problems which bothered them for a while already. Hence why we partnered with iRail, Trein Tram Bus and Caritas International.

iRail and Trein Tram Bus were our first pilot testers. We picked them because they had a specific open innovation project (create social value through openness) whilst having a decent community on both sides to back up their request. Open Knowledge Belgium set up W4P to crowdsource for their concept Spitsgids. The point of Spitsgids is to obtain, process, analyze and predict train travel data through user input. iRail then makes this data usable for others.

And while Trein Tram Bus has no technical experience, which is good to see how our UX was doing, iRail had a lot of technical volunteers who could pinpoint us to technical mistakes and issues, which they issued on GitHub promptly. This greatly helped us in going from a very beta prototype to a usable pilot-ready prototype. Both parties had no former experience with Crowdfunding or sourcing. They tested out gathering financials and coaching resources.

Our second testers were Caritas International, who unlike the former testers are a big organisation and established name in the social world. Because of the unprecedented speed, scale and spread of international migration and the global refugee crisis Caritas International started Housing4Refugees last year. Housing refugees in private accommodation is a huge challenge, still it provides advantages for everyone: refugees are able to live in sound accommodation, learn the language faster, and adjust to a new environment more easily. They wanted to extend the campaign on a real crowdsourcing platform, because formerly it was only a blog entry on their webpage and a Google form⁸³. They wanted to focus on finding volunteers (not money, material or coaching) that wanted to offer their (second) home to refugees for at least one year. They searched 30 volunteers to do this.

Using our finished prototype for use on our test cases

Both iDrops/Caritas and iRail developed a concept for which they wanted to crowdsource resources. In the first Spitsgids pilot we didn't have to guide them in setting up. They understand Open Source code quite well and had a secured (https) instance running in no-time. They did however needed guidance in selling the project, developing a communication plan, knowing what to do and when to do it during the project period. The campaign was successful and they gathered more resources than intended.

To set up www.housing4refugees.be, OK-BE hosted an instance only and gave a short hands-on workshop on how to use W4P. Then iDROPS/Caritas International took the matter in their own hands. Caritas International used a more traditional way of promoting Housing4refugees including a Facebook page, an appearance on TV and 2 catholic magazines. The campaign wasn't a success

⁸³ <http://www.caritas-int.be/nl/page/10000-vluchtelingen-zoeken-een-huurwoning>

though. Trying to change the perception of refugees deemed to be a completely different story compared to Spitsgids. In fact instead of being able to test the platform, they had to combat negative and racist slurs online during the campaign rather than convince to right target group to engage.

Retrieve data from the test cases

Not only do we set up these test cases, in a test environment. We actually use them to crowdfund for our pilot projects. By doing so we retrieve live data from these test cases, this comes from a general point of view (rethinking a certain part of our application to better fit the need of the user or donators) or a technical point of view (finding flaws in our system or in our code).

Hotfix bugs that are found during the test cases

Using the data we retrieved earlier we hotfix bugs in our application. We noticed for example our code met the standard for a generic use of our template, but in specific situations there were still some issues, albeit in logic on how to do things or in the code itself. All issues open and solved are hosted on GitHub⁸⁴.

Use the feedback during the test cases to write future features

Which brings us to the next point where we noticed that the feedback given was not only to fix bugs or somewhat alter the layout or flow of the web application, but rather where the feedback suggested some features that we had not yet thought about or that could be implemented. The good thing about our web application is it is pretty easy to implement some of these features because of how W4P is built.

Summarise any problems you have encountered, and how they have been overcome

- Finding suitable projects to pilot our project

While we have great partners for our pilot project, effectively finding the right projects proved not to be without difficulties. There are a lot of projects or ideas with which we could empathize ourselves as each of them had a story and its own possibilities as a great project for W4P. We solved this by objectively choosing the projects based on our knowledge about the topics, what issues the project themselves would address and the resources they required based on the scope.

- Overcome lack of technical knowledge

We noticed it was very hard for non-technical platform-owners to give concrete and usable feedback to our developer team. To overcome this, we gave all platform and end-users with issues our email address to contact us directly. This way we acted as an intermediary between (end)-users and developers.

Project Management And Dissemination

⁸⁴ <https://github.com/openknowledgebe/W4P>

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Summarise any management concerns and activities to recover the situation.

We can now safely say we have a stable bèta that can be further tested by real life cases. The next challenge is to maximise or at least have a decent uptake of the Open Source Template and make sure one or more W4P members are involved.

We do feel that iDROPS and Underlined are excellent first partners to iterate the platform with, but for a maximum impact we'll have to cooperate with multiple partners and open source providers to make sure W4P is being actively used. This creates a positive lifecycle for Open Source technology. The better the usage, the more the tool is being developed by people within and outside of the Open Source community. Losing that momentum might cause W4P to become deprecated and unused.

Detail any publications, publicity or other dissemination activity.

<http://w4p.be/> W4P is our informative one-pager about the platform in itself, giving non-technical user information and a contact point regarding W4P.

Blogpost with the crowdsourcing analysis results:

<http://www.openknowledge.be/2016/02/11/introducing-our-crowdsourcing-template-and-why-were-building-it/>

Interactive infograph based on the crowdsourcing data: <http://bit.ly/1XtSdXL>

Pilot 1 Spitsgids specific:

<http://spitsgids.be> is one of our pilot projects. It has successfully reached its goals while also getting coverage on large newspapers in Belgium.

http://www.standaard.be/cnt/dmf20160112_02064462 is one of the articles in which our pilot is introduced.

<http://www.demorgen.be/technologie/een-app-kan-straks-vertellen-of-u-niet-beter-een-trein-later-neemt-b171f8a3/> (another article about our pilot project)

<http://datanews.knack.be/ict/nieuws/treintrambus-en-irail-willen-overvolle-treinen-voorspellen/article-normal-692899.html> a third and final newspaper article about our pilot.

Pilot 2 - Housing4refugees specific:

<http://housing4refugees.be> is the second pilot project. It has not reached its goals for reasons indicated above. Still, #housing4refugees was getting some coverage in Belgian (social) media.

<http://deredactie.be/cm/vrtnieuws/videozone/programmas/terzake/2.44568?video=1.2672586> TV programme with Caritas International on the difficulties of finding a house for refugees.

<https://vimeo.com/158152057> this video was used by iDROPS to promote the pilot.

<http://www.bloom-cocreation.com/all-articles/home-away> blogpost on #housing4refugees

Dissemination during the final event:

- Cf. Twitter <https://storify.com/PJPauwels/w4p-launch-23-06-ghent>
- Eventbrite: <http://w4p.eventbrite.nl/>

22.3.4 Sustainability of the solution

The prototype itself will be available under an Open Source license, which instead of prohibiting cities and foundations to use it, will stimulate them to use and maintain the product together with the founders of the platform. We discussed the license internally with the partners and finally came to the conclusion that an MIT license was the way to go. Creative Commons licenses were found to be too broad, including things such as Open Content. And the GPLv license was eventually found to be too restrictive, as any contribution to the codebase would be forced to be Open Source as well. The latter is a good license for Open Source technologies that are heavily developed by the same organisation or a select group of coders, but limit the usage outside that organisation, let alone building features on top of it. Because we want maximum adoption and usage of W4P we decided the MIT license would be a good fit. More info on the details of this license on:

https://en.wikipedia.org/wiki/MIT_License.

Of course, setting up a Open Source product and knowing how to use it with your target audience is not something many foundations and governments are able to do. That's why our developers are thinking about providing Service-Level-Agreement contracts to set up the platform on their own servers. After a first survey we found out that our target group is willing to pay around 10.000 euros for a generic platform setup on their own servers and up to 35.000 for a custom version, depending on the features and work.

Meanwhile the people of iDROPS support these platform users through workshops and testlabs, to show how you approach, guide and launch social profit projects in a sustainable way. The workshops can either be paid by the local platform owners by paying a yearly fee. They can also provide workshops on a project basis, with a fee based on the percentage of the requested budget.

Open Knowledge Belgium will maintain the IP of the product, making sure it remains Open Source and will find additional sources of funding to maintain the platform and add new features.

Offering these on top level services makes sure that prospects have any opportunity to contact us for support, while preventing vendor lock-in for organisations that do not need our help. That is important if you want to create a network of localised platforms.

Other sources of financing can be through social innovation investors or foundations and governments requiring additional features for their regional version. For these additional feature, we can for invite them to hire a few students during <http://open.summerofcode.be/> to continue work on the platform. These students are trained to work on Open Source code and are also part of an Open Knowledge project.

If we do find specific calls for proposals that might cover further development on W4P we will try and set up a European consortium. With hopefully more cases in Belgium and new partnerships we might be able to roll-out over the whole of Europe. The people from the Open Source platform Goteo were

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already enthusiastic of inviting us in a few calls as consortium partner regarding creating a sustainable lifecycle for crowdfunding activities.

One of the main challenges here is to from an Open Source product with attached services to a hybrid SaaS model. Cf. 2.4 Risks.

22.3.5 Risks

Risk of low adoption-rate due to technical knowledge gap

Open Source is a fantastic way to give anyone the tools to setup anything, only for internet hosted instances you still need the technical skills to host it on a webserver and hook it to the proper dependencies to stay updated. This still requires someone with deployment skills to deploy and setup a W4P instance. Organisations with no in-house knowledge of this might not be able to setup a W4P.

Measures: We're looking into setting up a hybrid SaaS model in which the installation wizard is open for everyone and can be filled in at any time. At the end the end-user is prompted to fill in their desired webserver service and after payment will have an automated deployment of a W4P instance. This however is not easy to setup and will take time to gather the proper experts and resources.

Risk of losing focus regarding our scope

It is important that during the process we shape W4P according to the needs of our primary target groups as well as keep our unique identity in relation to the other existing platforms. Otherwise our platform might become either too generic (too many similarities with other available platforms) or too specialised (only relevant to a very small target group).

Measures: Have strategic talks between technical staff, partners and potential users about the features and final product and its features.

22.3.6 User-based evaluation of the concept

We followed the Digital Development Principles while pushing for Principle 6: Use Open Data, Open Standards, Open Source and Open Innovation. Principle 6 has helped convince a whole cadre of techies and social/cultural workers that programs should only be investing in Open Source technologies.

THE PRINCIPLES

- Design with the User
- Understand the Existing Ecosystem
- Design for Scale
- Build for Sustainability
- Be Data Driven
- Use Open Standards, Open Data, Open Source, and Open Innovation
- Reuse and Improve
- Address Privacy & Security
- Be Collaborative

Too often in the field of technology, tools are created, or tech-enabled projects are designed, without sufficient input from the stakeholders whose engagement and ownership are critical to long-term success. Principle #1: Design with the User provides recommendations to avoid this common

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pitfall. Therefore we have tried to develop a context appropriate solution informed by user needs. We presented the with the goal, looks and possibilities of our platform and quickly followed up with a survey. You can read the results below.

Pre-user-evaluation

Approx. 25 participants were involved in the first surveys since we want to include these user groups in planning, development, implementation and assessment. 57% did not yet think about using crowdfunding or crowdsourcing in their organization. Still, 29% feels there is a serious need to start doing so and 14% are about to do so.

The biggest motivation to start using a crowdsourcing platform is finding extra funding. It was said that these days it is dangerous to fully depend on subsidies, so alternative ways of funding have to be found. The idea to find extra funding via the internet has a lot of benefits: no borders, no door to door to find support and everyone can donate. Also, organisations that have participated in crowdfunding say you know very fast whether the targets have been reached (as opposed to getting results out of subsidy projects).

Principle #2: Understand the Ecosystem provides recommendations about how to ensure projects and programs are built, managed, and owned with consideration given to the local ecosystem.

A variety of answers have been given to the following question: What type of crowdfunding and crowdsourcing are relevant for your target group?

3.1	Donations: Payment without rewards	50.00%
3.2	Rewards: Payment with rewards	62.50%
3.3	Shares: Payment with profit	12.50%
3.4	Loan without interest: Temporary loan	12.50%
3.5	Loan with interest: Temporary loan with interest	12.50%
3.6	Provide for materials	37.50%
3.7	Provide for coaching	62.50%
3.8	Providing voluntary work	25.00%

To the question about what kind of crowdsourcing platform they preferred, the following was said:

4.1	An open source platform, that we can further develop with our own IT department. So, no need for support.	16.67%
4.2	A platform that we can establish with the makers, but afterwards can use independently. We receive training en technical guidance to get started.	16.67%

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4.3	A platform where we can outsource all, both technical support as well as project coaching.	33.33%
4.4	A platform where we can outsource the technical support but do the project coaching ourselves.	50.00%
4.6	A platform where we outsource the project coaching but do the technical support ourselves.	16.67%

Last but not least, about the model of payment was answered in the following way:

5.1	A monthly fixed price	12,50 %
5.2	A one of fixed price	62,50 %
5.3	A consultancy cost	25 %

We reached three target groups (cities, foundations and community groups), with 25 respondents which we counted as users. There were double as many men as women and four times more young people than old people.

Post-project-user-evaluation

On 23 June 2016 we had a W4P launch event and input gathering moment in the K22 in Ghent. The room was filled with Foundations, Local Government IT and policy participation people and non-profits with specific motivations and possible crowd projects. The idea was to pitch W4P to our primary target group as well as receiving feedback on the template for further iteration and flagging possible risks for non-adoption.

The results: The crowd was overall impressed with the end-result. The platform had a certain familiarity in comparison with the current crowdfunding tools, whilst still offering a good addition of tools for going beyond crowdfunding alone. A lot of projects even noted that were mainly thinking about asking for volunteers and for coaching (people focused sourcing) rather than funding.

They were however more sceptical about the 'one project at a time' feature, but after explaining that it's better to host multiple focused W4P's rather than one containing all types of projects received good feedback. Their feedback was that this is an OK approach if the final product is light enough (not too much stress on their servers) and if technical implementation of W4P is kept to a minimum. That last remark was also the main feedback we got from the crowd as being their biggest concern: "How easy will it technically be to setup such a W4P tool?" "Do you need how to code or deploy internet applications?" were questions that arised by many of the attendees. And besides our service model we didn't have any to-go answers. This is still a big challenge in Open Source internet applications. How can make the leap for non-technical users as small as possible.

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This is something we will have to overcome in the future by having extensive guides for adopters and in the long term have a technical (automated) solution for.

22.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 42.

Table 42: Snapshot of project "W4P"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To develop social crowdsourcing platform that is open source and will give anyone access to a one-project-a-time platform to ask for funding, volunteers, coaches and/or materials, which advances on traditional crowdfunding channels by considering the non-financial contributions in addition to the funding itself.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> Undertook market and technical research, established a legal framework and conducted user surveys on crowdsourcing adoption and readiness. Determined the technical features, source code location, license and data model. Created mock-ups and first designs. Built the open source template and integrated everything into the prototype. Identified appropriate test cases and used the finished prototype to test these, retrieve data, hotfix bugs, and collect feedback to write extra features. <p>The project successfully delivered 11 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> Dedicated project website: http://w4p.be/ Social media of project partners – OKF Belgium, Pieter-Jan Pauwels and iDrops: combined total of over 4,200 followers on Twitter. Created infographic based on crowdsourcing data: https://magic.piktochart.com/output/10999207-crowdfunding-in-minimal-theme Pilot 1 featured in 3 newspaper articles. Pilot 2 featured in a TV programme, a blog and a promotional video from project partner iDrops: https://vimeo.com/158152057 Launch event dissemination: https://storify.com/PJPauwels/w4p-launch-23-06-ghent Participated at NetFutures with a presentation in the CHEST session of the CAPS Concertation Meeting, which was advertised on CHEST's website: http://www.chest-project.eu/caps-netfutures-chest-presentations/ News article about the project on the CHEST website: http://www.chest-project.eu/w4p-purpose-people/ 309 interactions in the project's section on the CHEST Community Forum.

Table 43 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on community building and empowerment) and secondary (impact on civic and political participation) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 43: Mandatory KPIs for W4P

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	3	3	4
		Number of users involved in co-design process	10	25	15
		Ratio between men and women involved	1/2	1/2	10/4

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		Ratio between young, adult and old people involved	3/5/2	3/5/2	3/7/0
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	0	0	0
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	1	1	1
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	4	3
		Number of comments / replies on project blog entries on CHEST website	0	2	10
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	200	153
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	15	30	227

23 Yubu / BeInvolved⁸⁵

Yubu (former name: BeInvolved) develops a prototype for a web based serious game platform providing support to high school students in Study and Career Orientation (SCO). The web based digital learning platform consists of an online library with serious games and an adaptive platform. The platform will guide students through SCO from the start of the first year up to the final exams in the last year of secondary school. Students will play serious games to identify their mastery, discover their interests and talents.

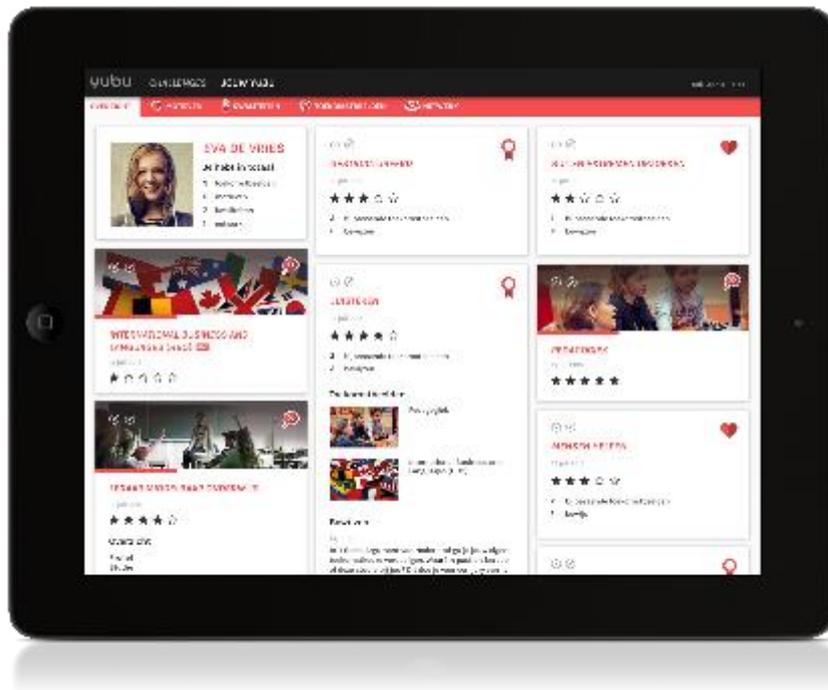


Figure 28: Screenshot of Yubu prototype

23.1 The societal problem

23.1.1 Description of the problem

[Study and Career Orientation (SCO) on secondary schools helps students to identify their mastery but it doesn't function properly in The Netherlands. Totally, more than a quarter of all students dropout during their first year of tertiary education of which 70% admits they did not receive proper SCO⁸⁶.

The underlying problem why SCO fails is threefold:

- 1) Students are not actively involved in SCO. They lack motivation because the future is abstract and students are not aware of its importance. Students are dissatisfied with the current SCO methods (Schut et al, 2013). They miss the personal touch, do not feel represented by the outcomes of different tests and are not interested in the current methods.
- 2) Schools don't have the capacity to provide students with the required individual guidance. Due to a lack of manpower and expertise schools prove ill-equipped to provide their students with the required personal guidance for the SCO process.

⁸⁵ Chapter contributors: Mathias Becker, Guus Meijer

⁸⁶ Broek van der, A., Wartenbergh, A., Braam, C., Brink, M. & H. Poels, 2013, monitor beleidsmaatregelen: de relatie tussen beleidsmaatregelen, studiekeuze en studiegedrag.

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3) Schools and parents do not join forces in the SCO process of students. Parents experience difficulties helping their children with the SCO process. They are poorly informed about their children's progression by schools and they experience difficulties reaching out to their children.

Multiple actors are affected by the dysfunctional SCO system in The Netherlands;

- It affects the motivation of high school students for SCO.
- These unmotivated students affect the motivation of the SCO teachers within schools.
- The students that switch studies within one year are confronted with the extra costs of one year studying. Mostly these students turn to their parents with this problem.
- In The Netherlands universities are granted a fee per graduated student. Since the study switchers do not finish their study the universities and other educational institutes are not (or less) compensated for the provided education. Since tertiary education is funded by the government this mostly affects the Dutch government.

The Dutch government did act on the problem. They increased the pressure on the decision making process of the students firmly. Since last year institutes who provide tertiary education can perform intakes with all subscribers of which the result can be binding. Students can be declined by the institutions were before the institutions were obliged to take in all applicants possible. Also last year the Dutch government abolished the scholarships that were available to all students before.

On the other hand the government made it less open-ended for schools to provide SCO. From schoolyear 2017-2018 the provision of SCO is mandatory for schools. Schools however struggle how to implement this given the fact that they already are understaffed.

23.1.2 Scale of the problem

[In The Netherlands more than 50.000 students switch studies in their first year. This is more than a quarter of all first-year students (Broek et al., 2013). The associated costs with a study switch are estimated around €9.000 per student. Around €3.000 are costs for the students which are costs for housing, living, books, etc. The remaining €6.000 are costs for the community mostly paid by the government. These are expenses paid to make education possible e.g. teacher loans and university housing costs. The total costs associated with study switching is thereby estimated at €450 million per year in The Netherlands alone.

Regarding the Dutch numbers an estimation can be made about the problem in Europe. Europe counts just over 20 million students enrolled in tertiary education (Eurostat). 4 million of these students are in their first year assuming that tertiary education on average lasts 5 years. Assuming that 25% of these students switch in Europe with the related costs of €9.000 gives a potential problem of 9 billion euros Europe wide.

But more important than the costs of study switching is what the number of study switchers tells us. This number tells us that when leaving high school, more than a quarter of our students did not identify their mastery yet. This is worrying because this could lead to Early School Leaving (ESL). With Europe's shrinking workforce, Europe has to make full use of its human resources.

Young people who leave education and training prematurely are bound to lack skills and qualifications, and to face serious, persistent problems on the labour market. In 2012, nearly five and a half million young people between 18 and 24 years old had not finished upper secondary education and were not in education and training. On average, the unemployment rate of these early school leavers is 40.1%, compared to 23.2% overall youth unemployment in Europe. ESL creates great hardship for the individuals and huge costs for European economies and welfare states. Tackling early school leaving is a stepping stone towards improving the opportunities of young people and for supporting smart, sustainable and inclusive growthⁱ.

EU countries have committed to reducing the average share of early school leavers to less than 10% by 2020. Between 2011 and 2013 a working group on early school leaving brought together policy

makers and practitioners from nearly all EU countries and exchanged good practice examples and experiences in reducing school leaving. In March 2012 the Commission organised a conference on policies to reduce early school leaving. One year later, policy developments on early school leaving in eight EU countries were reviewed. A working group on school policy will continue the cooperation between EU countries⁸⁷....]

23.1.3 Previous approaches to solving the problem

In general, there are two types of SCO-methods; general SCO methods used school-wide and individual SCO-programs performed by study counsellors.

Taken the general SCO-methods used by schools into account, roughly three problems can be identified. First, the methods fail to engage students. Second, these methods only focus on activities within the school eco-environment excluding parents. Third, the work load of SCO methods mostly focuses on the moments of decision instead of providing a constructive process.

Study counsellors are mostly used as a last resort. They prove effective but are expensive with prices around €1.000 per programme.

23.2 Implementation of organizational structure

23.2.1 Maturity of the project

The serious gaming platform Yubu is currently in use by 24 Dutch schools for Study and Career Orientation. Yubu is used by 401 teachers and 5789 students on a weekly base.

Product development for the Yubu version of schoolyear 2016-2017 is started based on all gathered feedback from the first users. A new version is released this February.

Furthermore sales and marketing activities are at full speed to reach out to as many Dutch high schools as possible.

23.2.2 Organizational structure

Yubu management

Yubu is managed by the Founders Rob Derks, Kees Meershoek and Guus Meijer. Within the Yubu management all are responsible for the long-term strategy, Kees is responsible for finance and deals with Yubu's investors and Guus handles business development.

Product development

Guus Meijer is Yubu's product development manager. Guus is responsible for the overall product development and coordination. Guus is the main contact for all pilot schools.

Guus is assisted by Jurrian van der Zwan. Jurrian is a graduate student Media Entertainment Management and develops a method to measure how actively involved students are in Study and Career Orientation. Jurrian's method will be used to measure the overall performance of Yubu.

UI/UX design

UI/UX design is performed by Léonie de Ruiter who is permanently employed by Yubu. Léonie is responsible for the look-and-feel of Yubu.

Léonie is assisted by Liona Henzen, a graduate student from Communication and Multimedia Design from the Hogeschool Rotterdam. Liona graduates on the design of the Yubu app.

Next to Liona Léonie is also assisted by Steve Wang, also a graduate student from Communication and Multimedia Design. Steve examines the possibility for the design of an interface agent for Yubu to involve the students.

⁸⁷ http://ec.europa.eu/education/policy/school/early-school-leavers_en.htm

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Content design

Content design is performed by Aimy Ogaeri. Aimy manages the content creation and curation process at Yubu. Aimy is assisted in game design by Kees Meershoek and Guus Meijer.

Aimy is assisted by Laura Hoogenboom. Laura is a graduate student Applied Psychology from the Hogeschool Leiden. Laura studies the possibilities in which way Yubu can further assist students preparing for their admission tests for tertiary education.

Software development

Rob Derks is co-founder of Yubu and lead developer.

Rob is assisted by Lars Volkers, a graduate student from Computer Science from the Hogeschool Rotterdam. Lars graduates on the performance of Yubu.

Marketing & sales

Kees Meershoek is Yubu's marketing and sales manager. Kees is responsible for all Yubu communication and organises the Yubu product presentations targeting Dutch high schools .

23.2.3 Key personnel

Guus Meijer (Be Involved/Yubu founder, game developer & teacher)

Guus is one of the founders of Be Involved and Yubu. Guus obtained his MSc in Biotechnology from the Delft University of Technology prior to founding Be Involved in 2010.

During his student years Guus worked as a teacher in chemistry, science and biology. In this period Guus experienced the challenge to teach abstract course material (e.g. electron shells) to his students. In order to get his students more involved Guus experimented with different teaching methods as video's, quizzes and other interactive methods. Sometimes successful, sometimes with less success.

When the possibilities of serious gaming were introduced to Guus by Kees Meershoek (his at that moment soon to be co-founder of Be Involved), Guus became immediately convinced of the potential of serious gaming for education. It resulted in the start of Be Involved in 2010 and 5 years later the games of Be Involved are in use at over 30% of the Dutch high schools.

Guus brings didactic expertise to the table next to 5 years of entrepreneurial experience (specific in the field of new business development) and further experience in game development.

In this project Guus was involved as game developer, teacher during the pilots and project manager.

Guus his specific motivation for this project is that he wants to prevent students making the same mistake he made 13 years ago. In 2002 Guus started with Architecture in Delft but already after a couple weeks he discovered this was not the right match. Guus therefore can personally relate to the problem.

Kees Meershoek (co-founder Be Involved/Yubu, game developer & teacher)

Kees (30) founded Be Involved together with Guus in 2010 after obtaining his MSc degree in Technical Policy and Management from the Delft with a specialization in Serious Gaming. For his graduation Kees developed a serious game for the Indian think-tank C-step and his findings were published in the book. Kees has a sacred belief in the power of serious gaming and with Be Involved he wants to give all Dutch students the possibility to benefit from this power.

Within Be Involved Kees is the serious game expert with warm relations to the research field of gaming. Kees has 5 years of entrepreneurial experience and experience in leading a game development team.

In this project Kees was involved as game designer, teacher and lead the game developmental process.

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Aimy Ogaeri (Content designer)

As a developmental psychologist Aimy contributes to Yubu as content developer. Aimy always takes into account what she believes is suitable for the age that the content is developed for. Aimy tries to think in ways of what is fun and comprehensible. Aimy experienced as a teacher that if children had a fun experience during class, they will talk about it for days. Aimy's goal is to achieve the same effect with the Yubu content!

Léonie de Ruiter (UI/UX designer & graphic designer at Yubu)

Leonie (26) graduated as a graphic designer at the Art Academy. During the minor gamification she learned different ways to get people moving in a playful way. This approach is also used by Yubu: they think from the view of a user how games can be used to activate them.

Leonie deals with all the design decisions related to Yubu. Thereby, it's important to be flexible and versatile. Because as a designer for a large and extensive platform like Yubu, you have a lot of different tasks and needs various skills. That's the reason that Leonie takes different roles. This varies from the User Experience Designer who researches a pleasant user experience, an Interaction Designer who reflects on how the user can easily get the information he or she needs, or a Visual Designer that makes a beautiful visual display.

From her study Leonie has learned to design and think from a user perspective, so-called User Centered Design. This approach is also used by Yubu, which is reflected in the many user tests and interviews with students and mentors. An approach that fits the vision of Leonie: good design gets people moving.

Rob Derks (Founder of StudieID and co-founder of Yubu)

Rob Derks is the software engineer of Yubu. Rob graduated as an architect at the Technical University of Eindhoven and after his graduation he worked as mathematics and physics teacher for two years. During the last period of his study and his work as a teacher he taught himself to develop software.

In 2011 as a hobby project, Rob developed a free tool for students (www.studieid.nl) in which students could gain ideas for future studies in less than 5 minutes. Rob experienced that different schools started using the tool and the online traffic increased. Given the success Rob decided to develop a complete platform for Studie and Career Orientation which he launched in September 2013. In January 2014 Rob and Be Involved decided to join forces to create a SCO platform with serious gaming.

Rob has didactic expertise, extensive knowledge of the (Dutch) educational system and programming skills in different languages. In this project Rob performed all software development.

23.2.4 Partnerships, cooperations, and networks

StudieID B.V.

In March 2014 Be Involved joined forces with StudieID to develop and commercialize the serious gaming platform for Study and Career Orientation. StudieID, a young Dutch company with an equal mission as Be Involved to improve SCO, already started building an online SCO platform. The combination of the software developmental expertise and power of StudieID, and Be Involved's experience in creating enriched educational content and its extensive experience of the Dutch educational market, formed the perfect ingredients to make the serious gaming SCO platform a success. Therefore Be Involved and StudieID started a joint venture called Yubu in April 2014 to jointly develop and exploit the serious gaming platform for SCO.

VO Raad (the Dutch Secondary Education Board)

Be Involved keeps close contact with the Dutch Secondary Education Board; the VO-Raad. At the moment the VO-Raad is responsible for the restructuring of the process for Study and Career Orientation since it becomes a mandatory school subject in the schoolyear 2016-2017. The VO-Raad keeps Be Involved updated of the latest developments and supports Be Involved's vision in public.

H2H Business participations

H2H Business Participations is an informal investor participating in start-up organizations. H2H invested in Yubu in Yubu's first investment round in November 2015. The investment is used for a successful market introduction of Yubu in The Netherlands.

Kickstart Venlo

Kickstart Venlo is a regional investment fund in the Venlo region of The Netherlands. Kickstart invested in Yubu together with H2H Business Participations in November 2015.

Icares B.V.

Icares is one of Yubu's datapartner. Via Icares Yubu purchases all up-to-date study and career information to create study-, capacity- and/or career-tests. Icares has data available for over 130 countries.

Studiekeuze123

Studiekeuze123 is one of the biggest career orientation websites in The Netherlands. Studiekeuze123 provides Yubu with up-to-date information of all Dutch studies and universities like career events, study information and general information about the universities. Studiekeuze123 is a governmental organization. In return Yubu made one of its study tests available at the website of Studiekeuze123.

Client schools

Yubu has signed contracts with 24 Dutch schools for schoolyear 2015-2016. Yubu is used by 401 teachers and 5789 students on a weekly base. Each school pays 4,99 per student including VAT.

Zadkine Rotterdam

Zadkine is one of the biggest providers of midlevel tertiary education in The Netherlands. Yubu is planning a pilot together with the section Computer Sciences of Zadkine due to start September 2016. This pilot is the first step to expand Yubu's market to the midlevel tertiary education (ca. 500.000 students in The Netherlands).

23.3 Implementation of the solution approach

23.3.1 Solution approach

Research under students that switched studies showed that around 60% of the students switched study because they did not put any effort in SCO. Yubu's main approach is therefore to focus on the activation of students for SCO.

Activation can be reached following three steps. First you will need to engage the student, then motivate him and finally activate him. Below is described how Yubu does that for its students.

Engage

Engagement can be reached using a personal appeal. The user must be able to personally relate to Yubu. Yubu therefore chooses to personally address the user with personal messages and having their name and profile picture visible on all pages.

Motivate

The next step is to motivate the user. For motivation Yubu follows the RAMP model which describes how different person (or player) types are intrinsically motivated. RAMP stands for Relatedness, Autonomy, Mastery and Purpose.

Relatedness is important for the player type called the Socializer. A socializer is motivated by social status, social connections and belonging. In Yubu users can share their profile with friends and Yubu has challenges in which users can help each other.

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Autonomy is important for the player type called the Free Spirit. The Free Spirit is motivated by creativity, choice, freedom and responsibility. In Yubu students can decide themselves which challenges they perform and in which order. Yubu therefore makes the students responsible for their own learning path and provides them with the freedom to create their own learning path.

Mastery is important for the player type called the Achiever. Achievers are motivated by learning, personal development and levels. Yubu therefore visualizes the progress of students very clearly.

Finally there are the Philanthropists who are motivated by altruism, meaning and the reason why. The meaning of every functionality and process step of Yubu is therefore explained.

Activate

The final step to activation can be achieved by removing barriers that users experience. The barriers that Yubu identified for students were (1) students could not personally relate to SCO methods, (2) students tend to read no more (3) students experienced SCO as abstract.

Yubu tries to remove/reduce this barriers as follows;

1. Yubu tries to connect to the youth. This can be seen in the tone-of-voice used in Yubu and Yubu's visual design.
2. Yubu's uses less text and more visuals.
3. Yubu provides students with games to make SCO more specific and couples every process step to the bigger picture.

23.3.2 Target groups

The targeted users of the solution are students, schools, parents and governments

Dutch students (#900.000)

Students are dissatisfied with the current SCO methods (Schut et al, 2013). They miss the personal touch, do not feel represented by the outcomes of the different tests and are not interested in the current methods. For the students Yubu tends to create:

- 1) An adaptive platform providing the students with a personal study plan tailored on their needs;
- 2) Games in the form of real-life challenges providing the students with tangible experiences;
- 3) The power of serious games to motivate and activate the students.

Dutch secondary schools (#1.000)

Due to a lack of manpower and expertise schools prove ill-equipped to provide their students with the required personal guidance for SCO. The adaptive digital platform will cover most of the time-consuming tasks providing the teacher with enough to focus on student coaching instead of process managing. Yubu wants to provide schools with a platform that:

- 1) Monitor results, performance and progress of students;
- 2) Keep students engaged using notifications and gamification methods;
- 3) Provide each student with an individual learning track based on the student's needs.

Parents of Dutch students (#500.000)

Recent studies have shown that parents are the most valuable influencers in the SCO process of their children (VO-raad, 2013). However, parents experience difficulties getting involved in the process. They are poorly informed about the SCO process, their responsibilities and they experience difficulties reaching out to their childs. For parents Yubu tends to achieve;

- 1) Perfect alignment between them and schools giving both parties insights in the progress of the student;

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- 2) Coaching tips & tricks for each game their children play;
- 3) Active participation in some of the games.

Reaching out to the target groups

To increase brand awareness and sales, Yubu specifically targets schools. Yubu gives presentations on the regional quarterly meetings of the school study counselors. Yubu also hosts its own presentations throughout the country for which they invite all regional school study counselors.

Schools can purchase a license on the Yubu platform for €4,99 per student per year. The student can use all content and features of the platform. Different assignments and platform features ensure parental involvement. Students can activate a free account for their parents enabling them to follow the progress of their child.

23.3.3 Activities and work performed

Work Package Number : 1 Execution Pilot
Actual Starting month : February 2015 Actual End month : April 2015
Work Package Objectives: <ul style="list-style-type: none">• A description of different users being (1) students, (2) teachers and (3) parents.• List of platform requirements
Description of work this period: Main achievements: <ul style="list-style-type: none">• 20 SCO games were successfully evaluated by teachers and students• A list of platform requirements was set-up following the feedback of students and teachers Detailed description of work performed to reach the achievements listed above: <p>26 game concepts were tested by giving guest lectures on 6 pilot schools with over 500 students. Each game was tested at least once in 3 different classes. A game was successfully evaluated if at least 80% of the students could appoint the learning goal afterwards and at least 80% of the students evaluated the game as fun. The evaluation was done using a written survey afterwards.</p> <p>Brainstorm sessions were conducted with students and teachers of the different schools to derive the requirements of the SCO platform.</p>
Summarise any problems you have encountered, and how they have been overcome <ul style="list-style-type: none">• We discovered that for every game lesson it was essential to explain relevance precisely to the students. When the students did not see how they could benefit from the lesson their attention level diminished. Yubu therefore explains the relevance of every process step, assignment and functionality to the student.• We discovered that only around 50% of the teachers were intrinsically motivated to perform SCO activities and that they have really limited time available for SCO. Yubu therefore aims to provide teachers with plug-and-play lessons to reduce preparation time.

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- Most teachers proved to be ICT laggards. Yubu therefore needs to work as easy as possible.

Description of planned activity for next reporting period

Work package is completed

Work Package Number : 2 Prototype Design

Actual Starting month : March 2015

Actual End month : May 2015

Work Package Objectives:

- Paper prototype of the platform design
- Description of platform use cases

Description of work this period:**Main achievements:**

- Wireframe design of Yubu version 1.0

Detailed description of work performed to reach the achievements listed above:

Based on the platform requirements derived from Work Package 1 the wireframes of Yubu version 1.0 were designed by Be Involved's (now Yubu's) UI/UX designer. Different versions of the wireframes were tested in different classes of the pilot schools on teachers and students.

Summarise any problems you have encountered, and how they have been overcome

- SCO spans the total period of secondary education. This implicates that the design needs to appeal to a broad audience (students from 12-18 years). The wireframes were therefore tested on classes of all ages.
- The brainstormings showed that teachers demanded very specific functionalities. Therefore a separate teacher section was designed with all teacher functions.

Description of planned activity for next reporting period

Work package is completed

Work Package Number : 3 Prototype development

<p>Actual Starting month : April 2015</p> <p>Actual End month : September 2015</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none"> • Develop the working responsive prototype
<p>Description of work this period:</p> <p>Main achievements:</p> <ul style="list-style-type: none"> • In the first week of September 2015 20 schools with approximately 4.500 students started working with the prototype called Yubu. <p>Detailed description of work performed to reach the achievements listed above:</p> <p>Development of the working prototype with the following content and functionalities:</p> <p>Student section</p> <ul style="list-style-type: none"> • Content store with 45 different assignments which can be played online • Algorithm that makes a distinction between students who 'have an idea what they want to choose' and students 'that do not have a clue'. The algorithm provides each student with assignments relevant to their situation. • Online portfolio in which students can save and view their outcomes. The outcomes of all assignments are directly saved in the portfolio. Students can add findings to their portfolio separately from the assignments. • An in-platform connection with databases containing (1) description of all available studies in The Netherlands, (2) dates and location of SCO events hosted by universities, (3) descriptions of 3.000 professions. • Buddy system which enabled students to invite friends and family to keep track of their progression. Buddies received a Yubu inlog with gave them insight in the portfolio of their buddy. <p>Teachers section</p> <ul style="list-style-type: none"> • Lesson planning tool which enabled teachers to schedule lessons for their classes. • Overview of my students. In this section teachers are able to see the portfolio of their students and keep track of their progress.
<p>Summarise any problems you have encountered, and how they have been overcome</p> <ul style="list-style-type: none"> • Some of the assignments created by the Content design team proved to be too challenging for development. This was solved by a better coordination between the content design team and developer about technical feasibility. • Harvesting the different databases required a lot of processing power making the platform very slow. The code was optimized and the server capacity was extended.

Description of planned activity for next reporting period

Work package is completed

Work Package Number : 4 Prototype evaluation

Actual Starting month : September 2015

Actual End month : January 2015

Work Package Objectives:

- Piloting Yubu on at least 3 different schools to provide insights in the user experience
- Construction of a roadmap for further development

Description of work this period:

Main achievements:

- In September 2015 20 schools with 4.500 student users started using Yubu for SCO.
- The use of Yubu was evaluated with teachers and students from all schools
- The obtained feedback is translated in user stories that form the backlog for further Yubu development
- A new Yubu version was introduced this February 2016

Detailed description of work performed to reach the achievements listed above:

- Yubu trained the teachers of the different schools in using Yubu.
- User tests were performed with teachers and students. In this user test one of the Yubu team members sat next to a user (teacher/student) who was logged in Yubu. The user got a simple task to perform on Yubu and the Yubu team member watched the user trying to complete the task (e.g. try to find information about this specific study). This gave lots of insights in the usability of Yubu.
- Interviews have been performed with teachers and students about their experience with Yubu and their future demands.
- Co-creation sessions have been performed with teacher and students to generate different solutions to the biggest challenge; 'What determines your progression in SCO and how can it be visualized?'

Summarise any problems you have encountered, and how they have been overcome

- The biggest remark on the prototype was that the users wanted to see their exact progression in the SCO process. But what determines ones progression in SCO and how can it be visualized? This challenge was overcome via multiple brainstorming and co-creation sessions with teachers. The solution that Yubu came up with is to make a distinction between the development of the required competences to move along the SCO process and the actual orientation process itself. In the newest version of Yubu students find a training centre in which they can develop the required competences next to their discovery centre in which they can orientate. The students have an overview which training level they have achieved which is coupled to annual set goals. On the other

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<p>hand the students have an overview of the outcomes of their orientation process which gives them insights in their future choices.</p> <ul style="list-style-type: none">• Yubu experienced that students do not read instructions or even text in general. The problem is overcome by using as less text as possible and more visuals.• The design of Yubu was very busy. This attracted students but scared away teachers. The new design of Yubu is more quiet.• In the prototype students were obligated to assign their parents as buddy. This was designed from the base that having a parent as buddy would always be beneficial for the student. We however received feedback that students did not want to involve their parents since they are pushed into a certain direction by their parents. In the new design students have complete control about who to invite as buddy and who not.• There is a need to be able to use Yubu when no computer or laptop is available since ICT facilities on Dutch schools are still not sufficient. Therefore Yubu started a research in the design of the Yubu app.• Students and teachers have limited time and want to know the required time investment in advance. Yubu now provides the required time investment for every assignment.• Gathering and ordering all user feedback was time consuming. Yubu therefore explores automated systems which can be integrated into the platform to harvest user feedback.
<p>Description of planned activity for next reporting period</p> <p>Work package is completed</p>
<p>Work Package Number : 5 Project Management</p>
<p>Actual Starting month : February 2015</p> <p>Actual End month : May 2016</p>
<p>Work Package Objectives:</p> <ul style="list-style-type: none">• Completing the Interim Report• Completing the Final Report
<p>Description of planned activity for next reporting period</p> <ul style="list-style-type: none">• Work package is completed

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

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Detail any publications, publicity or other dissemination activity.

Be Involved specifically targets high schools to increase brand awareness and sales. This is done via the following channels:

- Regional product presentations.

From June 2015 till June 2016 Be Involved hosts 20 regional product presentations throughout The Netherlands. Be Involved invites all Dutch deans to these product presentations.

- Guest lectures/workshops at educational conferences

Be Involved is invited to present Yubu at different educational conferences concerning SCO.

- Direct mailing

Be Involved has contact information of all Dutch deans and keeps them informed with a monthly newsletter.

Overview of the attendees at regional Yubu product presentations:

<i>Date</i>	<i>Location</i>	<i># teachers</i>	<i># schools</i>
29-10-2015	Leeuwarden	2	2
29-10-2015	Alkmaar	3	3
12-11-2015	Rotterdam	2	3
12-11-2015	Venlo	1	1
19-11-2015	Amersfoort	1	1
19-11-2015	Den Bosch	3	2
26-11-2015	Breda	3	2
3-12-2015	Meppel	4	4
3-12-2015	Leiden	7	5
10-12-2015	Alkmaar	4	2
15-1-2016	Apeldoorn	5	2
21-1-2016	Eindhoven	4	3
28-1-2016	Nijmegen	1	1
4-2-2016	Amsterdam	3	3
18-2-2016	Den Haag	1	1
10-3-2016	Utrecht	2	2
17-3-2016	Zwolle	5	2
17-3-2016	Goes	3	2

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24-3-2016	Dordrecht	1	1
	Total	55	42

Overview of the Yubu guest lectures on conferences:

- 6-11-2015 VVSL Conference (SCO teacher association): 70 teachers attended our guest lecture
- 4-2-2016 NVS-NVL Conference (SCO teacher association): 30 teachers attended our guest lecture.

Overview of our direct mailing statistics

- 1.160 subscribers (teachers responsible for SCO of every Dutch School)
- 4 mailings to all subscribers

23.3.4 Sustainability of the solution

Marketing goals

At first Yubu focuses on the Dutch market. Yubu targets to become market leader in the field of educational methods for Study and Career Orientation within 3 years. Within 5 years Be Involved aims to introduce a stand alone version of Yubu available in Europe/US.

Target groups

The target groups of Yubu are;

- Dutch schools providing secondary education
- Dutch students following secondary education
- Parents

Dutch schools providing secondary education

- Total number: 1.000 schools
- Within reach of Be Involved: 500 schools within 3 years

Within Dutch schools deans are responsible for the Study and Career Orientation (SCO) process. Therefore Be Involved mainly reaches out to deans in order to get into contact with high schools. With Yubu Be Involved offers deans a SCO method;

- that creates an individual learning path for each student,
- that activates students in the SCO method using gamification & serious gaming techniques,
- and connects to the world of students.

Dutch students following secondary education

- Total number: 900.000
- Within reach of Be Involved: 450.000 within 3 years

Be Involved offers Dutch high school students a constructive SCO process improving the student-study match and prevent students from health issues as stress, uncertainty, dissatisfaction and even depression caused by wrong choices.

Parents

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- Total number: 500.000
- Within reach of Be Involved: 250.000 within 3 years

Be Involved offers parents of high school students more insights in the SCO process of their children. Further parents are empowered to help their children with the SCO process.

Yubu Businessmodel

- Schools can purchase a Yubu license for €4,99 incl. VAT per student per year.
- Schools can purchase a Yubu training (train-the-trainer) for €599,- incl. VAT for groups till 15 persons. Training for groups over 15 persons cost €899,- incl. VAT.

Yubu aims to become market leader within 3 years reaching half of all Dutch students following secondary education.

Table 1: Yubu's financial predictions from 20150801 Yubu businessplan.

	Schoolyear '15/'16	Schoolyear '16/'17	Schoolyear '17/'18	Schoolyear '18/'19
Revenue	39.693	238.079	960.103	1.547.128
Costs	256.293	212.685	374.128	410.454
Profit	-216.600	25.394	585.976	1.136.664

Yubu Finance

In November 2015 Yubu attracted equity from two private investors. This investment enables Yubu to further develop the prototype and introduce Yubu to the Dutch market.

23.3.5 Risks

Risk 1: student activation disappoints

One of Be Involved goals is to activate students for SCO. The use of serious games and the gamified platform should contribute to this. It however must still be tested if the student activation of Yubu is satisfactory. Be Involved therefore collects specific data via Yubu to evaluate student activation. Be Involved can use the data to improve student activation via content or gamification. Furthermore Yubu wants to create specific games to create awareness of the importance of SCO. In this way Yubu wants to improve the intrinsic will of students for SCO.

Risk 2: platform adaptation within schools fails

A large part of the teacher population in The Netherlands is not used to using technology during classes. This could affect the adaptation of the platform since there is a risk that people resist the use of the platform. To cope with this problem beforehand Be Involved offers extensive training sessions to schools.

Risk 3: sales efforts deliver too little

Be Involved intends to grow the licence number of Yubu quickly. However, there is a risk that sales will go slower. In that case Be Involved must scale some of the product development down. In order to asses this risk Be Involved monitors its sales funnel closely.]

23.3.6 User-based evaluation of the concept

User statistics (schoolyear 2015-2016)

- 24 schools used Yubu for SCO
- 5789 student users

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- 401 teacher users
- 28.317 logins
- 9.530 future ideas (e.g. studies, professions, dreams) generated with Yubu
- 15.747 discovered qualities (e.g. I am a leader) using Yubu
- 10.308 discovered motives (e.g. I want to help people) using Yubu
- 23.261 assignments done using Yubu

User evaluation outcomes

- The biggest remark on the prototype was that the users wanted to see their exact progression in the SCO process. But what determines ones progression in SCO and how can it be visualized? This challenge was overcome via multiple brainstorming and co-creation sessions with teachers. The solution that Yubu came up with is to make a distinction between the development of the required competences to move along the SCO process and the actual orientation process itself. In the newest version of Yubu students find a training centre in which they can develop the required competences next to their discovery centre in which they can orientate. The students have an overview which training level they have achieved which is coupled to annual set goals. On the other hand the students have an overview of the outcomes of their orientation process which gives them insights in their future choices.
- Yubu experienced that students do not read instructions or even text in general. The problem is overcome by using as less text as possible and more visuals.
- The design of Yubu was very busy. This attracted students but scared away teachers. The new design of Yubu is more quiet.
- In the prototype students were obligated to assign their parents as buddy. This was designed from the base that having a parent as buddy would always be beneficial for the student. We however received feedback that students did not want to involve their parents since they are pushed into a certain direction by their parents. In the new design students have complete control about who to invite as buddy and who not.
- There is a need to be able to use Yubu when no computer or laptop is available since ICT facilities on Dutch schools are still not sufficient. Therefore Yubu started a research in the design of the Yubu app.
- Students and teachers have limited time and want to know the required time investment in advance. Yubu now provides the required time investment for every assignment.
- Gathering and ordering all user feedback was time consuming. Yubu therefore explores automated systems which can be integrated into the platform to harvest user feedback

23.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 44.

Table 44: Snapshot of project "Yubu"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
To increase and improve students' Study and Career Orientation (SCO), so that they can make better study and career choices, by developing a serious	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ 20 SCO games successfully evaluated by teachers and students. ○ List of platform requirements created from teacher and student feedback. ○ Wireframe design of Yubu v1.0 	<ul style="list-style-type: none"> ○ Dedicated project website: https://www.yubu.co/ ○ Regional product presentations to schools to over 40 schools ○ Guest lectures/workshops at 2 conferences ○ Monthly newsletter with 1,160

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gaming platform that has a 3-stage approach: engage, motivate, activate.	<ul style="list-style-type: none"> ○ Development of a working prototype with sections for teachers and students (September 2015). ○ Yubu piloted in 20 schools with 4,500 students. ○ Feedback from pilots facilitated creation of a new version of Yubu (February 2016). <p>The project successfully delivered 8 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved</p>	<ul style="list-style-type: none"> ○ subscribers. ○ Be Involved social media accounts: Facebook (238 likes) and Twitter (143 followers). ○ News article on CHEST website: http://www.chest-project.eu/yubu-serious-gaming-for-study-and-career-orientation-sco/ ○ 202 interactions in the project’s section on the CHEST Community Forum.
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Table 45 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on community building and empowerment) and secondary (impact on ways of thinking, values and behaviours) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 45: Mandatory KPIs for Personal Health Record for Self-Management Elderly

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	3	3
		Number of users involved in co-design process	0 (schools) 0 (students) 0 (teachers)	30 (schools) 10.000 (students) 600 (teachers)	24 (schools) 5.789 (students) 401 (teachers)
		Ratio between men and women involved	50-50%	50-50%	50-50%
		Ratio between young, adult and old people involved	Young 0% Adult 0% Old 0%	Young 90% Adult 10% Old 0%	Young 93% Adult 6,7% Old 0%
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	1	3	3
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	4	4
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	4	4
		Number of comments / replies on project blog entries on CHEST website	0	5	4
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers,	0	250	236

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		facebook friends, etc.)			
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	20	15

24 YouSense⁸⁸

The objective of YouSense is to allow all citizens from Europe to self-monitor the air pollution in their daily life and direct environment, and to share this data, through the development of affordable devices with a linked portal and smart phone app. The aim of the project is to develop such a tool with the citizens and for the citizens. It will include a basic open source device, and further crowd-sourced developments.



Figure 29: Screenshots of the YouSense app

24.1 The societal problem

24.1.1 Description of the problem

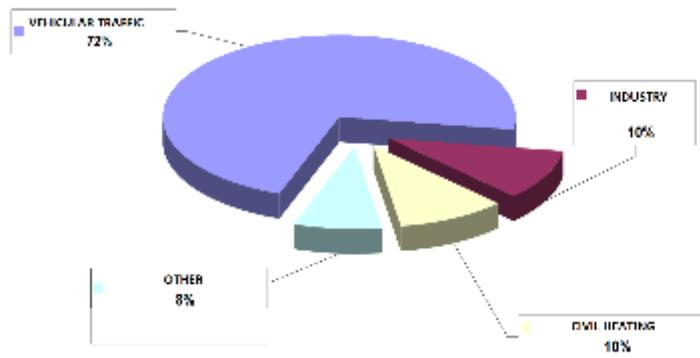
Every day, we breathe in about 15,000 litres of air. Besides the essential oxygen, a lot of dangerous pollutants end up in our lungs. In particular, particulate matter (PM) constitute a serious danger to people's health. In addition to this, individual pollutants such as diesel soot (a component of PM) also contribute to climate change. Therefore, any reduction in air pollution contributes significantly both to general health and to climate protection - in the end cleaner air means better quality of life.

Effects of air pollution on human health, in particularly on overall mortality, are known for years, species for the enormous health impact of some major pollution. Emblematic was the case in London in 1952, known as "The Great Smog of London ": from 5 to 8 December 1952 also thanks to the presence of particular weather conditions, the British capital was enveloped in a blanket of smog that caused the death of 4,000 people in one week. In that week, mortality increased by 2.6 times compared to the same period last year, and deaths failure respiratory, acute bronchitis and pneumonia grew by 9.3 times, with a total increase estimated at 3,500-4,000 units.

Currently it is difficult to repeat a situation similar to the one in London in 1952, because are changed fuels used for heating, there are revenue into force throughout Europe laws regulating emissions. However, as demonstrated by recent epidemiological studies, cities are still considered at risk, because of other types of polluting substances (in particular of those emitted by cars). The major source of air pollution in urban centers (urban air pollution) is constituted by vehicular traffic, while in measurement contribute less space heating civilian settlements and emissions zones industrial.

⁸⁸ Chapter contributors: Mathias Becker, Pasquale Donadio

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In details:

- over 60% of the nitrogen oxides present in urban areas is due to the emissions from road traffic;
- over 90% of this carbon monoxide in urban areas due to vehicular traffic;
- vehicular traffic is responsible for 75% of total emissions benzene on a national scale, of these more than 65% originated in areas urban.

The YouSense project comes from citizens of the Italian city of Naples, where air pollution due to vehicular traffic is an issue but where there is a lack of information and data on this question. The objective is to allow all citizens from Europe and Worldwide, to self-monitor the air pollution in their daily life and direct environment, and to share this data, through the development of affordable devices with a linked portal and smartphone app.

One of the citizens at the origin of the project is a system engineer who decided to bring his competences to the project, already allowing the development of first prototypes (devices, portal and smartphone app). During the execution of the CHEST project he has developed close contact with several user communities, which are embedded in the collaborative economy, and with complementary competencies including a consulting company specialized in supporting projects with a social and environmental impact. The aim of the project at the beginning was to develop such a tool with the citizens and for the citizens, conceived to minimize impacts of the air pollution on citizen's health: today we can say that this objective has been achieved with great success!

24.1.2 Scale of the problem

The challenge comes from a group of citizens from the Italian city of Naples, where air pollution is an issue but where there is a lack of information and data on this question. They want to have information and data in order to be aware of the situation, to take informed decisions in their daily life, and to be empowered to be able to discuss the topic and influence political decisions.

But this challenge is also a challenge for Europe, and beyond, targeted by the Seventh Community Environment Action Programme of 20 November 2013 ("General Union Environment Action Programme to 2020 - Living well, within the limits of our planet"). As described in this document, "the World Health Organisation estimates that environmental stressors are responsible for between 15 % and 20 % of all deaths in 53 European countries" and "According to the OECD, urban air pollution is set to become the primary environmental cause of mortality worldwide by 2050". Moreover, they raise the issue that "A substantial proportion of the Union's population remains exposed to levels of air pollution, including indoor air pollution, exceeding WHO recommended standards" and that "water quality and air pollution levels are still problematic in many parts of Europe, and Union citizens continue to be exposed to hazardous substances, potentially compromising their health and well-being".

24.1.3 Previous approaches to solving the problem

In Naples and more generally in Italy, current monitoring of air pollution is carried out by the Regional Environmental Protection Agencies - ARPA (ARPAC, for Campania, which includes Naples). If we take the example of the monitoring of particulate matter 10 (PM10) in Campania: there are only

20 stations, unfortunately with periodic breaks in service, where their data is based on gravitational monitoring of the PM10 filter with a forced fan, using a filter that has to be changed daily and analyzed. So there is no continuous monitoring, only a daily value. The data can be accessed by the citizens only by downloading a daily or weekly bulletin, but there is no easy continuous and user-friendly access to the data. Such a situation seems to be frequent in several Italian and European countries, and even in those with a higher quality of monitoring, it seems that the information is rarely easily accessible in a user-friendly system, which is a prerequisite to see the topics fully handled and discussed by European citizens.

The project's digital social innovation exists in the context of the current strong development of "smart cities" and sensor networks.

However, today's citizens still do not have access to a low-cost device linked to community sharing portal, or an app for continuous monitoring and real-time sharing. We have identified a few initiatives that seems to be partly related to such an innovation but nothing is ready yet, and none of these initiatives have the unique combination of advantages of this project: (i) coming from a bottom-up idea from citizens, (ii) aiming at empowering citizens, (iii) combining open solutions, participatory approaches and patented solutions, (iv) already planned to be embedded in existing collaborative economy communities (Students of Engineering, Bike City Milan and Naples, and Airbnb sustainable community), (v) having a combination of fixed-mobile handheld (Mini) devices which are necessary to cover the full range of citizens activities, and (iv) having a network of 30 devices working.

The technology of the project is based on optical sensors which allow continuous monitoring (whereas the current technology of Italy's official institution uses a gravitational filter which only gives daily results), along with temperature and humidity sensors. The current prototypes use PM10 sensors, commercially available, and future development will use PM2.5 and PM1 sensors. The results obtained are in line with the results of the official institution allowing for a 10% margin for error, thus the prototypes should be considered as pollution sentinels but not yet as a precise measurement system (this will be the case after calibration in the future).

The IPR strategy is to have a three-layer model: a basic low cost open-source device to allow all citizens to quickly have access to the information, a patented sophisticated device to be commercialized, and the open-source crowd-sourced future device. The project has started to select some aspects to include in a patent proposal. Claims to file about the sophisticated device are currently drafting and the complete filing of a patent is scheduled in the next months.

24.2 Implementation of organizational structure

24.2.1 Maturity of the project

Pilot phase: The project has reached all the objectives set in the original proposal: (i) completed the development of the prototype network composed by 30 device trials, (ii) completed the tests of the network in real environments, (iii) involved user communities (four different distributed in Italy and Europe), integrated user needs and get their feedback after trials, (iv) setting up the business plan.

24.2.2 Organizational structure

The organizational structure of the project is based on the following work packages (same structure as initially planned – no change).

WP1 Analysis of the detailed requirements [delivered]

Overview:

- Technical requirements detailed and refined
- First user's requirements coming from the small user study

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Timing: M1 - M2

Deliverable: report on the requirements

Involved persons/organizations: Pasquale Donadio + the consulting company GOODPROJECT + the involved communities + consultant for the user interface design for the portal and app.

WP2 Technical improvement [delivered]

Overview: Technical improvement, on the basis of results of the analysis of the requirements of WP1, will allow the improvement of:

- Devices
- Firmware
- Application
- Portal

In the annex of the proposal we presented the technical specification of current prototypes, and the features planned to be developed during implementation of the CHEST program.

Timing: M3-M5 Deliverable: New improved prototypes

Involved persons/organizations: Pasquale Donadio + consultant for the user interface design for the portal and app.

WP3 Tests and trials Overview [delivered]

- Technical tests of the Mini, Fixed and Mobile devices, portal and app
- Trials carried out by real users from four communities: Students of Engineering in Naples (5 Mini + 5 Fixed devices), Bike Napoli City (5 mobile devices), Bike Milan City (5 mobile devices) and Airbnb sustainable group (5 fixed devices + 5 handheld devices).

Timing: M6-M8

Deliverable: Report of results of tests and trials

Involved persons/organizations: Pasquale Donadio + GOODPROJECT + the involved communities + consultant for the web portal and app design and implementation (both iOS and Android) + lawyer for the drafting the YouSense Terms, Condition and Disclaimer document.

WP4 Preparation of future steps [delivered]

Overview:

- Feedback from users, which will be provide by the small user study
- Business plan, indicating routes for future exploitation
- Future device evolution, taking into account the results of both the users feedback and the business plan

Timing: M6-M8

Deliverables: Business plan, feedback report and device evolution report.

Involved persons/organizations: Pasquale Donadio + GOODPROJECT + the involved communities

24.2.3 Key personnel

The applicant, Pasquale Donadio, is a Cloud Architect and Project Manager in a big European industrial company, with 18 years of experience. He has set up this project in his own free time (there is no link with his position so no IPR issue related to his position).

The main skills of the applicant are: Computer science, project management, network security, and telecommunication. His research interests include cloud computing, cyber physical systems, Internet of things, sensor networks, network function virtualization, energy aware networks, software defined networking, optical networks, GMPLS control plane and path computation element architecture. He has authored/co-authored 30 papers and a book. Moreover, he has authored/co-authored 30 patents (29 active, 1 pending).

Thanks to his double skills, as electronic engineer for embedded systems and software engineer, he has been able to manage the development of the prototypes of the devices, portal and app.

In order to further advance the project Pasquale Donadio has worked with a consulting company specialized in supporting projects for business plan/strategy and user studies. Also the support in user interface design for the portal and app and related software development was made by a consultant company.

These requested additional competencies were planned and integrates in the original budget table.

24.2.4 Partnerships, cooperations, and networks

Subcontractors:

In order to further advance the project, the applicant has made use of the support of consultants for business plan/strategy and user studies, and also in user interface design for the portal and Android/IOS app. Also the support of a lawyer was needed for the drafting the terms and condition document of the YouSense device. In details, to this purpose, during the CHEST project lifetime, Pasquale Donadio has worked with a consulting company specialized in supporting projects for business plan/strategy and user studies, named GOODPROJECT. The cooperation with a consultant in web database design, user interface and app development allowed to create a professional web site and two professional smartphone apps, for bot iOS and Android operative systems. Finally, the support of freelance lawyer allowed to drafting the “YouSense Terms, Condition and Disclaimer” document and address the new IATA normative UN3481-P1966 about Lithium battery shipping guidance for electronic devices in Europe and outside Europe. These requested additional competencies are integrated in the budget table and will be based on subcontracting contracts.

Communities:

The YouSense project have involved four user communities, distributed locally (in Italy) and globally (worldwide). In details, two Italian user communities located in the city of Naples:

- Students of Computer science at University of Naples Federico II
- Bike City Naples

A similar Italian user community located in the city of Milan:

- Bike City Milan

A world-wide user community conceived to reproduce the same tests on worldwide scale:

- AirBnb sustainable and eco-conscious host and travelers

Real users from the four communities have carry out the trials:

Students of Computer Science at University of Naples Federico II have done experiments testing five Fixed and five handled devices; Bike City Naples have done experiments testing 5 mobile devices; Bike City Milan have done experiments testing 5 mobile devices and Airbnb sustainable group have participated to the experiments testing 5 Fixed devices and five Mini devices. The Italian Students

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and Bikers user communities was personally administrated by Pasquale Donadio. The Airbnb group about sustainability was administered by the founder of GOODPROJECT (he checked with Airbnb who confirmed that he can contact the group members for the test).

Additional partners:

During the CHEST project execution, a lot of scouting activities and meetings was done with a twofold objective:

- 1) Find additional partners to promote the YouSense platform.
 - a. In this case on January 2016, a meeting for possible cooperation was done with Magentalab people, winner of the second CHEST call.
 - b. Additional face2face and b2b meetings was done within the Mobile World Congress and CEBIT at the end of February and in March. Presentation of the YS platform was done in both the cases, in the b2b meeting area.
 - c. Participation to FuturNet in Bruxells on April, and presentation to the CAPS and CHEST project committee the YouSense project. Meet the Prof. Jorge Garcia Vidal from Universitat Politècnica de Catalunya. Verbal agreement on possible cooperation during the next months.
 - d. Participation to the CAPS meeting and workshop in Berlin. Meet the HackAir project people (Christodoulos Keratidis – from Draxis). Verbal agreement on possible cooperation during the next months.

- 2) Find additional partners to improve the hardware firmware and software of the YouSense platform. A particular attention was done to the development process of the devices, in order to speed-up the mass production and the quality of the final devices. In this case several meeting with Italian and European SME was done to find partnerships, acquire competences and instrumentation needed to improve the development process and the quality of the final device:
 - a. Milan: Meeting with possible subcontractors for development of the YS Web site and the Android app. B2B meeting with companies developing PCB in Italy (MicroLab).
 - b. Danzica: Electronic Exhibition and meeting with possible PCB designer and developer.
 - c. Colonia: Attending the Exhibition "Professional Mobile Radio Expo"
 - d. Roma: Meeting in Robot Italy about the plan and discount to buy consumables for 30 devices.
 - e. Milan: First meeting with "Bike Milan City" to propose the integration of the YS mobile on the bike. Attending the Electronic Exhibition of Novegro
 - f. Milan: B2B meeting with "Bike Milan City" and provisioning of YouSense device material

24.3 Implementation of the solution approach

24.3.1 Solution approach

The objective of the project is a social and collaborative innovation, to allow citizens to monitor air pollution (starting with PM10) and share this data, based on digital technologies (portal, app, and connected devices) and including open source developments.

The targeted impact is to raise awareness and empower citizens. With the data and the social network created, the citizens will be able (i) to better know the situation of air pollution continuously and precisely, both globally and in their direct environment, which is not possible today, (ii) to take related informed decisions in their daily life (where to live, best route to go to work to avoid pollution, ...), but also (ii) to start discussions on the topic on the basis of the monitoring data,

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meaning that they will then be able to (iii) influence political decisions in their countries and in Europe (directly through actions towards their politicians, but also indirectly as if, for example, citizens avoid polluted areas than all stakeholders will have an interest in reducing pollution).

Thus the benefits for users will be firstly to be better informed about air pollution, secondly to have a greater capacity to take informed decisions, and thirdly better health (both by taking decisions and by influencing political decisions). These benefits will have obvious positive impacts on health and environment, but also on social aspects (increasing the links between citizens and their participation in city life) and economic aspects (decreasing exposure to air pollution, and the air pollution itself, will decrease the costs of related health problems).

The first devices monitor particulate matter 10 (PM10), but it is already envisaged to add PM2.5 and PM1 sensors. And in the future, the system developed will be adapted for a large spectrum of other types of monitoring (other air pollutants, but also other types of pollution like water, and also other types of monitoring). Thus the target groups could be much larger, and the project could bring a huge impact to citizens' quality of life.

The project have reached all the objectives set at the beginning (i) the development of the prototype network composed by 30 prototypes trials, (ii) tests of the network in real environments, (iii) integrate user needs and get their feedback after first trials, and (iv) the setting up of a business plan. The targeted objective of the project about to set up a collaborative platform to share information about pollution with innovative devices at affordable prices to empower citizens for self-monitoring and sharing of data was achieved. All the information about the tests and experiments done by four user communities and thirty devices is available on the YouSense web site (www.yousense.eu). The project enables the development of low cost devices for self-monitoring and sharing air quality measurements directly into citizens' hands. During the development of the project, the following main objectives was reached: development of the network of prototype, first trial with users, get user feedbacks after trial, and business plan.

24.3.2 Target groups

The targeted users are the citizens of Europe, and beyond, who want to have access to information about air pollution in their direct environment and daily life. But the project also wants to target intermediary and prescriber targets, notably NGOs linked to air pollution and citizen's empowerment, as well as researchers and doctors. In order to ensure that the project meets the needs of the targeted groups, the project has already based its prototypes on the wishes of a small group of citizens from Naples at the origin of the project, but also on the needs expressed by citizens identified in the target group (see small user analysis in the deliverable 1) and by doctors and researchers sensible to the environmental issues. The characteristics of the three identified user groups can be summarized as the following:

Citizens

The target group all aim to be informed about the quality of the air near their home, schools and working place. This is to improve the life quality and health. Monitoring systems can be difficult and costly to use. YouSense can cover this gap giving the access to the information about the quality of the indoor and outdoor air to everyone. The benefits of the project to the citizens are:

Social:

- Improved quality of life through better control and monitoring of the air pollution
- Reduction in deaths due to particulate matter emissions
- Empower citizens to regain control of their environment

Environmental:

- Reduced Particulate matter emissions through the continuous application of best practices and norms

Economical:

- Reduction of health care costs due to respiratory diseases

The size of this target group can be considered per-city, in the sense that each target group can be associated to a well-defined city. This approach was also used during the selection of the user communities and the experiments done during the testing phase of the YouSense platform. This approach can be also useful to make comparative analysis about the air pollution between different cities. Considering that in Italy just under half the population (45%) in 2012 said to be interested in environmental issues (<http://www.istat.it/it/archivio/117583>), it is possible to derive easily the dimension of the target group for small medium and large cities.

NGOs

Private voluntary and non-governative organizations are very active in the field of the environment. Feature of these organizations is a strong ideology, pursuing the objective of contributing to the overall development of communities from social and economic point of view. The benefits of the project to the NGOs are:

Social:

- Find generalized solutions to minimize the effects of the air pollution on the citizens about respiratory diseases
- Reduction in deaths due to particulate matter emissions
- Improved quality of life through better control and monitoring of the air pollution

Environmental:

- Empower citizens to regain control of their environment

The size of this target group is strictly related to the sensitization campaign of non-governmental organizations are now taking action for clean air in Europe. With the contribution of the LIFE+ financial instrument of the European Union, nine NGOs are now taking action in the Clean Air campaign, created to improve implementation of the AQD on national and local levels. Taking part in the project are as different associations:

- the German VCD
- the German Umwelthilfe DUH
- the German Naturschutzbund Deutschland NABU
- the German Bund für Umwelt und Naturschutz BUND
- the Austrian VCÖ - Mobilität mit Zukunft
- the European Federation for Transport and Environment T&E
- the Danish Ecocouncil
- the Clean Air Action Group CAAG from Hungary
- the Slovakian Centre for Sustainable Alternatives CEPTA.

Doctors and researchers

The target group aim to study the relationships between the quality of the air and the respiratory diseases, especially for children and elderly. The continuous monitoring of the quality of the air in industrial areas and areas affected by high degree of pollution, can be as example useful to prevent and respiratory diseases and allergies and take adequate measures. The benefits of the project to the scientific organizations are:

Social:

- Find generalized solutions to minimize the effects of the air pollution on the citizens about respiratory diseases
- Reduction in deaths due to particulate matter emissions

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- Improved quality of life through better control and monitoring of the air pollution

Environmental:

- Empower citizens to regain control of their environment

Economical:

- Reduction of health care costs due to respiratory diseases

The size of this target group is very interesting, considering the number of doctors and researchers involved today in the study and treatment of respiratory diseases.

In order to ensure that the YouSense meets the needs of the targeted users, the project has already based its prototypes on the needs of a small group of citizens from Naples shared at the origin of the project, but also on the needs expressed by Bike City Napoli and the Students of University of Naples Federico II. On the basis of the experience in Naples, during the project the study was extended firstly in Milan, in North Italy (identifying a similar group), then in Europe and finally in China identifying a greatest group. At the end of the project, thirty trials were produced and distributed to users and feedbacks about technical and non-technical aspects was collected. The project has finally refined the case study and a complete strategy was explained in the business plan produced, including a detailed definition of the targets and way to reach them.

24.3.3 Activities and work performed

Work Package Number : WP3			
Actual Starting month :	3/2016		
Predicted / Actual End month :	9/2016		
Work Package Objectives:			
<p>The purpose of the WP3 was twofold: detail the main tests developed on the overall components of the YouSense platform (Mini, Mobile and fixed devices, web portal and smartphone app for iOS and Android) and describes all the tests carried out by the user communities involved in the YouSense experimentation focusing on the related results.</p>			
Description of work this period:			
Main achievements:			
<ul style="list-style-type: none"> • The first achievement of the work period was final test of the hardware and the software composing the YouSense platform. • The second achievement, within the mentioned working period, was the implementation of a network composed by thirty YouSense devices, distributed between four user communities, operating mainly in Italy and Europe to make simple tests about the air quality measurement. 			
Detailed description of work performed to reach the achievements listed above			
<p>The work performed to reach the first achievement was to define a complete development process for each component of the YouSense platform and then move the focus on the testing phase for both hardware, firmware and software components of the platform.</p> <p>One of the main challenge of the YouSense project was to produce the technology enablers to measure and share air pollution data, worldwide. To address this challenge, the following subsystems was developed:</p> <ul style="list-style-type: none"> • The YouSense devices • The YouSense smartphone apps • The YouSense web site <p>The following table describe the number of the devices produced, the apps, the web site and the status at the end of the CHEST project period.</p>			
	YouSense Devices	YouSense Apps	YouSense Web site
	Yousense Mini: 10 device released to user communities	Android App: released (downloadable on Google Play)	Web Platform: released (on line) www.yousense.eu
	YouSense Fixed (WiFi): 10 device released to user communities	iOS App: in approval status by Apple Development Team	
	YouSense Mobile(GSM/GPRS): 10 device released to user communities		
Before the definitive release of the YouSense platform, each subsystem was configured and tested.			
Test of the YouSense devices			

The YouSense device test procedure is part of the following development process:

- YouSense device assembling
- Sensor calibration
- Boxing and final tuning
- Packaging and shipping

This section describes the details of the tests done on the devices, for each step of the development process identified:

Phase 1) YouSense device assembling. After the preparation of the YouSense PCB (Printed Circuit Board) and the assembling of the main components of the device, a first level test procedure was done.

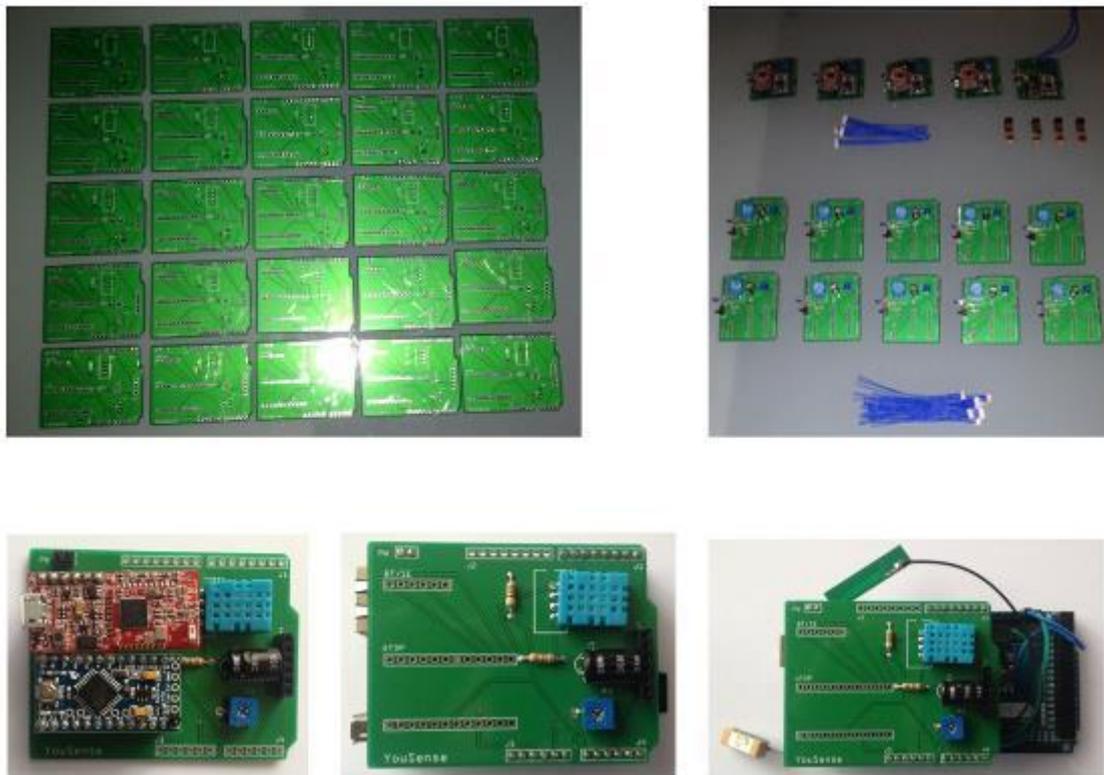


Figure 1 – Assembling of the YouSense device (Mini – Fixed – Mobile)

The test procedure is composed by three main tests, involving the electrical assembly, the firmware loading and the software test. The test procedure was applied to each YouSense device developed for the CHEST project (Mini – Fixed and Mobile). In details:

- **Electrical test.** This test was done after the assembling phase, to be sure that the basic components of the device was assembled correctly. This test is especially useful to found trouble in the connection between the battery-charger subsystem and the YouSense sketch. The following figure shows the expected voltage values as input of the battery-charger subsystem.

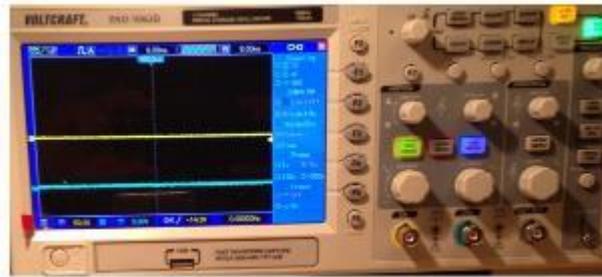


Figure 2 – YouSense Electrical test

In details, a successful test, indicates a voltage of 5v as output of the battery-charger subsystem/input of the YouSense device mainboard. This voltage needs to be tuned by acting on the trimmer of the voltage converter (step up)

- **Firmware loading.** This test is twofold. Firstly, we test the connection between the USB serial adapter and the PC in charge to load the firmware storage procedure; then we load the firmware in the device, controlling that the loading procedure do not fails. The next figure shows what happens in both cases.



Figure 3 – YouSense Firmware loading test

- **Software test.** This is the final test of the device assembling phase. After the electrical test and the firmware loading, the device is connected to a smartphone (both Android and iOS) and each feature of the YouSense device is tested.

Phase 2) Sensor calibration. The sensor calibration procedure permits to obtain the best performance of the device, during each measurement action. To have a broad spectrum of dust concentrations for calibration, we built a self-made dust dispenser. It basically consists of a box and fan that is connected to a small bale of steel wool. When the fan is turned on, the steel abrades chalk inside of the box and blows it into the outer containment. A filter sheet is used to prevent too much dust being dispensed at once. In the full calibration setup, the air flows through the dispenser, then into the box containing the YouSense and finally through the Dylos DC1100 (a Laser Particle Counter certified device). This dispenser makes it possible to quickly generate high dust concentrations which will decay slowly after turning on the dispenser. By alternating dispensing and ventilation phases, we enabled readings over the full spectrum of the sensor. For the actual calibration of the sensors we performed measurements over 18 hours, again sampling the YouSense PM 10 sensor at 100 Hz and the DYLOS 1100 at 1 Hz. The dust dispenser was set to be turned on for 15 minutes once an hour. This lead to a repeated sequence of rising and falling dust concentrations, allowing the sensors to repeatedly measure different concentrations levels.



Figure 4 – YouSense calibration

Phase 3) Boxing and final tuning

The **boxing and final tuning** procedure consists to realize a set of intermediate activities which permits to have a complete device, perfectly working and made of good quality. Three sub-steps was implemented:

- Selection of the YouSense box. During this phase a wide set of box and different materials

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was analysed. After that, the choice was on translucent polycarbonate box blue of the Hammond Manufacturing Co. Ltd., which is aligned with the measurement requirements of the PCB and contemporise is appealing. The next figure shows the result of this phase.



Figure 5 – Box for YouSense devices (Mini – Fixed - Mobile)

- Adaptation and of the Printed Circuit board. During this steps all the procedures needed to adapt the PCB to the box was done. In details the box was customized and “wholed”, in order to permits a good integration with the PCB. During this project this procedure was manual. In order to have excellent quality of the device can be preferred to have a standardized and automatic procedure.



Figure 6 – YouSense devices box adapted to the PCB (Mini - Fixed)



Figure 7 – YouSense devices completed

- Final tuning. The Final tuning of the sensor was done by acting a comparative analysis between the YouSense device and the DYLOS DC 1100, a certified device produced by Dylos Corporation (USA). The DYLOS is a Laser Particle Counter with 2 size ranges - small (bacteria, mold, etc) large (pollen, etc.).



Figure 8 – DylOS device

DC1100 features technology and engineering allows monitoring of indoor and outdoor air quality with an LCD screen that provides small and large particle counts with a dynamic bar graph showing actual count reading. Multiple modes including minute, hour, day and monitor to evaluate your air quality and store up to 30 days of air quality history for review.

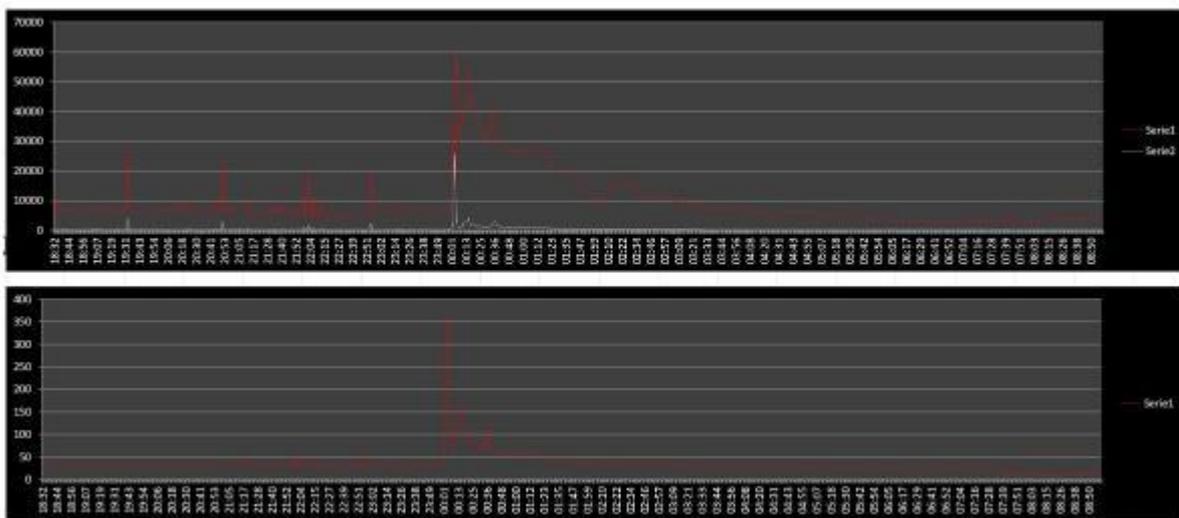


Figure 9 – Comparative analysis between DylOS and YouSense devices

The above figures demonstrate the success of the calibration of the YouSense device after the final tuning procedure. In details in the top figure, we can see the measurement of the air pollution forcing the DYLOS for 18 hours consecutively with different pollutants flow. The bottom figure shows instead the measurement of the YouSense device, forcing the YouSense in the same conditions. As shown in the figure, the YouSense device responds very good and eliminates also a lot of noise present instead in the DYLOS professional device. Algorithm used and methodologies are ready to be part of patent planned during the next months.

Phase 4) Packaging and shipping procedure

The packaging and shipping procedure of the YouSense device involves the following three subtasks:

- Selection of the package, which needs to be in line with the IATA specifications for the lithium battery device based shipment. The normative required is described by the UN 3481 – PI966 norms. The next figure shows the 2016 IATA DGR, compiled by DHL courier.

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	UN3090 - PI968			UN3091 - PI969	UN3091 - PI970	
Description	Lithium Cells / Batteries loose (bulk)			Lithium Cells/Batteries packed with equipment	Lithium Cells / Batteries contained in equipment	
Section	PI968 - Section II			PI968 - Section IB	PI969 - Section II	PI970 - Section II
Lithium metal cells / batteries capacity	Per Cell or Battery ≤ 0.3g	Per Cell: > 0.3g but ≤ 1g	Per Battery: > 0.3g but ≤ 2g	Per Cell: ≤ 1g Per Battery: ≤ 2g	Per Cell: ≤ 1g Per Battery: ≤ 2g	Per Cell: ≤ 1g Per Battery: ≤ 2g
Maximum number of cells and batteries per package	N/A	8 cells	2 batteries	>2 batteries > 8 cells	Those necessary to power the equipment and 2 spare	≤ 2 Batteries ≤ 4 Cells
Maximum net weight per package	2.5 kg (CAO)	N/A	N/A	2.5 kg (CAO)	5 kg (PAX & CAO)	5 kg (PAX & CAO)
"Description of content" statement as per IATA DGR	"Lithium metal batteries in compliance with Section II of PI968" and "CAO"			"Dangerous goods as per attached Shipper's Declaration" and "CAO"	"Lithium metal batteries in compliance with Section II of PI969"	See "Note 2" "Lithium metal batteries in compliance with Section II of PI970"
Labeling						
Accepted in Time Definite International (door to door)	Forbidden			Yes (See "Note 1")	Yes	Yes
Account approval required for Time Definite Int'l	N/A			Yes	Yes	No
Requirements for Air Capacity Sales (airport to airport)	Select "LB" and mention "CAO" in the restricted commodity type			Select "DG" and mention "CAO" in the restricted commodity type	Select "LB" and mention "Section II" in the commodity type	No Requirement Select "LB" and mention "Section II" in the restricted commodity type
<p>Each consignment must be accompanied with a document with an indication that: "The package contains lithium metal cells or batteries; the package must be handled with care and that a flammability hazard exists if the package is damaged; special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and a telephone number for additional information". This document is required for any shipment where the lithium battery handling label is required (i.e. Section IB and Section II) and is intended to be separate from the package.</p> <p>Note 1: Forbidden to, from, within the Asia Pacific region due to air carriers restrictions.</p> <p>Note 2: "Lithium metal batteries in compliance with Section II of PI970 (4 cells/2 batteries or less)" must be added for every shipments to, from, within the Asia Pacific region. This requirement is based on the Asia Pacific operators variations. However in this case the lithium battery handling label or additional documentation is not required. (PAX = Passenger and Cargo Aircraft, CAO = Cargo Aircraft Only)</p>						
Section	PI968 - Section IA			PI969 & PI970 - Section I		
Per Cell: > 1g Per Battery: > 2g	Accepted as Air Capacity Sales (See "Note 3") CAO: ≤ 35 kg, UN specification packaging required Fully regulated dangerous goods - Class 9 - Select "DG" and mention "CAO"			Accepted as Air Capacity Sales (See "Note 3") PAX: ≤ 5 KG or CAO: ≤ 35 kg, UN specification packaging required (only for PI969) Fully regulated dangerous goods - Class 9 - Select "DG" and mention "PAX" or "CAO"		
<p>Note 3: Lithium batteries packed according to PI968 Section IA and PI969/ PI970 Section I are not accepted in Time Definite International when shipped air road to, from or transiting an ADR member state.</p>						

Figure 10 – IATA specifications for Lithium Cells batteries

Due to the new IATA normative entered in force by the 1st of April 2016, was not possible to ship the device in such countries, such as Australia, Cina, Usa and Canada. In fact, the normative forbid the use of devices with lithium batteries embedded. Due to this problem, the devices destined to these regions was re-engineered using new batteries before the final ships. This caused a delay in the completion of the extra-European tests.

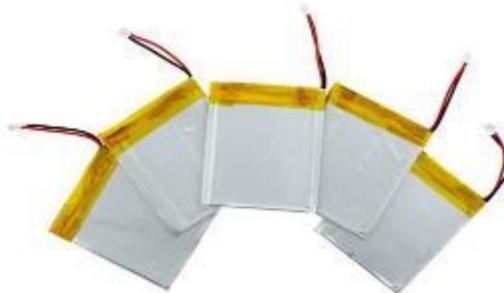


Figure 11 – Lithium Cells batteries

- Selection of the express courier and shipment, which is a very important procedure to ensure that the shipped device reach the destination in a very short time. After the comparative analysis between the possible choices, a couple of courier was selected:
 - Poste Italiane, for shipment in Italy and France
 - DHL for the other

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Figure 12 – First burst of devices shipped to the Airbnb community

Test of the portal (web application)

The purpose of the web application test is to verify the alignment of the site with the minimum requirements of the YouSense platform. Four main features were tested during the web application test:

- The navigation model
- The contents of the web site
- The YouSense map (graphical map)
- The application protocol APIs (RESTful API)

The test of the web application was done in first instance by the subcontractor in charge to develop and publish the YouSense web site.

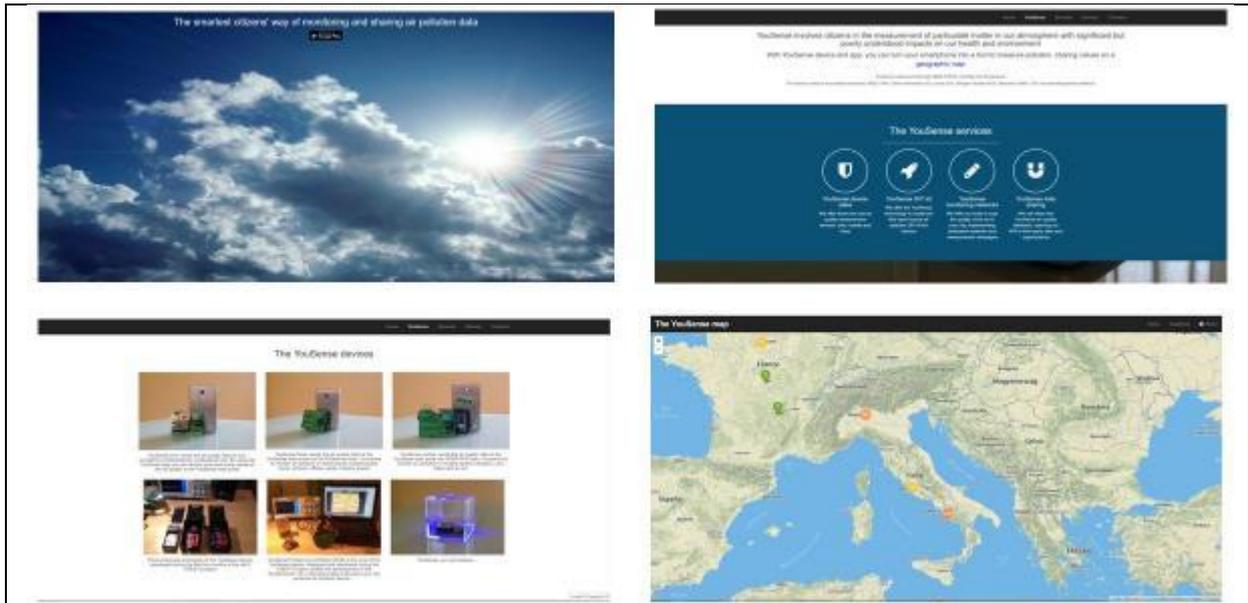


Figure 13 – YouSense web portal

Anyway a second test campaign was done directly by people involved in the YouSense test campaign in Naples and Milan. The test campaign raised a set of minor issues already solved in the current version of the portal, that can now be considered a stable release.

Finally, to test the spatial database and open to future services based on the YouSense API, the following test was done retrieving data using the http protocol:

<http://www.yousense.eu/getdata.php?key=value>

Input parameters: pm10 threshold or latitude AND longitude OR timestamp

Output parameters: pm10 value expressed in micrograms/cubic meter

Test of the app

The purpose of the smartphone apps test is to verify the alignment of the software application developed, with the minimum requirements of the YouSense platform. Since was developed two apps, one for each smartphone operative system (android and iOS), the test campaign was duplicated for each kind of smartphone.

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Figure 14 – YouSense app 1) iOS 2) Android

The test of the apps was done in first instance by the subcontractor in charge to develop and publish the YouSense apps for Android and iOS. Anyway a second test campaign was done directly by people involved in the YouSense test campaign in Naples and Milan. The test campaign raised a set of minor issues already solved in the current version of the apps, that can now be considered stable releases.

The work performed to reach the second achievement was to involve four user communities, distributed locally (in Italy) and globally (worldwide) to test the devices developed and, in general, the whole YouSense platform. The concept behind the experiments (done during the month of May and June 2016) was not to measure the air pollution only: experiments were conceived also to have a feedback from the users about the usability, performance and possible evolution of the YouSense platform. To realize a significant comparative analysis between the measures sampled by the citizens, we have defined a structured approach involving several user communities, living in different areas.



Figure 15 – YouSense testbed (Italy, Europe, Asia)

The test model carried out by real user from communities involves three different generic areas of the city were analysed:

- a) Pedestrian area
- b) Semi-pedestrian area
- c) Full traffic area (no pedestrian)

The pattern was applied to the urban cities of Naples and Milan, but it can be easily extended to each European or extra European city, worldwide. In details, during the execution of the tests, we have selected two Italian user communities located in the city of Naples:

- Students of Computer Science at University of Naples Federico II (UniNa)

- Bike City Naples

A similar Italian community located in the Italian city of Milan:

- Bike City Milan

A world-wide community conceived to realize similar tests on worldwide scale:

- AirBnB (Europe, America, Asia and Australia)

One of the main scope of the YouSense project, was the development of a number of device to distribute to the different communities in order to evaluate the impact of the new technology on the daily life of the citizens. The following table describe the list of the device developed and the association with the different user communities, before to start the experiments and look at the measurement results.

User communities/devices	YouSense Mini	YouSense Fixed	YouSense Mobile
Students @ UniNa	5	5	0
Bike City Naples	0	0	5
Bike City Milan	0	0	5
AirBnB	5	5	0
Total	10	10	10

Due to some delays related to the project and development of the PCB by third parties, the development of the devices was not completed in one step on April as planned in the original program, but organized in three different bursts:

- The first burst was composed by five YouSense Mini devices and five YouSense Fixed devices. Available on 30rd April 2016, was delivered to the Students @ Unina (ten in total).
- The second burst was composed by five YouSense Mobile devices and five YouSense Mini devices. Available on 30th May 2016, was delivered to Bike City Naples (5) and AirBnB (5) user communities respectively.
- The third burst was composed by five YouSense Mobile devices and five YouSense Fixed devices. Available on 15th June 2016, was delivered to Bike City Milan (5) and Airbnb (5).

This schedule, have allowed to reach all the objectives of the YouSense project, and be in time with the global CHEST development program.

Students of Computer Science at University of Naples Federico II

For the first YouSense test campaigns we have involved within the UniNa student's user community, a group of students from the Schools of Engineering, studying Computer Science who attend the first degree and the Master degree. This approach was conceived to test the device on the qualitative plan and to evaluate the feedback of the students with different expertise and seniority. The objective of the UniNa student's user community test study was then twofold:

- First, measure the air quality in the area of the scientific pole of Fuorigrotta (Naples)
- Second, receive a technical feedback from the students about the usability, performance and future evolution of the device.

Description of the experiment

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The test campaign of the UniNa student's user community was started on 2nd of May and was completed on 31st of May. The test was conceived by distributing five Mini devices to five students of the First degree and five Fixed devices to five students of the Master degree. The experiment consists to measure the level of Particulate Matter 10 (PM10) in two different locations of the academic pole of Engineering in Fuorigrotta:

- a) Within the pedestrian zone of via Claudio, near the Mostra D'oltremare (a big park with different green areas), where students move without the car to reach the different department buildings
- b) Within the traffic congested zone of Piazzale Tecchio, where students move to reach the main building of the College of Engineering

The duration of the experiment was 30 days, in order to take in account also climatic impacts on the air pollution. At the end of each experiment, students have given a quick interview about the usability, performance and improvements on the device. The results of this feedback will be shared within the next deliverable, the D4.1. YouSense devices was given away to the students of the two working groups to promote measures in the next coming months.

Numeric results of the test campaign

The test campaign has produced 718 measures of the air pollution, temperature and humidity, within the pole of the School Engineering in Fuorigrotta. In twenty working days (since there is no meaningful measurement during the weekends) with a mean of 35 measures per day and about 3.5 measures per device per day. Using the YouSense map tools available on www.yousense.eu, is possible to read the results, in terms of measures sampled:



Figure 17 – UniNa community results

The average value of the air pollution in the pedestrian zone of the UniNa campus is less than 30

micrograms/cube meters. This is a very good value. But looking at what happen near the car traffic zone, we can find a considerable increase of pollutants, as described in the above figures (less than 40 micrograms/cube meters). Clicking the history link is possible to have a complete view of the measurement (PM10, temperature and humidity) done in the selected zone.

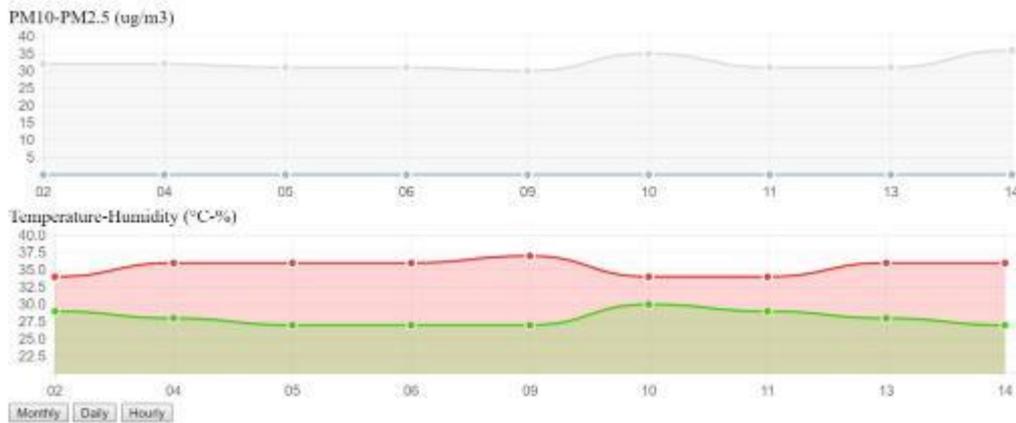


Figure 18 – PM10, Temperature and Humidity historical graph in the pedestrian zone

Bike Napoli City user community

0. In the second YouSense test campaigns we have involved the Bike Napoli City user community, a derivate group of free cyclists using the newest bike path setup built by the city of Naples. The community is composed moreless by 450 users.

1.



2.

Figure 19 – A member of the Bike Napoli City user community

3. In this context, the user group was selected with the intent to measure the quality of the air, in mobility, in different quarters of Naples. This approach was conceived to prepare the next test, involving the Milano Bike City user community, and make a comparative analysis extended to the two cities.

4.

Description of the experiment

The test campaign of the Bike Napoli user community was started on 1st of June and was completed

on 15th of June. Due to the limited number of devices, the test was performed mounting within the bicycle basket of five selected bikes, five Mobile YouSense devices, moving in five different zones of Naples. The experiment consists to measure the level of Particulate Matter 10 (PM10), temperature and humidity in five different semi-pedestrian zones of the city of Naples, served by a bike path, in mobility.

Due to the limited battery autonomy of the YouSense Mobile device, each bike can potentially collect no more of 2 hour of samples before the recharge. To simplify the experiment, each device needs to be recharged at the end of each day. This means that with the actual configuration, the YouSense Mobile device is ready to produce 2 hour of samples/day. Considering that the average velocity of a bike running in the city centre is about 15km/h, the YouSense Mobile device was configured to collect data each 10 minutes, in order to sample the quality of the air for each 2,5 km of the bike path (more less). With this in mind, each bike is configured to produce in the best case 12 sample per day.

The duration of the experiment was 15 days, in order to take in account also climatic impacts on the air pollution. At the end of each experiment, citizens have given a quick interview about the usability and improvements on the device. The results of this feedback will be shared within the next deliverable, the D4.1. The devices were given away to bikers to promote measures in the next coming months.

Numeric results of the test campaign

The test campaign has involved five bikes for fifteen days. At the end of the campaign we have collected 906 measures of the air pollution, temperature and humidity, in mobility, within the five zones selected. In fifteen days of sampling we have produced a mean of 60,4 measures in mobility per day (about 12,08 measures per device-zone per day). Using the YouSense map tools available on www.yousense.eu, is possible to read the results, looking to the whole graph:

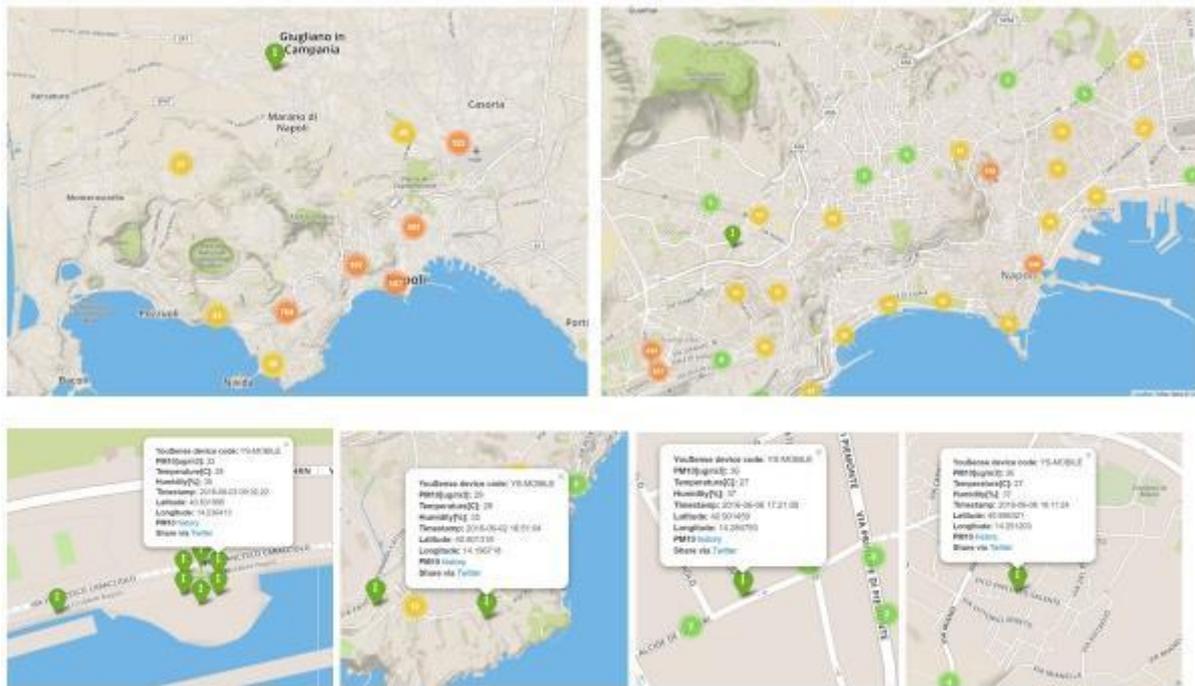


Figure 20 – Bike Napoli City user community results

Air quality near the seaside and Posillipo hill, is very similar to the pedestrian area analysed in the first experiment. But in the central areas especially in more traffic areas there is a considerable difference in terms of pollution till about 10 micrograms/cubic meter. Clicking the history link is possible to have a complete view of the measurement (PM10, temperature and humidity) done in the selected zone.



Figure 21 – PM10, Temperature and Humidity historical graph on the Posillipo hill

Bike Milan City user community

5. Bike Milan City user community is a free and independent cycling association of non-professional city bikers. The community is composed moreless by 375 users. In this context, the user group was selected with the intent to measure the quality of the air, in mobility, in different busiest district of Milan. This approach was conceived to complete the comparative analysis with Naples. In the near future, the idea is to extend this approach to all main Italian and European cities.

Description of the experiment

The test campaign of the Bike user community was started on 16th of June and was completed on 30th of June. Due to the limited number of devices, the test was performed mounting within the bicycle basket five Mobile YouSense devices on five bikes, moving in five different zones of Milan. The experiment consists to measure the level of Particulate Matter 10 (PM10), temperature and humidity in five different semi-pedestrian zones of the city of Milan, served by a bike path, in mobility.

Due to the limited battery autonomy of the YouSense Mobile device, each bike can potentially collect no more of 2 hour of samples before the recharge. To simplify the experiment, is supposed that the device is recharged at the end of each day. This means that with the actual configuration, the YouSense Mobile device is ready to produce 2 hour of samples/day. Considering that the average velocity of a bike running in the city centre is about 15km/h, the YouSense Mobile device was configured to collect data each 10 minutes, in order to sample the quality of the air for each 2,5 km of the bike path (more less). With this in mind, each bike is configured to produce in the best case 12 sample per day.

The duration of the experiment was 15 days, in order to take in account also climatic impacts on the air pollution. At the end of each experiment, citizens have given a quick interview about the usability and improvements on the device. The results of this feedback will be shared within the next deliverable, the D4.1. The devices were given away to bikers to promote measures in the next coming months. The next section shows the details of the zones selected.

Numeric results of the test campaign

The test campaign has involved five bikes for fifteen days. At the end of the campaign we have collected 897 measures of the air pollution, temperature and humidity, in mobility, within the five zones selected. In fifteen days of sampling we have produced a mean of 59,8 measures in mobility per day (about 11,96 measures per device-zone per day). Using the YouSense map tools available on www.yousense.eu, is possible to read the results, looking to the whole graph:

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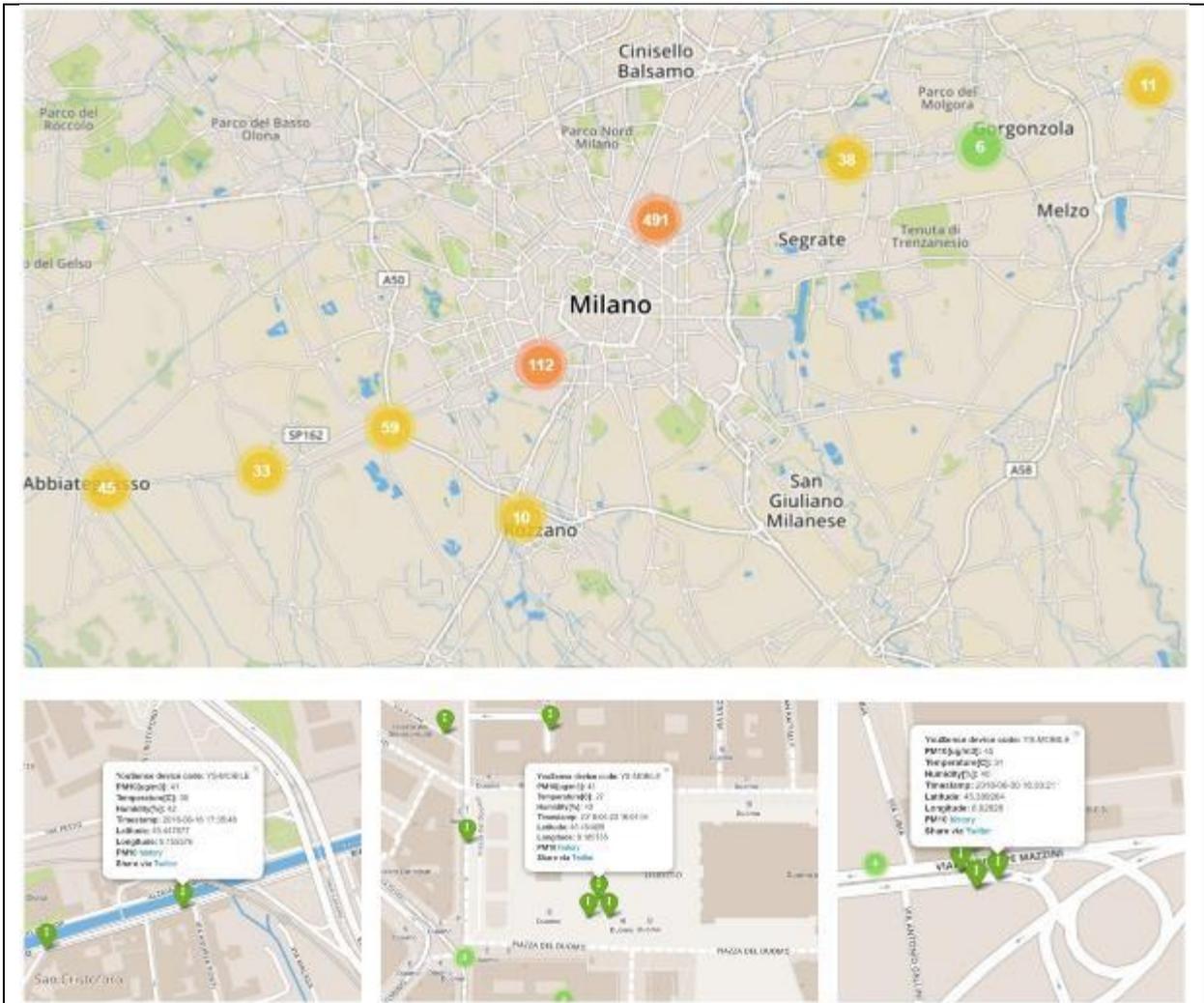


Figure 22 – Bike Milan City user community results

Air quality is moreless homogeneous in all the different zones analysed. Peaks of air pollution are found in the traffic zones. Making a comparative analysis with Naples is possible to see that between the two cities there is a considerable difference in terms of pollution till about 10 micrograms/cubic meter. Clicking the history link is possible to have a complete view of the measurement (PM10, temperature and humidity) done in the selected zone.



Figure 23 – PM10, Temperature and Humidity historical graph in Milan center

Other user communities and experiments

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Some additional experiments were made after the official testing period scheduled between May and June 2016. The last two experiments were done during July and August:

- In Europe (France, Switzerland and Ireland) by Airbnb user community
- In China (Hong Kong and Zhengzhou) by YouSense CEO

Airbnb sustainable and eco-conscious hosts and travellers

The Airbnb sustainable and eco-conscious host and traveller's community, helped the YouSense project to extend the air pollution measurement to several European cities, making additional comparative analysis.

Description of the experiment

The experiment involves a set of YouSense Mini device configured with iOS and Android smartphones and was implemented by Airbnb travellers, mainly in the cities of Paris, Dublin and Amsterdam. The experiment consists to measure the level of Particulate Matter 10 (PM10), temperature and humidity in different zones of Dublin, Paris and Geneva.



Figure 24 – Airbnb user community experiments

Numeric results of the test campaign

The test campaign has involved five people for two months (July and August). At the end of the campaign we have collected 24 measures of the air pollution, temperature and humidity, in mobility, within the zones selected. Using the YouSense map tools available on www.yousense.eu, is possible to read the results, looking to the whole graph:

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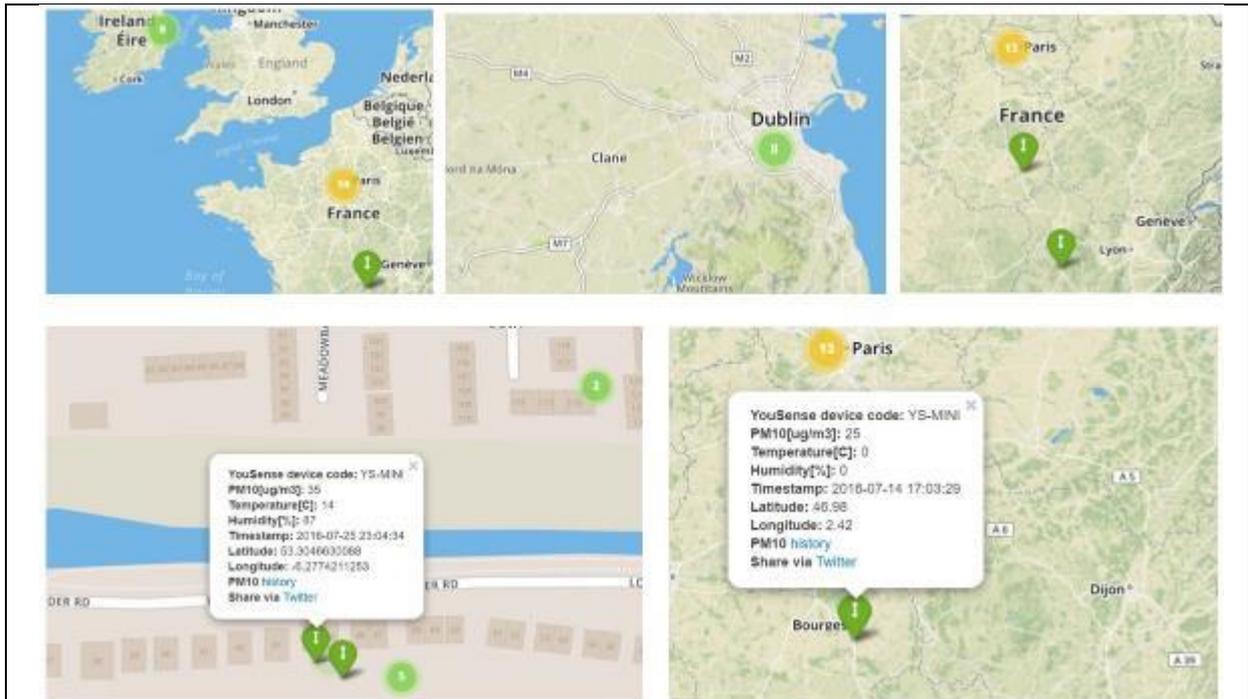


Figure 25 – Airbnb user community results

Looking to the map, air quality in Ireland is in the average of European one, both in the industrial district than in the city center. Air quality in center of the France and near Geneve is very good, with values around the 25 micrograms/cube meter. Air quality in Paris is also in the average of the European one (35 micrograms/cube meters). Next figure shows the air quality in Paris, during the experiment.



Figure 26 – Air quality diagram in Paris

Experiment on air quality in China

Air quality in China is one of the most known and difficult to solve problem of the last decades. This experiment was conceived to demonstrate the precision of the YouSense device and make a comparative analysis between data sampled in Italy and Europe.

Description of the experiment

The experiment consists in capture information about the air quality in two different locations of China:

- Hong Kong, a city near the sea where the air pollution concentration can be mediated by the wind current coming from the coast
- Zhengzhou, a city in the center of the Asian continent, without sea and more industrialized

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Figure 27 – YouSense experiments in China

The results of this analysis is firstly compared between the two city and then with the European one.

Numeric results of the test campaign

The test campaign has involved directly the YouSense CEO for one week, in the end of July. At the end of the campaign he have collected 86 measures of the air pollution, temperature and humidity, in mobility, between Hong Kong, Shenzhen and Zhengzhou. Using the YouSense map tools available on www.yousense.eu, is possible to read the results, looking to the whole graph:

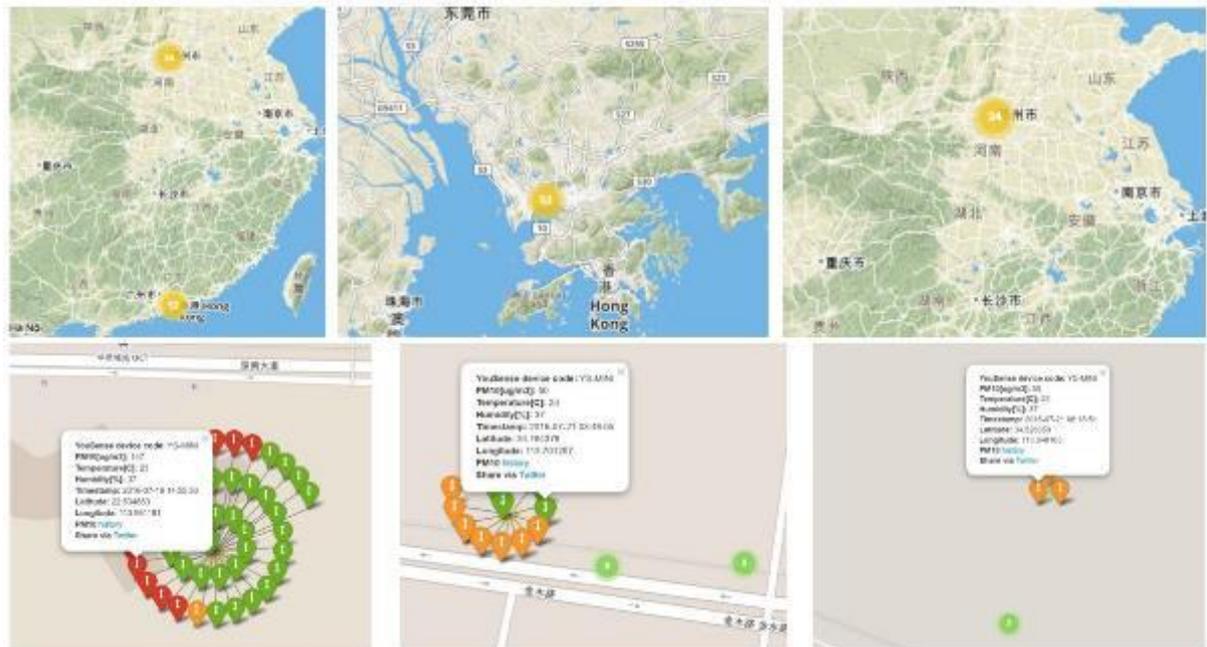


Figure 28 – YouSense experiments results

Looking to the map, air quality in China is very poor, both in Hong Kong, Shenzhen and Zhengzhou. Air quality in center of the Shenzhen is more than 50 micrograms/cube meter. Air quality in Honk Kong, in particular industrialized zones is more than 100 micrograms/cube meter. Next figure shows the air quality in Zhengzhou, during the experiment.

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Figure 29 – Air quality diagram in Zhengzhou

Summarise any problems you have encountered, and how they have been overcome

The first mass production and distribution of the YouSense devices was completed and a summary about the problems encountered during the development process was done. The main issues encountered during the implementation phase was:

- Components do not work properly
- Component mounted not correctly
- Box not appropriate
- Shipment of devices containing Lithium batteries inside and outside the Europe.



Figure 30 – Trash components

In details about the 10% of the components do not work properly. Component mounted not correctly and box not appropriate was just in the first prototyping phase, before to found the best box to adapt to the PCB. Finally, a redesign of the battery-charger subsystem was needed to solve the shipping problem in extra European countries.

Description of planned activity for next reporting period

For the future is planned the filing of the Patent related to the YouSense platform and the collaboration with similar ongoing projects.

Work Package Number: WP4

Actual Starting month:	3/2016
Predicted / Actual End month:	9/2016
Work Package Objectives:	
<p>The purpose of the WP4 can be summarized in three parts:</p> <ul style="list-style-type: none"> - Summarize the feedbacks received by the user communities involved in the YouSense project. - Present the business plan of the YouSense project and indicates all the possible routes for future exploitation. - List the enhancement of the device, and the whole YouSense platform, starting from the user's feedback and the business plan 	
Description of work this period:	
<p>Main achievements:</p> <ul style="list-style-type: none"> • The first achievement of the work period was the collection of the feedbacks coming from the four user communities involved in the project • The second achievement is the completion of a structured business plan, needed to scale up with the YouSense project for the near future • The third achievement is the collection of the user feedbacks about the evolution of the YouSense platform <p>Detailed description of work performed to reach the achievements listed above</p> <p>The work performed to reach the first achievement was to collect the feedback coming from the four user's communities involved in the project. In order to take into account the users' needs, the project planned a small user study to integrate, in a first step, the users' needs before the trial period, and in a second step, to get their feedback later in the project after the trial period. This section provides the result of the second part of the user study: the users' feedback after the trial period. This study has been performed by GOODPROJECT, a consulting company in Paris, France, specialized in supporting projects with a positive social and environmental impact.</p> <p><i>Protocol</i></p> <p>This final study was carried out within all the user communities that were involved in the project: a community of users from students from the University of Naples Federico II, a community of users from bike users in Naples, a community of users from bike users in Milan, and a community of users from the Airbnb group "Sustainable and Eco-conscious Hosts and Travelers".</p> <p>A message was sent after the trial period to the 25 persons who finally received the devices (see below for more explanations). We then received the feedback from 20 persons (2 persons informed us that they had not received the devices – due to customs problems – but they had not informed us before, and 3 persons have not filled the questionnaire).</p> <p>The tool used to prepare, collect, and analyse the questionnaire is "Google Forms". This study has been performed in August and September 2016.</p> <p><i>Communities involved / communities planned</i></p> <p>In the initial plan of the project, the communities to be involved were:</p> <ul style="list-style-type: none"> - BikeSharing Napoli (10 persons) - Airbnb group "Sustainable and Eco-conscious Hosts and Travelers" (15 persons) - Potentially International Society of Doctors for the Environment (ISDE) or to researchers with whom we have first contacts, otherwise they will be used in the Airbnb group (5 persons) 	

Finally the communities involved were:

- Bike users in Naples: 5 persons.
- Bike users in Milan: 5 persons.
- Airbnb group “Sustainable and Eco-conscious Hosts and Travelers”: 3 persons.
- Students from the University of Naples Federico II: 10 persons.

The differences from what was planned to what was done is due to the following explanations:

- In the Airbnb group, we had 15 persons, as planned, in the pre-user study. But then a new regulation from IATA entered into force 2 weeks before the sending of the devices. This new regulation forbids the postal sending of lithium batteries to a list of countries. Thus we could only send 5 devices on the 15 planned, and then 2 of them informed us that they had not received them and it was due to customs problems. The project is developing a new version of the devices with other type of batteries. As soon as we will have the possibility we will send this new version to the users who were planned to participate but who could not.

- The BikeSharing Napoli project has not received its planned funding to extend the project so they could not participate in the proposal. In order to keep the idea of mounting devices on bikes, YouSense found bike users in Naples and Milan to participate in the project

- The potential solution of ISDE and researchers could not be settled in the time frame of the project, so an alternative approach was to find students at the University of Naples Federico II.

This changes and problems have been bypassed by the project that has found alternative solutions with interesting results. All this points are a very good experience for the project in order to prepare the future steps.

Conclusion about the feedback from users

It is important to read the detailed results and analysis, and not only this conclusion, as the details are precious data for the project leaders to better understand their users' requirements.

The analysis of the entire study can bring the following conclusions and recommendations.

1. The first conclusion is an overall point that **the general feedback from the users is very positive, and that there is no important issue or weakness at this stage** of the project.
2. We also want to highlight that the project **managed to overcome the difficulties** at the beginning to send the devices to some users due to new IATA regulation forbidding sending lithium batteries by parcel, and found alternatives, which provided very good results.
3. The second conclusion is that the following **excellent feedback from the users can be already used by YouSense for communication purposes** on its website and social networks:
 - 95% say that their awareness about air pollution around them has increased with the use of the device.
 - 90% have been surprised by the results (“Transparent air is not always healthy”).
 - 95% say that the use of the device made them more interested about air pollution topics, wanting to know more about it
 - 80% have talked more about air pollution topics (with friends, colleagues, ...)
 - 100% think that such a project go further to improve the device and allow citizens to better know the quality of the air that they breath

- Very positive qualitative feedback: “Very useful for your health”, “I have been able to view the pollution data in a few seconds directly on my smartphone”, “First time I can know the air quality that I breath at the exact place where I am”, “Brilliant”, “Smart”, “Thrilling”, “Amazing”.
4. The project must **focus on providing excellent basics: measuring-reading-sharing**. Users want that the basics work perfectly.
 5. Besides the basics, YouSense should quickly **bring added value to its users by explaining the references** about air quality to understand the results, **by providing enriched information and deep analysis**, and **by linking the measurements to possible corrective actions**. These elements will make that users will use their device a lot and in the long term (not as one shot), which will bring more information to the community, and as any platform the value of YouSense is directly linked to the numbers of users. **Data privacy should be also correctly addressed** to allow users to share their measurements without fear.
 6. **Design must be a very important target** for the project. It should **involve tests with users**. Ideas of possible directions are to provide a **fashionable device with different colours/covers as an iPhone** (result of the pre-study), and to develop a **range of accessories as GoPro** (here the suggestion was to be able to fix it on a bike).
 7. **Communicate a lot to potential users**: it is very important that people exactly **know the requirements** to be able to use the device, and **what can do the device**. The project should also **give examples of possible usage** of the device, and it should **explain why knowing the air quality is an added value to live a better and healthier life**.
 8. **One major achievement of this study is that it showed that the project is not only a project about air pollution data, but that its first impact is to educate and raise awareness about air pollution**. This result opens large perspectives of deployment and of recruitment of new users. And in addition, the study has showed that **this awareness spreads beyond the users** themselves. These impacts could be a “selling point” to a lot of actors.
 9. Regarding the possible price, our analysis of the results is that the price should be between 80 USD and 140 USD: **between 70 EUR and 125 EUR**. But we let YouSense further analyse the data linked to the price questions to formulate their own target. YouSense should also take into account that the **potential users need to clearly understand the device and its action to better evaluate its price**. This is in line with the recommendation number 7 about communicating a lot.
 10. This trial phase **created already a small community of users** with a very positive attitude. The project should **work on keeping and maintaining this community** to allow building on/with it. The project should also not forget the planned users from the Airbnb community who could not receive the devices due to the new IATA regulation: it should keep the link and send them a next version of the devices.
 11. These results from the study performed by GOODPROJECT seem fully in line with the results of the qualitative questions asked by YouSense to some of its users. For a deeper understanding of all the users requirements and feedback, the reader should also take into account these elements.
 12. **This very positive feedback must not be taken as a final result**, it is just a support, and next steps will need lot of efforts and improvements. The users will expect a lot more from next versions.

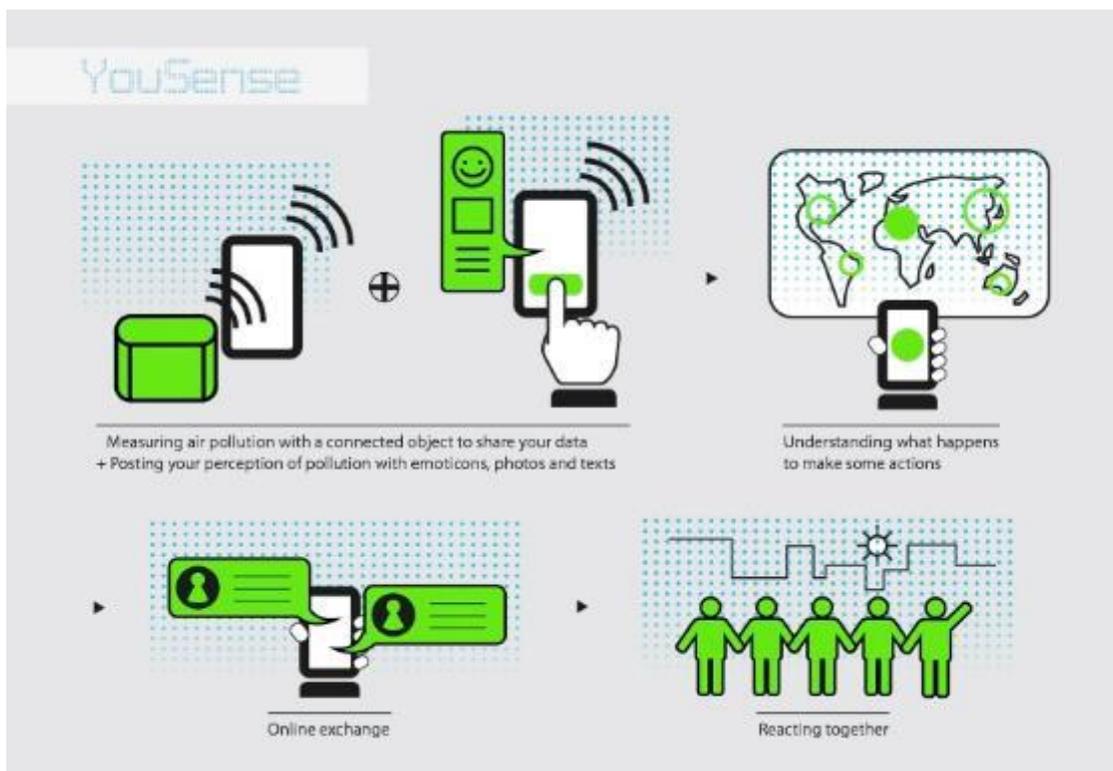
13. **Never forget that the project is from the Citizens and for the Citizens.** A lot of persons jumped in the trial phase on this basis. And some of them reminded it in the answers.

As listed above, the project can see a lot of very good results and opportunities for its next steps of development, including possible extensions to other type of sensors/pollutants as shown by the study.

The work performed to reach the second achievement was to plan the device evolution from the results of the user feedbacks and business plan. YouSense's mission is to allow citizens (i) to be better informed about the air pollution and other environmental measures having impacts on their daily life, (ii) to take informed decisions in their life, and (iii) to be empowered to start collective corrective actions.

The first step is to set up a "the smartest citizens' way of monitoring and sharing air pollution data". The next step will be to build on this first concrete platform to develop a generic sensors platform for citizens.

There are a lot of competitors and initiatives linked to air pollution monitoring, but none of them has reached yet "the winning zone". YouSense will do it because of its detailed understanding of the key factors and users' needs, of its strategy of fast development, and finally of its unique positioning between a citizens initiative and a commercial initiative with the motto "From the citizens and for the citizens".



Market Analysis

The needs

The idea of the YouSense project **comes from a group of citizens from the Italian city of Naples, where air pollution is an issue but where there is a lack of information and data on this question.** They want to have information and data in order to be aware of the situation, to take informed decisions in their daily life, and to be empowered to be able to discuss the topic and influence political decisions.

But this challenge is **also a challenge for Europe, and beyond**, targeted by the Seventh Community Environment Action Programme of 20 November 2013 (“General Union Environment Action Programme to 2020 - Living well, within the limits of our planet”). As described in this document, “the World Health Organisation estimates that environmental stressors are responsible for between 15 % and 20 % of all deaths in 53 European countries” and “According to the OECD, urban air pollution is set to become the primary environmental cause of mortality worldwide by 2050”. Moreover, they raise the issue that “A substantial proportion of the Union’s population remains exposed to levels of air pollution, including indoor air pollution, exceeding WHO recommended standards” and that “water quality and air pollution levels are still problematic in many parts of Europe, and Union citizens continue to be exposed to hazardous substances, potentially compromising their health and well-being”.

In Naples and more generally in Italy, current monitoring of air pollution is carried out by the Regional Environmental Protection Agencies - ARPA (ARPAC, for Campania, which includes Naples). If we take the example of the monitoring of particulate matter 10 (PM10) in Campania: there are only 20 stations, unfortunately with periodic breaks in service, where their data is based on gravitational monitoring of the PM10 filter with a forced fan, using a filter that has to be changed daily and analyzed. So there is no continuous monitoring, only a daily value. The data can be accessed by the citizens only by downloading a daily or weekly bulletin, but there is no easy continuous and user-friendly access to the data. Such a situation seems to be frequent in several European countries, and even in those with a higher quality of monitoring, it seems that the information is rarely easily accessible in a user-friendly system, which is a prerequisite to see the topics fully handled and discussed by European citizens.

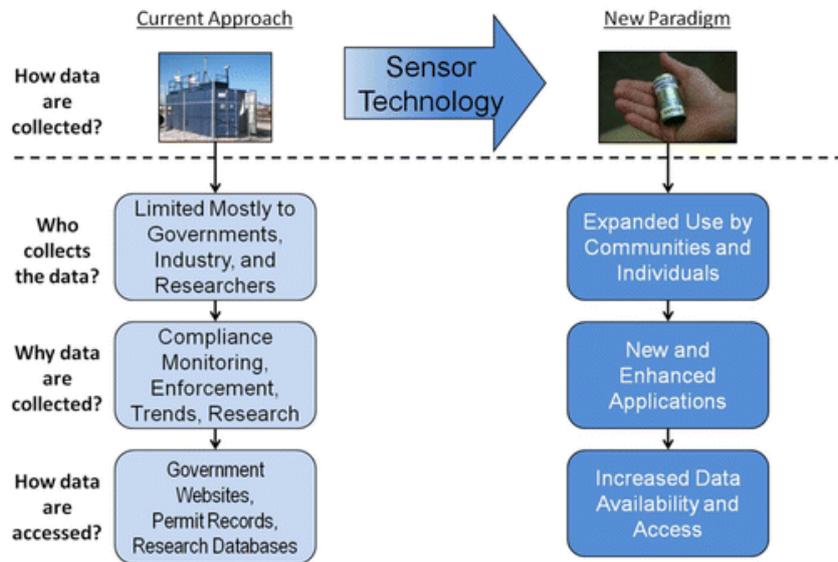
In order to meet the challenge, the targeted objective of the project is to set up a collaborative platform to share information about pollution with innovative devices at affordable prices to empower citizens for self monitoring and sharing of data. The project wants to put affordable devices for self monitoring and sharing directly into citizens' hands.

The market

The estimation hereinafter was presented by M&M. in July 2016 in the market study “Air Quality Monitoring Market by Product (Fixed Gas, Portable, Dust & Particulate Monitor, AQM Station), Pollutant (Chemical, Physical, Biological), End User (Government, Commercial & Residential, Petrochemical, Pharmaceutical) - Forecast to 2021: The **global air quality monitoring market (AQM) is estimated to reach USD 5.64 Billion by 2021**, at a CAGR of 8.5% in the forecast period. The presence of supportive government regulations for effective air pollution monitoring and control, ongoing government initiatives towards the development of environment-friendly industries, increasing public-private funding for effective air pollution monitoring, rising global levels of air pollution, and increasing public awareness related to healthcare and the environmental implications of air pollution are some key factors fueling the growth of the market. Furthermore, the high demand for air quality products in Asian countries such as China and India, technological advancements in the field of air pollution monitoring, and ongoing expansions of the petrochemical and power generation industries are offering new growth opportunities for market players. However, factors including high product costs and technical limitations associated with air quality monitoring products are hampering the market growth.

As outlined by Emily G. Snyder and al. in “**The Changing Paradigm of Air Pollution Monitoring**” (in Environ. Sci. Technol., 2013, 47 (20), pp 11369–11377), the air pollution monitoring paradigm is rapidly changing due to recent advances in (1) the development of portable, lower-cost air pollution sensors reporting data in near-real time at a high-time resolution, (2) increased computational and visualization capabilities, and (3) wireless communication/infrastructure. It is possible that these advances can support traditional air quality monitoring by supplementing ambient air monitoring and enhancing compliance monitoring. Sensors are beginning to provide individuals and communities the tools needed to understand their environmental exposures with these data individual and community-based strategies can be developed to reduce pollution exposure as well as understand linkages to

health indicators. Each of these areas as well as corresponding challenges (e.g., quality of data) and potential opportunities associated with development and implementation of air pollution sensors are discussed. The graph below is from Emily G. Snyder and al.



From our analysis we can split the Air Quality Monitoring market in the following segments. We present also the segments that should target YouSense.

N°	Segment	YouSense
1	citizens who want to know the air quality that they breath.	Main segment for YouSense
2	Public sector who want to know more about air quality and to communicate about it and to involve the citizens.	Segment for YouSense
3	Compagnies who want to monitor the air quality in their offices and to involve their personnel.	Segment for YouSense
4	Companies who want to provide building/office with air quality monitoring (real estate, office rentals).	May want high quality standard and industrial brands
5	Public authorities who want to control the air quality for health and regulations purposes.	Very high quality of the measurement
6	Polluting industries having to monitor the impact of their activities on the basis of regulations.	Very high quality of the measurement and brands

The competitors

We analyse here the competitors in the main market segment targeted by YouSense: the citizens. For the other two segments, there are also industry brands who provide high quality sensors but they are not linked to the citizens, where the clients for these two segment want also a link with citizens or at least with their personnel, so we do not present them here.

The project's digital social innovation exists in the context of the current strong development of "smart cities" and sensor networks, and of the emergence of a lot of initiatives in the domain of the air pollution topic.

D3.8 Report on Call 3 projects

In addition to the Market Analysis, the Deliverables D4.1-D4-2-D4.3 reports all the detailed information about the YouSense business plan. In details it reports the following confidential sections:

- Description of the company
- Organization & Management
- Marketing & Sales
- Description of Products and Services
- Funding
- Finance

The synthesis of the YouSense Business Plan, shows the following results and the next step for the project:

- Already communicate about the very good results of the feedback from the users during the prototype trial phase.
- Create the start-up YouSense about air pollution monitoring and sharing, and beyond.
- Start a crowdfunding campaign to develop the next version of the devices and DIY kits.
- Apply for public funding to help start the company.
- Raise love money and business angels.
- Sales to clients for year 1 – target 200 k€.

YouSense's mission is to allow citizens (i) to be better informed about the air pollution and other environmental measures having impacts on their daily life, (ii) to take informed decisions in their life, and (iii) to be empowered to start collective corrective actions.

The first step is to set up a "the smartest citizens' way of monitoring and sharing air pollution data". The next step will be to build on this first concrete platform to develop a generic sensors platform for citizens.

The business of YouSense is made of four elements:

1. Provide affordable sensor devices to allow self-monitoring by the citizens.
2. Enrich the data to deliver meaningful information to have an impact on citizens' daily life.
3. Develop tools to share the information and start collective actions.
4. Educate and raise awareness about air pollution and other type of pollution.

The targeted segments of users are: citizens, companies, and public actors.

The first products and services will be about Air pollution monitoring and sharing with Particulate Matter 10 sensors (fixed, mobile, and mini) and then in year 2 the AirCapsule extension to measure other air pollutants. Then YouSense will evolve towards a generic sensor platforms for citizens. In Year 4, YouSense will launch the WaterCapsule extension. In year 5, YouSense will launch the Fire&LandCapsule extension.

The planned turnover is:

- Year 1: 206 k€
- Year 2: 688k€
- Year 3: 2062 k€

- Year 4: 4544 k€

- Year 5: 12370 k€

The organization of the company will be based on teams based on the priorities to be developed first with the available budget:

- First year of the project: Management & Administrative, and Devices & DIY.
- Second year of the project: adding the new team of R&D.
- Third year of the project: adding the Services team and Sales team.
- Fourth year of the project: adding the new team of Rental.

The work performed to reach the third achievement was to collect the user feedbacks about the future evolution of the YouSense platform. For each user community we have listed the feedback, focusing on three main metrics: usability performance and evolution of the YouSense device.

Feedback from Student's user community

At the end of the test campaign, a set of standard questions were made to the citizens, especially on the YouSense Mini device, the app and the interaction with the web portal. We have resumed the most critical in the area of Usability, Performance and Expected improvements.

a) Usability of the YouSense

YouSense Mini device features a clear and simple way-of-use. The device is turned on by a small switch placed on its side, easily reachable while holding it in hand. Also, the mobile application that comes with the device shows lots of detailed information about how to connect and see pollution measures. The last version of the sensor also comes with a small connector that enables the sensor to be charged with the most common usb-cable available. YouSense app and portal comes with a very intuitive interface, easy to use.

b) Performance of the YouSense Mini

YouSense Mini sensor is accurate, reactive and achieves great performance; after turning it on, it takes just few seconds to configure the mobile application and be ready to receive, measure and share pollution data. Also, that information is highly accurate, as pollution values don't fluctuate between variable values but they keep stable as the measure goes on. Clicking the share button of the app, is possible to immediately put on the geolocalized map of the YouSense portal the data measured. The device is powered with a long life rechargeable battery.

c) Expected improvements YouSense Mini

Some improvements could be made regarding the aesthetic aspect of the sensor, maybe using different shapes or colors for the sensor box that covers some of the electronic components. Also, improvements may regard some 'protection' for the sensor if one would, for example, decide to leave the sensor on the outside of the house (gardens, windows, etc.) and still be able to take some measures. Finally, a miniaturized version of the device (e.g. dress-ble) could expand the range of users.

Feedback from Napoli Bike's user community

At the end of the test campaign, a set of standard questions were made to the bikers, especially on the YouSense Mobile device. We have resumed the most critical in the area of Usability, Performance and expected improvements.

a) Usability of the YouSense

YouSense Mobile device features a simple way-of-use. The device can be attached to the bike basket and then turned on by a small switch placed on its side. However, at the moment there are no opportunity to fix it on bikes without basket. Also a control from the bike handle bar can be considered a plus. The sensor comes with a small connector that enables the sensor to be charged with the most common usb-cable available. YouSense app and portal comes with a very intuitive interface, easy to use.

b) Performance of the YouSense

YouSense Mobile sensor is accurate, but is not possible to have a realtime feedback from the device itself. To look at the data sampled, is needed to reach the web site. The device is powered with a rechargeable battery with a limited duration (no more than 2 hours). The YouSense Mobile device needs a SIM card (like to a telephone with internet enabled) to connect it to the GPRS and GPS network. This can be too expensive to mount on a bike.

c) Expected improvements of the YouSense

Some improvements could be made regarding the technical, mechanic and aesthetic aspect of the sensor. From a technical point of view, a little display with the values of the measures is required. A powerful rechargeable battery and an alternative way to connect to the network can be a plus. From mechanical point of view a way to fix the device to the bike is a must. Also the use of a solar panel and the control of it via the bike handle bar is desired.

Feedback from Milano Bike's user community

At the end of the test campaign, a set of standard questions were made to the Milan bikers, specially on the YouSense Mobile device. We have resumed the most critical in the area of Usability, Performance and expected improvements.

a) Usability of the YouSense

YouSense Mobile device features a simple way-of-use. The device is difficult to assemble or attach outside/or on top of the bike, also because any support needs to be homologated. The device lacks also of a realtime control/display. The sensor comes with a small connector that enables the sensor to be charged with the most common usb-cable available. YouSense app and portal comes with a very intuitive interface, easy to use.

b) Performance of the YouSense

YouSense Mobile sensor is accurate, but is not possible to have a realtime feedback from the device itself. To look at the data sampled, is needed to reach the web site. The device is powered with a rechargeable battery with a limited duration (no more than 2 hours). The YouSense Mobile device needs a SIM card (like to a telephone with internet enabled) to connect it to the GPRS and GPS network. This can be too expensive to mount on a car.

c) Improvements of the YouSense

Some improvements could be made regarding the technical, mechanic and aesthetic aspect of the sensor. From a technical point of view, a little display with the values of the measures is required. A powerful rechargeable battery and an alternative way to connect to the network can be a plus. From mechanical point of view, a way to fix the device to bike (i.e. homologated brackets) is a must. Also the use of a solar panel and the control of it via the bike console is desired. The use of a different box to prevent severe weather is desired.

Summarise any problems you have encountered, and how they have been overcome

No problem encountered

Description of planned activity for next reporting period

For the future is planned to proceed with the indications of the business plan, included the crowdfunding, the filing of the Patent related to the YouSense platform and the collaboration with similar ongoing projects.

Project Management And Dissemination

Summarise any management concerns and activities to recover the situation.

During the execution of the second phase of the YouSense project, within the CHEST program, no management concerns are raised. So there was no corrective actions.

Detail any publications, publicity or other dissemination activity.

In the second phase of the project several publicity initiatives was performed, in order to propose the YouSense platform in different additional contexts:

Smartcity context, in order to measure the level of air pollution under civil galleries (and measure the level of pollutant produced by cars and autobus):

- Meetings with Bike Napoli City, to propose the integration of the YouSense mobile device on top of the bike;
- Meetings with Milano Napoli City, to propose similarly the integration of the YouSense mobile device on top of the bike;
- Meeting with Piernicola Pedicini staff (European Parliament) for integration of the YouSense within the Punto Zero project

Railway context, in order to measure the level of air pollution under the railway galleries, during the operation and maintenance activities

- Participation in Professional Mobile Radio Expo: B2B meeting with Acksys company for the integration of the YouSense device in rail tunnels;

The same approach was followed till the end of the project in order to cover also the following areas:

- **Airport** context, in order to measure the level of pollution in the airports, near the starting and landing runways
- **Naval** port context, in order to measure the impact of the ships on the air pollution, specially when the port is very close to the cities (e.g. Naples)

Activities performed during the duration of the project:

- Meeting on January 2016, for possible cooperation done with MagentaLab people, winner of the second CHEST call;
- Participation to the Mobile World Congress (Barcelona, 22-25/2/2016) for B2B activities, dissemination and technology scouting;
- Participation to the CEBIT (Hannover, 14-17/3/2016) for B2B activities, dissemination and technology scouting;
- Participation to FuturNet in Bruxells on April, and presentation to the CAPS and CHEST project committee the YouSense project. Meet the Prof. Jorge Garcia Vidal from Universitat Politècnica de Catalunya. Verbal agreement on possible cooperation during the next months; Meet the FIWARE project people for a possible cooperation based on future open

calls.

- Participation to the CAPS meeting and workshop in Berlin. Meet the HackAir project people (Christodoulos Keratidis – from Draxis). Verbal agreement on possible cooperation during after the end of the CHEST project;
- Publication of the paper describing YouSense within the conference: First ECSA Conference 2016 – Citizen Science – Innovation in Open Science, Society and Policy (Citizen engagement and collective intelligence for participatory Digital Social Innovation);
- Scheduled the first filing of the patent describing the YouSense solution. The first filing is intended in Italy, in order to limit the costs and receive the research report prepared by the European Patent Office (on behalf of the Italian Patent Office).

24.3.4 Sustainability of the solution

One achievement of the CHEST funding period is the delivery of a Business Plan, which presents the next step for the project:

- Already communicate about the very good results of the feedback from the users during the prototype trial phase.
- Create the start-up YouSense about air pollution monitoring and sharing, and beyond.
- Start a crowdfunding campaign to develop the next version of the devices and DIY kits.
- Apply for public funding to help start the company.
- Raise love money and business angels.
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The first step is to set up a “the smartest citizens' way of monitoring and sharing air pollution data”. The next step will be to build on this first concrete platform to develop a generic sensors platform for citizens. The business of YouSense is made of four elements:

1. Provide affordable sensor devices to allow self-monitoring by the citizens.
2. Enrich the data to deliver meaningful information to have an impact on citizens’ daily life.
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4. Educate and raise awareness about air pollution and other type of pollution.

The targeted segments of users are: citizens, companies, and public actors. The first products and services will be about Air pollution monitoring and sharing with Particulate Matter 10 sensors (fixed, mobile, and mini) and then in year 2 the AirCapsule extension to measure other air pollutants. Then YouSense will evolve towards a generic sensor platforms for citizens. In Year 4, YouSense will launch the WaterCapsule extension. In year 5, YouSense will launch the Fire&LandCapsule extension.

The planned turnover is:

- Year 1: 206 k€
- Year 2: 688k€
- Year 3: 2062 k€
- Year 4: 4544 k€
- Year 5: 12370 k€

D3.8 Report on Call 3 projects

The organization of the company will be based on teams based on the priorities to be developed first with the available budget:

- First year of the project: Management & Administrative, and Devices & DIY.
- Second year of the project: adding the new team of R&D.
- Third year of the project: adding the Services team and Sales team.
- Fourth year of the project: adding the new team of Rental.

24.3.5 Risks

Risks are organized per workpackage in the following table:

WP	RISK	GRADE	IMPACT	MITIGATION
WP1 Analysis of the detailed requirements	Electronic components not available to cover the desired function	Medium	High	This risk is very high specially for the implementation of the GPRS/GPS version of the device. For this reason, different platforms and solutions were analyzed to cover this potential problem. At least two possible solutions have been identified.
	Platform (device, web portal and App) does not meet the requirements	Low	High	Hardware, firmware and software architecture are still validated during the first phase of the project. The demonstrator is still running and validates the complete set of requirements listed in the WP1 deliverable.
WP2 Technical improvement	Device do not work as expected	Low	Medium	Experienced Electronic Engineer has designed a reliable device, tested with three versions of the prototype in different conditions.
	System doesn't deliver correct values of PM10	Medium	Medium	During the technical improvement phase, an alternative strategy using algorithm-based solution was identified. Instruments are used to calibrate sensors, also with comparative analysis. A Printed Circuit Board is designed within the project to avoid errors during the mass production phase.
	Platform is difficult to use	Medium	Low	A detailed analysis of the state of the art and improvements needed was done to introduce an easy process to measure and share the values of the air pollution. The process is inspired to the most known social networks (Twitter and Facebook).
	Difficulty to geolocalize information	Medium	Medium	The project could also encounter problems linked to areas which would not be covered by GSM, so we could experience lost data or GPS information: the solution would be to limit the usage to zones well covered by GSM.
WP3: Test and trials	Test problems	Medium	Medium	Technical risks should have been solved in WP2. In the event of problems occurring at the test stage, we could go back to the improvement/development phase.
	Low participation in the user tests	Low	Medium	Low participation in the user tests is a potential risk, but we are confident that the 2 communities are very interested as shown in the first discussions.

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WP4 Preparation of future steps	Negative feedback from users and/or a need to find different alternatives.	Medium	Medium	Alternative solutions will be set out in the device evolution plan, taking in account of all the failure points. A detailed analysis including the alignment to the requirements, the results of the tests and the possible enhancements is needed to have an overall picture.
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At the end of the project is possible to conclude that there were no problems related to the risks described in the table. However, because of new IATA normative UN3481-PI966 about Lithium battery shipping, they were found trouble sending devices outside of Europe, which have affected the sending of all devices to the AirBnB community. This problem was later resolved through a rapid re-engineering of the device power supply module and battery replacement Lithium with a traditional one.

24.3.6 User-based evaluation of the concept

The project is based on a bottom-up approach, which takes the user at the centre of the project.

We started the project by a small user study in December and 2015 and January 2016 to understand the needs of the users (15 potential users from the community Airbnb group “Sustainable and Eco-conscious Hosts and Travelers”).

This study brought results that could be expected, but also results that are surprising (examples: the required size of the device is not the smallest possible as we thought, as if people understand that the smallest possible size can be a problem for measure accuracy; same surprising result for device color and weight; 50% of the participants say that they have a good awareness about the air quality around them, where we thought that a lot of participants would declare a lack of information).

Moreover the study gathered a lot of data about users’ requirements and expectations, which are precious information for the project. All these results should give very important information for the next development of the projects. All these results are presented in full details in D1.1 – Analysis of detailed requirements.

We carried out a second user study about their feedback after the trial period, in August and September 2016.

The study was carried out involving four different user communities: Students of University of Naples Federico II, Bike Napoli City users, Bike Milan City users and finally the Airbnb group “Sustainable and Eco-conscious Hosts and Travelers” (target group: citizens). The tool used to prepare, collect, and analyse the questionnaire is “Google Forms”. The total number of persons having answered the questionnaire is 25 persons.

The main elements of this study are very positive:

- 95% say that their awareness about air pollution around them has increased with the use of the device.
- 90% have been surprised by the results (“Transparent air is not always healthy”).
- 95% say that the use of the device made them more interested about air pollution topics, wanting to know more about it
- 80% have talked more about air pollution topics (with friends, colleagues, ...)
- 100% think that such a project go further to improve the device and allow citizens to better know the quality of the air that they breath
- Very positive qualitative feedback: “Very useful for your health”, “I have been able to view the pollution data in a few seconds directly on my smartphone”, “First time I can know the air quality that I breath at the exact place where I am”, “Brilliant”, “Smart”, “Thrilling”, “Amazing”.

More details about this study are presented in the section WP3 and WP4 of this report. And this study is presented in full details in D3.1 and D4.1.

D3.8 Report on Call 3 projects

This trial phase created already a small community of users with a very positive attitude. The project should work on keeping and maintaining this community to allow building on/with it. The project should also not forget the planned users from the Airbnb community who could not receive the devices due to the new IATA regulation: it should keep the link and send them a next version of the devices.

24.4 Main results

The main results of the project with regard to progress, achievements and dissemination are summarized in Table 46.

Table 46: Snapshot of project "YouSense"

Main project goal	Project progress and main achievements	Highlights of dissemination activities
A social and collaborative innovation, to allow citizens to monitor air pollution (starting with PM10) and to share this data, based on digital technologies – portal, app and connected devices – with open source developments.	<p>The project has accomplished its main goals and milestones:</p> <ul style="list-style-type: none"> ○ Collection, analysis and formalizing of the YouSense platform's technical requirements. ○ Implementation of a user study collecting additional requirements. ○ Development of 3 versions of the hardware prototype and 3 versions of the firmware prototype. ○ Development of 2 prototypes of smartphone apps (for Apple and Android OS). ○ Implementation of the YouSense web portal. ○ Testing of the hardware and software of the YouSense platform. ○ Implementation of a network of 30 devices, between 4 user communities, to test air quality. ○ Collection of feedback to facilitate the evolution of YouSense. <p>The project successfully delivered 6 internal deliverables and 3 CHEST reports (Social Impact Plan, Interim Report, Final Report), all approved.</p>	<ul style="list-style-type: none"> ○ Dedicated project website: http://www.yousense.eu/ ○ Meetings for integration of the YouSense device in Naples. ○ Participation in Professional Mobile Radio Expo, Mobile World Congress and CEBIT, including B2B meetings. ○ Participation at NetFutures, including presentation at CHEST workshop (held in the CAPS Concertation Meeting) – potential collaborations discussed. ○ Participation at CAPS workshop (Berlin), including meeting with the HackAir project. ○ Publication of a paper for the ECSA Conference. ○ YouSense social media accounts: Twitter and Facebook. ○ News article on the CHEST website: http://www.chest-project.eu/yousense-smart-monitoring-and-sharing-of-air-pollution-data/ ○ 110 interactions in the project's section on the CHEST Community Forum.

Table 47 shows the results achieved for the mandatory indicators common for all projects. Further details on the social impact and their project-specific Key Performance Indicators in their primary (impact on community building and empowerment) and secondary (impact on civic and political participation) impact area are provided in D2.3 (Monitoring and Impact Analysis).

Table 47: Mandatory KPIs for YouSense

Dimensions	Indicators	Variables	Baseline value	Target value	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	0	2	4
		Number of users involved in co-design process	0	30	28

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		Ratio between men and women involved	-	50%	40%
		Ratio between young, adult and old people involved	-	50%	40%
ACCESS TO INFORMATION	Project self-evaluation of its capability to influence information asymmetries	Project self-evaluation of its capability to influence information asymmetries (e.g. access to sources of information that represent a range of political and social viewpoints, access to media outlets or websites that express independent, balanced views, etc.)	2	4	4 aAmudoinegn cteh e sphuabrliinc,g D oant a sSociceianlt imfice dia, spiatep er, Web development
	Number of tools/activities developed by the project for influencing information asymmetries	Number of tools/activities developed by the project for influencing information asymmetries	0	5	5
KNOWLEDGE SHARING	Sharing through CHEST website	Number of entries in project blog on CHEST website	0	6	0
		Number of comments / replies on project blog entries on CHEST website	0	10	0
	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	0	50	0
		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	0	100	0

25 Summary

This report has demonstrated that the beneficiary projects of CHEST Call 3 have succeeded in achieving their goals by the tremendous work they have carried out. Based on the reporting scheme specifically developed by CHEST, which adapted lightweight and standardized reporting methodologies, this deliverable has shown the various achievements reached by the projects in a structured way.

For each of the 23 initiatives we have shown their individual organizational structure ranging from innovative and determined individuals and start-ups/SMEs to non-profit organisations, NGOs, universities and research organisations as well as social entrepreneurs. This highlights the success of CHEST in reaching out to a broad and diverse community of social innovators throughout Europe – the CHEST Call 3 beneficiaries alone already represent 9 different countries as Table 48 shows.

Table 48: Country and Entity Type of CHEST Call 3 Beneficiaries

Project Title	Country
3D-Immersion Platform with Low-literacy course	Netherlands
Active Citizen	Iceland
AdviSex	Italy
Hybrid Letter Box - Bridging the analog/digital gap	Germany
Jourvie - an app for the eating disorder therapy	Germany
Kidslox: setting boundaries in the age of the iPad	UK
Medhance	Spain
MoreLife Online - Tackling Global Obesity	UK
MountainWatch	Italy
Open language learning platform on Serlo	Germany
PAYEZE - mobile payment solution	UK
Personal health record for self-management elderly	Netherlands
Provenance Coin: Open supply chains on Blockchains	Italy
ReadRunner - A Playful Reading Platform for Dyslexics	Italy
SchulePLUS Mobile Application	Germany
SHOP&DROP- love to shop, care to drop	Netherlands
SourceIT-Mapping Resources to Increase Recycling	Ireland
Tender-IT	Netherlands
Transformap - mapping social innovation	Austria
User Centric Energy Management for Social Housing	UK
W4P - Crowdsourcing local social innovation	Belgium
Yubu – Belnvolved – Serious Gaming for Study and Career Orientation	Netherlands
YouSense - Citizens for monitoring/sharing air pollution data	Italy

One central goal and achievement of CHEST has also been the involvement of grassroots initiatives, non-profits and small-scale start-ups and social enterprises, a target group that is normally underrepresented in European funding schemes. Not so in CHEST, where the vast majority of beneficiaries belong to this group as Figure 30: Organisation types of Call 3 beneficiaries. Figure 30 shows (even more remarkable is the fact that 2 of the successful applicants started their application to CHEST as individuals and founded SMEs in the course of the CHEST funding).

D3.8 Report on Call 3 projects

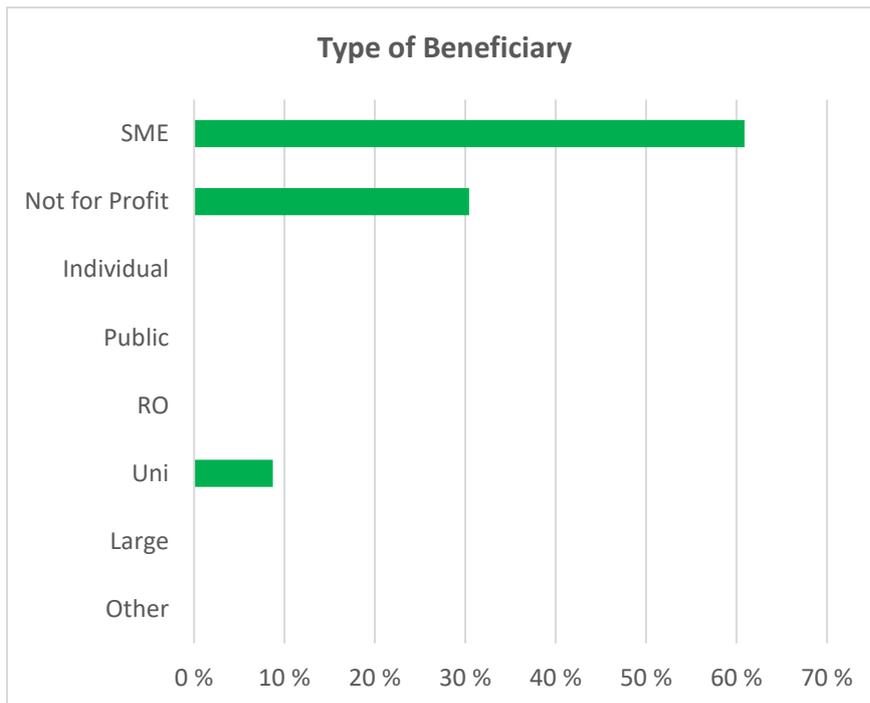


Figure 30: Organisation types of Call 3 beneficiaries

The previous chapters have demonstrated the various achievements of the 23 beneficiaries of CHEST call 3. For each initiative, the societal challenge addressed has been described in detail along with the solution approach pursued in order to overcome it. Each project has laid down in detail the efforts undertaken by them in the course of the CHEST funding scheme as well as the results achieved. The latter being even more impressive considering the fact that the 23 beneficiaries were in a prototype stage or at the initial stage introduction of a solution only.

Furthermore, the project reports have also shown that all Call 3 beneficiaries have achieved their respective goals including the successful and extensive involvement of their end-users in the early stages of their concept design and prototype development, resulting in truly co-designed solutions. The strong focus on end-user involvement for all CHEST beneficiaries right from the start ensured the high number of users that have been reached and involved in the co-design activities: 31.047 users from 86 different target groups involved in the development process of the 23 prototype projects of Call 3 as summarized in Table 49. The projects have also been successful in implementing tools and activities to address information asymmetries (86) and in sharing their knowledge through social media channels (34.277 followers and 4.934 communications combined). The impacts resulting from the projects' outputs and outcomes are described in more detail in D2.3.

Table 49: Selected mandatory KPIs of CHEST Call 3 beneficiaries

Dimensions	Indicators	Variables	Measured value
COMMUNITY BUILDING	User involvement in prototype evaluation / test usage	Number of target groups involved in co-design process	79
		Number of users involved in co-design process	31.047
ACCESS TO INFORMATION	Number of tools/activities developed by the projects for influencing information asymmetries	Number of tools/activities developed by the projects for influencing information asymmetries	86
KNOWLEDGE SHARING	Sharing through social media channels	Quantified measure of followers on selected social media channels (e. g. twitter followers, facebook friends, etc.)	34.277

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		Quantified measure of communications on selected social media channels (e. g. number of project tweets and re-tweets, etc.)	4.934
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Consequently, putting CHEST into perspective by comparing its results to those of other CAPS projects by applying the IA4SI self-assessment toolkit (with the assessment process overseen by the IA4SI team), the manifold achievements of CHEST and its beneficiaries, suggest that CHEST is one of the projects with the best social impact results within the CAPS program. Overall, CHEST scored well above the average of all CAPS projects participating in the IA4SI evaluation with a total of 683 points (CAPS average: 470) the same being true for many of the dimensions assessed in IA4SI, for example the impact on community building and empowerment as one of the areas most projects chose as their primary or secondary impact area (for further details, please refer to D2.3 Monitoring and Impact Analysis).



Figure 31: CHEST overall IA4SI impact rating

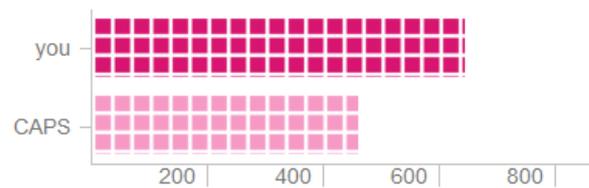


Figure 32: CHEST impact on community building and empowerment compared to CAPS average

D3.8 Report on Call 3 projects

These highly successful outcomes are even more remarkable given the fact that for the beneficiary projects of CHEST call 3, the delays related to the administrative changes and obstacles caused by the European Commission have made the projects' development additionally difficult. Due to the very nature of CHEST, call 3 beneficiaries being small organisations, grassroots initiatives and SMEs, they were not able to continue their work before the administrative process of their integration and payment was completed. Consequently, most of the projects had to delay parts of their work or even pause the project implementation completely. Therefore, most internal milestones and deliverables could not be completed as they had been planned when the projects started their work under the CHEST funding. Staying abreast of these administrative changes, the CHEST consortium allowed each project to individually re-schedule their implementation process with the constraint that the work planned in the applications had to be carried out by the end of CHEST in M36 and that each project had to deliver their final report in the same month. This shows that the CHEST scheme to monitor the beneficiaries' progress and Social Impact was suitable and effective.

