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## **DELIVERABLE**

### *D4.8 – Pilots’ RoI and SROi analysis*

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**Project Acronym: UNCAP**

**Grant Agreement number: 643555**

**Project Title: Ubiquitous iNteroperable Care for Ageing People**

**Revision: 1.1**

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<b>Project co-funded by the the Horizon 2020 Framework Programme of the European Union</b>		
<b>Dissemination Level</b>		
P	Public	<b>X</b>
C	Confidential, only for members of the consortium and the Commission Services	

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## 1. Revision history and statement of originality

### 1.1. Revision history

Rev	Date	Author	Organization	Description
0.1	30.10.2017	M. Guadalupe Rodríguez	Atos	ToC
0.2	20.11.2017	M. Guadalupe Rodríguez	Atos	Section 8: Methodology SROI
0.3	04.12.2017	M. Guadalupe Rodríguez /Axel Steinhage	ATOS/FUTURE	SROI Höhenkirchen pilot
0.4	07.12.2017	M. Guadalupe Rodriguez/ Urban Sedlar/ Polona Lah; Mojca Volk	ATOS/UL/VOG	SROI Maribor pilots
0.5	12.12.2017	M. Guadalupe Rodriguez	ATOS	SROI Rumanian pilots
0.6	14.12.2017	M. Guadalupe Rodríguez	ATOS	SROI Italian pilots
0.7	18.12.2017	M. Guadalupe Rodríguez	ATOS	SROI Greek pilots
0.8	21.12.2017	M. Guadalupe Rodríguez	ATOS	SROI Skopje pilot
0.85	22.12.2017	M. Guadalupe Rodríguez	ATOS	Conclusions
0.9	27.12.2017	Andrea Rossi	ATOS	Revision and English Edition
1	30.12.2017	Giuseppe Conti	TRILOGIS	Final version of document
1.1	31.12.2017	Irene Facchin	TRILOGIS	Quality check

### 1.2. Statement of originality

*This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.*

## 2. List of references

Number	Full Reference
[1]	<i>D1.1 – Uses cases description, system requirements and PIA/TRVA</i>
[2]	<i>D1.2 – Regulatory constraints</i>
[3]	<i>D1.4 – Pilots deployment and test plan</i>
[4]	<i>D3.12 – Bi-monthly Pilot Progress Report V12</i>
[5]	<i>D4.1 - Analysis of improved efficiency within the health and care systems – First Version</i>
[6]	<i>D4.2 – Analysis of improved efficiency within the health and care systems – Final version</i>
[7]	<i>D4.3 – Analysis of improved quality of life of involved users and carers – First Version</i>
[8]	<i>D4.4 – Analysis of improved quality of life of involved users and carers – Final version</i>
[9]	<i>D4.5 – Analysis of impact on business and financing models</i>
[10]	<i>D5.3 – Business plan – First version</i>
[11]	<i>The SROI Network (2012): A guide to Social Return of Investment (SROI). The Cabinet Office. UK.</i> <a href="http://www.Socialvalueuk.org/app/uploads/2016/03/The%20Guide%20to%20Social%20Return%20on%20Investment%202015.pdf">http://www.Socialvalueuk.org/app/uploads/2016/03/The%20Guide%20to%20Social%20Return%20on%20Investment%202015.pdf</a>
[12]	<i>A report From the Good Ship SROI (2017), Cynthia Gair, REDF</i> <a href="https://www.researchgate.net/publication/265568763_A_Report_From_the_Good_Ship_SROI">https://www.researchgate.net/publication/265568763_A_Report_From_the_Good_Ship_SROI</a>
[13]	<i>Violeta ISAI, Riana Iren RADU. "The Cost of Medical Services per Patient and the Efficiency of Hospital Care Activity – an Insight from the Romanian Hospitals" Annals of "Dunarea de Jos" University of Galati Fascicle I. Economics and Applied Informatics Years XXII – no2/2016</i> Available in: <a href="https://www.arthra.uqal.ro/bitstream/handle/123456789/4290/uqal_f1_2016_nr2_Isai_Radu.pdf?sequence=1&amp;isAllowed=y">https://www.arthra.uqal.ro/bitstream/handle/123456789/4290/uqal_f1_2016_nr2_Isai_Radu.pdf?sequence=1&amp;isAllowed=y</a>

### 3. Table of Acronyms

<b>Acronym</b>	<b>Description</b>
<b>ADL</b>	<i>Activities of Daily Living</i>
<b>AOK</b>	Allgemeine Ortskrankenkasse
<b>CPS</b>	Cognitive Performance Scale
<b>DRS</b>	Depression rate scale
<b>EHR</b>	Electronic Health Record
<b>FCG</b>	Formal Caregivers
<b>HiT</b>	<i>Health Systems in Transition</i>
<b>IADLC</b>	<i>Instrumental Activities of Daily Living Capacity</i>
<b>ICG</b>	Informal Caregiver
<b>NIPH</b>	National Institute of Public Health
<b>PE</b>	<i>End users</i>
<b>QoL</b>	<i>Quality of Life</i>
<b>REDF</b>	<i>The Roberts Enterprise Development</i>
<b>ROI</b>	<i>Return of Investment</i>
<b>SROI</b>	<i>Social Return of Investment</i>
<b>ULSS</b>	<i>Azienda Unita Locale Socio Sanitaria n° 5 Ovest Vicentino</i>
<b>WHO</b>	World Health Organization



## 4. Executive Abstract

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UNCAP project aims to deliver a suite of innovative ready-to-be-marketed ICT products and services, based on consumer-grade technologies, designed to help elderly people with cognitive impairments live a more independent life.

The general objectives of the UNCAP Project are:

- Improve health care process' efficiency through better evaluation processes during the hospital and home care recovery phase;
- Improve treatment and prevention at home as a mean to delay the cognitive impairment of elderly people and possibly to postpone the need of recovery in hospitals or hospices;
- To support a more independent life of elderly people and improve the quality of life & dignity of those ones with cognitive problems by help them in being more independent and for more time.

This deliverable focuses on making visible those Social, labour and economic benefits that the UNCAP Project delivers.

When talking about economic benefits related to services offered to dependent people, it is common to use the wording "Social spending" that implies the fact theses expenses or spending has no economical return for the Society but it can be justified as Solidarity or charity as a mean to reach Social cohesion and inclusiveness. There is a growing consensus in considering this protection system of the dependent people as an investment that is profitable not only in Social terms but as well as in economic & terms. For this reason, in this deliverable, it is fair to use and study the Social Return on Investment (SROI) as mean to measure and evaluate all the pilots involved in the UNCAP Project.

The methodology used to calculate the SROI resembles the one used in the financial management, known as ROI. Nevertheless, the SROI tries to present a different, more comprehensive vision of the return of the resources invested by assigning monetary values to Social outputs and results that normally are not considered in standard measurement of welfare as they do not have recognizable monetary market value.



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## 8. The Methodology SROI

The SROI methodology was created at the end of the decade of 1990 being documented for the first time in the year 2000 by REDF<sup>1</sup> (The Roberts Enterprise Development), a philanthropic Foundation of San Francisco, to calculate the benefits to Society of the Social programs and companies oriented to the creation of employment for people with special difficulties.

Nowadays it is a standardized method used mostly in the Anglo-Saxon countries to calculate the return of Social programs and used as a methodological reference through the SROI International Network [11].

The SROI methodology is inspired in the calculation of the ROI in financial management but while ROI (Return of Investment) is the only ratio for the measurement of the profitability of investments, the SROI analysis seeks to present a more complete view of the return of resources invested by assigning monetary values to the results of an organization, project or initiative that normally are excluded from this type of assessment for lack of Market Value.

Therefore, the SROI coefficient is a comparison between the value generated by a given project or initiative and the investment done to reach the goal/s of the same project or initiative.

$$SROI = \left( \frac{Benefits - Expenses}{Expenses} \right) * 100 = X\%$$

The SROI analysis gives a quantitative vision in order to understand and manage the intended goals and impacts of a Project, of a business or of an organization. The methodology collects the impact evaluations of the different interest' groups and it assigns an economic value to each identified impact even though they lack of market value.

The main principles of the SROI analysis are the following [11] [12]:

- It is of basic importance the active participation of the main interest groups and stakeholders;
- It is essential to create an impact map to better understand the changes and impacts that are created by the projects and organizations that bring on the Social initiatives; this impact map illustrates the relations between the resources available to a given project or organization, its activities and the results of the before mentioned activities;
- It is useful to limit the impacts of a given project or organization by assigning part of the results to other organizations, projects or circumstances;
- Only the relevant impacts have to be included in the analysis;
- It is crucial to assign the economical values to all results to ensure the inclusion of each and every relevant aspect that are of importance for the stakeholders involved, including, as well, those aspects and impact that lack of market value.

The SROI methodology has been taken as the general application framework and has been adapted to carry out the analysis within UNCAP project, the following phases have been followed:

<sup>1</sup> <http://redf.org>



- Phase 1: Establish the scope and identification of stakeholders;
- Phase 2: Collection of information;
- Phase 3. Results and determination of impact;
- Phase 4. Communication and use.

## 8.1. Scope and identification of stakeholders

The scope of UNCAP project is improvement of quality of life of patients and sustainability of health systems through the implantation of UNCAP technologies. More specifically;

- Improve the effectiveness of health care processes through more effective evaluation processes during hospital-hospice recovery;
- Improve treatment and prevention in the home, in order to delay the cognitive deterioration of the elderly and, possibly, postpone the need for recovery in hospitals or hospices;
- Support a more independent life and improve the quality of life and the dignity of users with cognitive disabilities, helping them to be more independent and longer.

The UNCAP Project interest groups were defined in deliverable D4.1 [5]. They are the End-Users (PE), the Formal Caregivers (FCG) and the Informal Caregiver (ICG).

Moreover, if we are taking analysing the SROI, we have to include as interest group the Public Administration and the institutions that are providing theses Social services. In this respect, we have included in each pilot case a paragraph outlining the status of each Health Care System according to the studies from the European Observatory on Health System and Policies, a branch that belongs to the World Health Organization (WHO). In deliverable D5.3 [10], section 8.3.4, a study on these particular stakeholders has been carried outlining their main expected benefits and their economical returns.

## 8.2. Collection of information

The information necessary to conduct this study has been collected by different means:

- **Surveys distributed to each participant to the pilot sites in order to do the impact analysis of the pilot itself and to link it to the expected potential benefits on these three analysed items:** QoL of patient, sustainability of health system and innovation and growth effect. These surveys handed out to pilots are described in deliverables D4.1 [5], D4.2 [6], D4.3 [7], D4.4 [8] and D4.5 [9].
- **Pilots’ responsible one to one interviews:** Before implementing the clinical study, pone interviews with pilots’ responsible were carried out in order to collect their expectations before the implementation of the pilot itself and in order to agree on the indicators that will be then used in order to evaluate the expected impact. After clinical study, in the project meeting in Thessaloniki

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(with those pilots responsible attending the meeting) and by phone have been collected information on the personal experience of the pilots in different dimensions: Usability, Acceptability, Satisfaction, Perceived QoL, Efficiency and Business. The results of this interviews were included in D4.3 [7] and D4.4[8].

- **Information from other UNCAP WPs:** UNCAP Project documentation generated in WP4, the same WP where this document is included and documentation coming from other UNCAP WPs such as WP1, WP3 and WP5, in order to collect useful information for the implementation of this study.
- **Other documentation:**
  - Health Systems in Transition (HiT) series the European Observatory on Health Systems and Policies.
  - SROI methodology-related documents.
- **Online consultations** to obtain general information related to health system in the countries where the pilots are established.

### 8.3. Results and determination of impact

In this phase estimations have been produced and evaluated in order to measure the impact study on the identified results previous to the implementation of the Project. In other words, the resources invested have been evaluated and the results in terms of cost-benefits analysis have been produced, whenever possible, including the calculation on the Social return of the investment. Last but not least, a ROI indicator has been calculated as well as the SROI indicator, whenever possible according to the currency agreed.

### 8.4. Communication and use

The dissemination of the results of this study will be done through the drafting of similar documents to this one. Moreover, communications and dissemination documents ad -hoc will be further evaluated in order to present the result of this study at international congresses and events.

## 9. Return of Inversion in Pilots sites

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### 9.1. German Pilot

#### 9.1.1. Pilot in Höhenkirchen

The pilot in Höhenkirchen is the Wohnen am Schlossanger nursing home with formal care settings for long-term care for the elderly with 72 apartments. The nursing home offers assistance with personal hygiene, eating & feeding and pharmacological treatment adherence. For UNCAP project, it is a Scenario 3 and a Scenario 4 (D1.1[1]).

##### 9.1.1.1. Objective and interest group

According D1.1[1], the main objective for Höhenkirchen pilot through the use of UNCAP technologies is:

“Detecting and preventing falls of elderly persons in the nursing home”.

According this objective, the interest group of stakeholders involved in this pilot are Primary End-Users, Formal Caregivers, Next-of-kin and Administrative Nursing Home and indirectly Allgemeine Ortskrankenkasse (AOK).

- **Primary End-Users**

The specific objective for this group would be improving their health and well-being by preventing falls and consequently the prevention of broken bones. Moreover, it would be improving their quality of life an increased sense of privacy due to the fact that nurses will be not forced to enter their room in order to check on them and their safety.

- **Formal Caregivers**

Workload optimization due to an improved and more efficient work assignment due to the fact that thanks to the UNCAP technology the nurses can attend the potential emergencies at the right time, especially when emergencies due to patients falls happen. This would help their quality of life as well, by decreasing the work stress.

- **Next-of-kin**

Improving the quality of life of this group by knowing that the UNCAP technology ensure more safety and help in reducing the incidents due to unexpected falls.

- **Administrative Nursing Home**

Budget reduction due to an improved workload assignments and workload of the formal caregivers (nurses).

The improved quality of care pays off by higher monthly contributions.

##### 9.1.1.2. Expenses

In this pilot, the expenses are the ones related to the purchase and installation of the UNCAP technology.

## *Purchase of technologies*

The investment done in Wohnen am Schlossanger nursing with technologies in order to carry out the clinical study with 20 users is depicted in Table 1. The information comes from deliverables D3.12[4] y de D1.4[3].

**Table 1: Expenses in UNCAP Technologies in Höhenkirchen.**

<b>Technologies</b>	<b>Quantity</b>	<b>Price by unit (€)</b>	<b>Cost (€)</b>
<b>UNCAP Box</b>	1	200	200
<b>Smartphone</b>	1	300	300
<b>TV set</b>	1	500	500
<b>Tablet</b>	1	200	200
<b>SensFloor</b>	10	163 per m <sup>2</sup>	24.450
<b>Sensor Mat</b>	12	211	2.532
<b>Accessories</b>	20	270	5.400
<b>Raspberry Pi</b>	11	35	385
<b>Total</b>			<b>33.967€</b>

## *Installation of technologies*

Under this paragraph we consider the installation costs of SensFloor of 10 rooms; the installation cost is 50€/m<sup>2</sup> according to the information provided. Assuming that the rooms have an average size of 15m<sup>2</sup>, the installation cost is estimated at 7.500€.

Total expenses: 41.467€.

### **9.1.1.3. Benefits**

By not taking part in the general impact study of the UNCAP Project, the information used for the SROI analysis of this pilot has been given directly by the pilots' responsible people through its own studies and statistics.

### *Reduction in falls and injuries*

The reduction in falls and injuries help a reduction in treatment expenses of the health insurance. Also, in private nursery home, the improved quality of care pays off by higher monthly contributions.

The number of falls in this pilot of 72 rooms that is not equipped of a system for detecting patients' falls is according to their own statistics of 12.48 falls per month.

By equipping 22 rooms with a system for falls detections, the number of falls has been reduced to 11.42 falls per month, that is to say 1.06 falls less per month. This means a reduction of 12.69 falls on an annual basis.

90% of falls requires medical assistance from medical staff form the hospital emergency. In Germany, the intervention cost of this staff is valued at about 800€.

Therefore 12.69 falls less annually means an annual save of 9.137€ for the health insurance covering this cost.

On the other hand, according to AOK statistics, 10% of falls of an elderly person ends up into a bone fracture which in this case would mean 1.269 fractures less per year. Given that the cost of a hip fracture is calculated around 20.000€, we can estimate a potential saving of 25.380€ excluding rehabilitation costs.

### **Social Benefits**

On top of the more than evident economical costs, we have to consider benefits as well that involve the wellness and quality of life of the stakeholders involved. The elderly residents that avoid the fall can maintain a higher quality of life and the caregivers optimize their workload by allowing them to help the residents at the right time therefore decreasing their stress due to labour conditions. We do not have any indicator for this pilot specifically that allows us to quantify in economic terms this kind of Social benefits.

Total Benefits: 34.517€/year.

#### **9.1.1.4. Return of Investment in Höhenkirchen**

Given that we do not have any economic value to attach to the Social benefits we have detected, we will calculate the ROI indicator with the information that we have as follows:

$$ROI = \left( \frac{34.571 - 41.467}{41.467} \right) * 100 = -16.63\%$$

This is to say that for every 100€ of investment in the technological installation in the first year, we have a return of 83.36€ € per year.

It is clear that the cost of installation will be paid off after three years Thus, that the benefit can be estimated at around 105.000€. Thus, that

$$ROI_{3\text{ years}} = \left( \frac{105.000 - 41.467}{41.467} \right) * 100 = 153.51\%$$

Thus, after 3 years, for every 100€ invested, the return will be of 253 €. In this case benefit will be for AOK.

## **9.2. Greek Pilots**

### **9.2.1. Pilot in Athens**

The pilot in Athens is supported by BioAssist S.A, a company focused on development of innovative technologies to ensure the senior population's quality of life, extending and assisting their independent living. In this pilot, the patients receive the assistance at home. For UNCAP project it is a Scenario 1.

#### **9.2.1.1. Objective and interest Group**

According D1.1[1], the main objective for Athens pilot through the use of UNCAP technologies is:

“Incorporate automatic reminder functionality, vital signs monitoring features and Social networking, engaging at the same time the patient’s doctor. This would

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improve the quality of life and dignity of residents and it would reduce the workload of healthcare professionals”

According this objective, the interest group of stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Informal Caregivers and indirectly Greek Health System.

- **Primary End-Users**

The specific objective for this group is the improvement of their quality of life or the at least the maintenance of it, in way to guarantee these users to live independently in their home.

- **Formal Caregivers**

The primary care doctor has its primary objective in monitoring the general health conditions of his/her patient following the personalized program defined and managed for the patient itself that he/she can Access via the Electronic Health Record (EHR) of the patient.

On the other hand, the primary helpdesk personnel have the primary goal to improve the medical assistance service and improve the remote assistance of the emergency cases, always by accessing the patient’ EHR.

- **Informal Caregivers**

The main goal for this interest group is being informed at any time about the health condition/wellbeing of his/her own relative, potentially intervening in case of an emergency.

### 9.2.1.2. Expenses

The costs incurred in this pilot for the adoption of the UNCAP technology during the clinical study, according to the information provided by the pilot`s responsible, can be divided into four cost categories: purchase of technology, staff training, maintenance & other expenses. The technology adopted served for 35 end-users.

#### *Purchase of technologies*

In Table 2 we can see the investment of the Athens pilot in the UNCAP technology in order to implement the clinical study. This information comes from deliverable D3.12 [4] and its related costs come from deliverable D1.4 [3].

**Table 2: Expenses in UNCAP technologies in Athens.**

<b>Technologies</b>	<b>Quantity</b>	<b>Price by unit (€)</b>	<b>Cost (€)</b>
<b>Tablet</b>	30	200	6.000
<b>Glucometer</b>	3	15	45
<b>Blood pressure meter</b>	20	200	4.000
<b>Pulse oximeter</b>	30	60	1.800
<b>Total</b>			<b>11.845€</b>



## Training

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The users need to learn how to use the UNCAP technology. Thus, each user needs a training course between 5 and 10 days, given by a member of the Clinical Staff. The cost of this activity has been of 2000€.

## Maintenance

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The maintenance cost of the UNCAP technology is estimated at 200€/year.

## Others

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In order to store the information collected for the patients, a web hosting service has been rented at the price of 200€/month. Thus, the annual cost for this category is 1.200€.

Total expenses: 15.245€.

### 9.2.1.3. Benefits

As a result of the impact analysis presented in deliverables D4.2 [6] and D4.4 [8] we can infer the potential economic and Social benefits reached by the Athens pilot with the use of the UNCAP technology during the clinical study. According to the clinical study, the main benefits in this pilot were an improvement in the hospitalization expenses, general expenses, an improvement of the overall level of depression of the PE, an improvement of the QoL of the PE and an improvement of the satisfaction of the PE, ICG and FCG. In the next paragraphs, we will try to quantify these benefits. The calculation will be done over 1 year and over the 35 patients that have used the UNCAP technology.

To monetize these benefits, we will take into account Some information provided by the Greek pilot's responsible on a 2011 statistic document reporting the costs of the health services in the private sector. We would assume then that the costs are the same for the public health care services with the only difference is that the patients do not pay directly these costs. The obtained total benefit will be then increased by a 5% given the inflation rate between 2011 and 2017.

### Improvement in Hospitalization expenses

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The benefit in this category is obtained from the following sub-categories:

- **Saving in the number of visits to the general practitioner**

According to the impact analysis conducted, the number of visits to the general practitioner during the clinical study decreased by 30% from the 31.70 monthly visits to 19.40, a reduction of 12.3 visits/month.

The average price for a general practitioner visit in 2011 was about 30-50€. We will then consider the median value of 40€ as reference, So that:

12.3 visits/month \* 12 month \* 40€/visit → Benefits: 5.904€

Benefit with 5% revalorization: 6.200 €

- **Savings in the number visits to specialist doctor**

According to the impact analysis data, the number of visits to a specialist doctor has decreased by a half in those patients using UNCAP technology as compared to the rest of the patients not adopting the technology provided by the project.



Thus, given that we have 35 patients and on average 1 visit per month, we will estimate the total visits saved at 17.5 monthly.

The price of a specialist visit in 2011 was ranging between 30 and 80€; taking as reference the median value of 55€ we have

$17.5 \text{ visits/month} * 12 \text{ month} * 55\text{€/visit} \rightarrow \text{Benefits: } 11.550 \text{ €}$

Benefit with 5% revalorization: 12.127 €

- **Savings from remote visits**

According to the impact analysis data, among the patients adopting UNCAP technologies the remote visits have decreased from 25.5 to 1.30 monthly. This is a decrease of 24.3 by month in remote visits. Assuming an average remote visit duration of 15 minutes that is given by a doctor which current salary by the hour is approximately 25/hour, we have

$24.3 \text{ remote visits/month} * 0.25 \text{ duration} * 12 \text{ month} * 25 \text{ €/hour} = 1.820\text{€}$

Benefit: 1.820 €

- **Savings in Referral between primary and secondary care**

In this category, the decrease is of 0.4 visits per month per patient, according to the general information provided by the pilot. Assuming a price of 30€ per visit to secondary care and applying the inflation rate, we have

$0.4 \text{ visits/month/patient} * 35 \text{ patients} * 12 \text{ months} * 30\text{€/referral} = 5.040 \text{ €}$

Benefit with 5% revalorization: 5.290 €

Total Benefits for Hospitalization expenses: 25.440€

### **General Expenses**

Even though in the impact analysis there are many indicators that have improved in this area, only few of them will be used to quantify the related benefits to the improved quality of life. In this paragraph, we will consider only the ones that impact the economical aspect. Thus, the benefit in this category is obtained by summing up the following sub-categories:

- **Decrease in displacements by ambulance**

Adopting the UNCAP technology displacements by ambulance have decreased by a number of 3 per month. The cost of an ambulance displacement in 2011 was between 30€ and 80€. Considering a medium price of 55 € for displacement, we have:

$3 \text{ displacements/month} * 12 \text{ months} * 55 \text{ euros} = 1.980 \text{ €}$

Benefit with 5% revalorization: 2.079€

- **Decrease of number of hours per week spent by FCG**

In the general report of the pilot it is reported that patients using UNCAP technology need 0.5 hours of nurse assistance per week as compared to 2 hours per week for the patients not using UNCAP technology. This is a decrease of 6 monthly hours per patient. If we consider that the average nurse salary is at 20€ for hour, we have

$6 \text{ hours month/patient} * 12 \text{ months} * 35 \text{ patients} * 20\text{€/hour} = 50.400 \text{ €}$

Benefit → 50.400 €

- **Number of days-off work to assist the elderly for ICG**

The information obtained from the impact analysis indicates that on average the ICG missed 27 working day less if their relatives are using UNCAP technologies. Taking into account that the Greek average hourly salary is at 95€/day (1880€/month), we obtain:

27 days \* 12 months \* 95 €/day = 30.780 €

Benefits → 30.780 €

Total Benefits for General Expenses: 83.259€

### ***Improved general level of depression in PE***

According to the QoL study described in deliverable D4.4 [8], in the Athens pilot the indicator DRS (Depression rate scale) improves among the patients that has adopted the UNCAP technology. The improvement of this indicator is strictly linked to the improvement of the patients` health that in turn affects the decrease of the hospitalization expenses and of the general expenses. Therefore, the monetization of this category can be considered as calculated already in the previous paragraphs.

### ***Improvement in the QoL of PE***

Deliverable D4.4 [8] shows that indicator QoL-AD pin the Athens pilot has increased of the test group using UNCAP technology from 33 to 34, while in the patients not using this technology the same indicator decreased from 28 to 26. This implies a 3-point improvement for the patients using UNCAP technology and since this indicator ranges from 11 until 44, this implies an almost 10% in the quality of life perception for these patients. Once again, we consider this benefit very much linked to the decrease of the patients` hospitalization and therefore we can as well consider this category as already monetized in the previous paragraphs.

### ***Improved life satisfaction of PE, ICG y FCG***

The impact study for the Athens pilot has demonstrated an improved life satisfaction of the actors involved in the adoption of the UNCAP technology. Like for the previous indicators, this improvement impacts the decrease in hospitalization of the PE, the minor number of hours dedicated by the FCG and ICG to their relatives Thus, that the monetization of these benefits can be considered as included in the monetary benefits previously calculated.

Total Benefits: 108.700 €

#### **9.2.1.4. Return of Investment in the Athens Pilot**

From the calculation and information reported in the previous paragraphs, we can calculate the SROI for this pilot as follows:

$$SROI = \left( \frac{108.700 - 15.245}{15.245} \right) * 100 = 613\%$$

The return of investment for this pilot is very high as already indicated by the impact analysis, Thus, the adoption of the UNCAP technology can be considered very beneficial for the pilot itself. This return on investment will be beneficial mainly for the Greek Healthcare National System.



## 9.2.2. Pilot in Thessaloniki

This pilot is placed in a valid active and health aging e-home/living located at the lab of Medical Physics in School of Medicine of Aristotelio Panepistimio Thessalonikis. Elderly people visit the health aging e-home and stays there for 1-2 hours per day fulfilling diverse daily activities. For the UNCAP project it is considered a Scenario 4.

### 9.2.2.1. Objective and interest Group

According to D1.1[1] the main objective for Thessaloniki pilot through the use of UNCAP technologies is:

“to provide different activities and games that improve quality of life, physical capacity and socialization; this helps keep the elderly people active, busy and healthy and slows the cognitive decline”

According this objective, the interest group o stakeholders involved in Thessaloniki pilot in manly Primary End-Users. Other is Informal Caregivers and indirectly the National Greek Healthcare system.

- **Primary End-Users**

The goal is to decrease the cognitive impairment of elderly people by improving the quality of life thorough games that allow the patients to keep themselves active and alert.

- **Informal Caregivers**

The goal is to improve their general satisfaction and decrease their stress by decreasing the fear for the healthcare of their relatives.

### 9.2.2.2. Expenses

According to the information provided by the pilots `responsible, the expenses due to the adoption of the UNCAP technology for this pilot during the clinical study can be divided into three categories: purchase of technology, staff training and maintenance.

The UNCAP technology has been used by more than 90 users in this pilot even though for the impact analysis information have been collected only for 64 of these users.

#### ***Purchase of technologies***

In Table 2 we can see the investment done in Thessaloniki in order to implement the clinical study. The information on the selected technology has been collected from deliverables D3.12 [4], D1.1 [1] and the costs collected from deliverable D1.4 [3].

**Table 3: Expenses in UNCAP technologies in Thessaloniki.**

Technologies	Quantity	Price by unit (€)	Cost (€)
UNCAP Box	2	200	400
Smartphone	3	300	900
Tablet	2	200	400
Smart TV	1	500	500
PC	10	900	9.000
Touchscreen	4	300	1.200
Kinect	4	200	800
Webcam	2	100	200
Glucometer	3	15	45
Glucometer strip	4	18	72
Blood pressure meters	5	200	1000
Pulse oximeter	2	60	120
Scale	4	150	600
<b>Total</b>			<b>15.273 €</b>

### ***Training***

The staff needed 6 hours of training in order to learn how to use the UNCAP technology. The overall cost for this activity is then of 300€.

### ***Maintenance***

The cost for the maintenance of the UNCAP technology is estimated at 150€/year.

Total expenses: 15.723€

### **9.2.2.3. Benefits**

According to the impact analysis realized on the clinical study, the benefit obtained by the adoption of the UNCAP technologies are a decrease in hospitalization expenses, an improvement of the level of depression of the PE and an improved life satisfaction of the PE and the ICG. These benefits will be calculated over a span of 1 year and for 64 patients on which an individual survey has been performed. The monetization of these benefits has been carried out following the same criteria as the ones used in the Athens pilot.

### ***Improvement in Hospitalization expenses***

The benefit for this category derives from the following sub-categories:

- **Saving in the number of visits to the general practitioner**

According to the impact analysis, the number of general practitioner visits during the clinical study decreased by 28 monthly.

The average price of a general practitioner visit in 2011 was between 30 and 50 €. We will take into account an average price of 40€ as a reference. Thus, that:

28 visits/month \* 12 months \* 40€/visit → Benefits: 13.440€

Benefit with 5% revalorization: 14.112 €

- **Savings from number visits to specialist**

According to the impact analysis, patients using UNCAP technologies decreased the specialist visits from 41 to 26 visits per month. This means a decrease of 15 specialist visits per month.

The price of a specialist visit in 2011 was between 30€ and 80€. We take the median price of 55€ Thus, that we have a saving of

15 visits/month \* 12 months \* 55€/visit → Benefits: 9.900 €

Benefit with 5% revalorization: 10.395 €

Benefits: 24.507€

### ***Improved general level of depression in PE***

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According to the impact analysis showed in deliverable D4.4 [8], in Thessaloniki the indicators DRS and IADLC improved among the patients that adopted UNCAP technologies. This implies a decrease of the depression level and an increased capacity for instrumental activities in their daily life. This leads as well to an overall decrease of the hospitalization expenses Thus, that the monetary quantification of these indicators can be included in the category described before.

### ***Major life satisfaction of PE y ICG***

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The impact study showed a better life satisfaction as well among PE and ICG interest groups. For the PE group, this improvement impacts directly the decrease of hospitalization Thus, that the monetary benefits can be included in the previous calculation.

The improvement in satisfaction among ICG impacts the decrease in hours dedicated to the elderly people. For the test Group using UNCAP technology, the number of hours dedicated to their relatives decreased to 38 per month. Thus, we can quantify this by assigning a monetary value equal to an average Greek salary of 10.5€/hour in 2016 Thus, that:

38 hours/month \* 12 months \* 10.5 €/hours = 4.788 €/year

Major Life Satisfaction Benefits: 4.788€/year

Total Benefits: 29.295€/year

#### **9.2.2.4. Return of Investment in Thessaloniki**

With the information collected in the previous paragraphs, the SROI for this pilot can be calculated as follows:

$$SROI = \left( \frac{29.295 - 15.723}{15.723} \right) * 100 = 86\%$$



This means that in the first year for every 100€ of investment, we can have a return of 186€ thanks to the adoption of the UNCAP technology. This return on investment will benefit mostly the National Greek Healthcare System.

## 9.3. Italian Pilots

### 9.3.1. Pilot in Città della Pieve

The Città della Pieve Pilot have been implemented in the Nursing Home "Creusa Brizi Bittoni" where the services help people affected by comorbidity as cognitive disorders, cardio-and brain-vascular diseases, arthrosis, consequences of fractures, and other conditions reducing self-sufficiency.

The Nursing Home provides the following services: Medical care and nursing, social care, Daily care, Physiotherapeutic activities, Recreational activities, Religious service, Laundry and ironing, Hairdresser and barber, Fitted kitchen and cookers, Music therapy, Tours, Connections with family members, Connections with the surroundings.

For UNCAP project it is a Scenario 4.

#### 9.3.1.1. Objective and interest Group

According D1.1 [1], the main objective this pilot through the use of UNCAP technologies is:

"to have Some information and measurement at different times, in order to do a comparison and to find 1) a non-conformance 2) Some corrective and preventive actions modification of alertness state".

According this objective, the interest group o stakeholders involved in this pilot are Primary End-Users and Formal Caregivers.

- Primary End-User

The main goal for this Group is to improve the patients' quality of life.

- Formal Caregiver

Improve the efficiency of the medical staff by decreasing the stress on the job and increasing their satisfaction.

#### 9.3.1.2. Expenses

According to the pilots' responsible, during the clinical study the only expenses incurred by the pilot were the ones related to the purchase of the UNCAP technology. The technology is being used by 10 users.

#### *Purchase of technologies*

The investment by Città de la Pieve pilot to purchase the UNCAP technology is shown in Table 4Table 2. The information on the selected technology comes from deliverable D3.12 [4] and their cost comes from deliverable D1.4 [3].

**Table 4: Expenses in UNCAP technologies in Città della Pieve.**

Technologies	Quantity	Price by unit (€)	Cost (€)
Tablet	3	200	600
PC	2	900	1.800
Touchscreen	2	300	600
Kinect	9	200	1.800
Webcam	2	100	200
Glucometer	3	15	45
Glucometer strip	10	18	180
Blood pressure meters	2	200	400
Pulse oximeter	3	60	180
Scale	1	150	150
<b>Total</b>			<b>5.955 €</b>

Total expenses: 5.955€

### 9.3.1.3. Benefits

Starting from the impact analysis we will try to quantify the benefits obtained by the adoption of the UNCAP technology during the clinical study.

#### *Improvement in Hospitalization expenses*

The benefit in this category has been calculated as follows:

- **Saving number visits to general practitioner**

According to the impact analysis the patients adopting UNCAP technologies has decreased their visits to the general practitioner from 28 to 14 on a monthly basis. This means a decrease of 14 visits/month.

The price of a general practitioner visit is estimated at 20 €.

14 visits/month \* 12 month \* 20 €/visit = 3.360€

Hospitalization expenses: 3.360€

#### *Improved general level of depression and Daily Living for PE*

According to the QoL study presented in deliverable D4.4 [8], the indicators DRS y ADL have improved in this pilot in the group of patients adopting UNCAP technology. The improvement of these indicators is connected to the improvement of the general health of the patients and therefore to the decrease of the patients 'visits to the general practitioner. Thus, we can consider this improvement monetarily as included in the previously described category.

Total Benefits: 3.360€

#### 9.3.1.4. Return of Investment in Città della Pieve

Thus, given the information collected, this is the SROI calculation for this pilot:

$$SROI = \left( \frac{3.360 - 5.955}{5.955} \right) * 100 = -43.57\%$$

For each 100€ invested in the pilot in the first year, we expect a return of 56.43€.

### 9.3.2. Pilot in Ovest Vicentino

The pilot in Ovest Vicentino comprises three facilities located in the North-East of Italy, namely Lonigo, Valdagno and Montecchio helping elderly people with cognitive disorders with a variety of services including among them educational animated services, psychological support and physiotherapy. This facility can give assistance to 160 patients. For UNCAP project it is a Scenario 3 and Scenario 4.

#### 9.3.2.1. Objective and interest Group

According D1.1, the main objective for this pilot through the use of UNCAP technologies is:

“To detect movements and health-related events using sensors that allows the carers to monitor and quickly respond to the patients if a health-related event occurs and sharing health data with a specialist outside the nursing home.”

According this objective, the interest group of stakeholders involved in this pilot are Primary End-Users, Informal Caregivers, Formal Caregivers and USSL 5 that is responsible for the care of patients in the local area.

- **Primary End-Users**

The main goal for this group is to improve the quality of life adopting the UNCAP technology

- **Formal Caregivers**

Optimize the work load of the staff by improving the work efficiency and decreasing the work-related stress that will end up in a better organizational performance.

- **Informal caregivers**

Being informed at any time about the care of their relatives as well as being informed about their health/wellbeing conditions.

- **USSL 5**

Improving the quality of service by adopting new technologies.

#### 9.3.2.2. Expenses

According to the pilots' responsible, during the clinical study the only expenses incurred by the pilot were the ones related to the purchase of the UNCAP technology. The technology is being used by 25 users.

### *Purchase of technologies*

The investment by Ovest Vicentino pilot to purchase the UNCAP technology is shown in table 5Table 2. The information on the selected technology comes from deliverable D3.12 [4] and their cost comes from deliverable D1.4 [3].

**Table 5: Expenses in UNCAP technologies in Ovest Vicentino.**

<b>Technologies</b>	<b>Quantity</b>	<b>Price by unit (€)</b>	<b>Cost (€)</b>
<b>UNCAP Box</b>	4	200	800
<b>Smartphone</b>	6	300	1.800
<b>Tablet</b>	3	200	600
<b>TV Set</b>	4	500	2.000
<b>PC</b>	6	900	5.400
<b>Touchscreen</b>	6	300	1.800
<b>Kinect</b>	4	200	800
<b>Webcam</b>	6	100	600
<b>EEG Emotive</b>	4	800	3.200
<b>Glucometer</b>	4	15	60
<b>Glucometer strip</b>	4	18	72
<b>Pulse oximeter</b>	4	60	240
<b>Scale</b>	3	150	450
<b>Total</b>			<b>17.822 €</b>

Total expenses: 17.822€

#### **9.3.2.3. Benefits**

Starting from the impact analysis we will try to quantify the benefits obtained by the adoption of the UNCAP technology during the clinical study that has lasted 3 months and according to the pilots responsible has been not easy to quantify.

#### ***Improvement in Hospitalization expenses***

There has been an improvement in the decreasing of hospitalization days among the patients using UNCAP technologies as compared to the ones not using it. This decrease, according to the impact analysis is by a 25%, corresponding to 0.4 days per patient. According to WHO, in 2008, the hospitalization cost was around 380€; by adjusting this values with an inflation rate for Italy at 10% in 2017, we have a cost of 374€. By considering only the 3 months of the clinical study, we have

0.4 days\* 3 months \* 25 patients \* 340€ =10.200 €

## **Improvement of general satisfaction for PE and FCG**

The impact analysis shows slight improvement in the indicators that evaluate the general satisfaction of PE and FCG.

In the case of PE, a benefit of this improvement is a lower number of hospitalizations, Thus, we will consider that the quantification is included in that item.

For the FCG we do not have any tool given the small duration of the clinical study that allows us to monetize this benefit.

Total Benefits: 10.200€

### **9.3.2.4. Return of Investment in Ovest Vicentino**

In this section, we calculate the SROI for the period of the clinical study. Given the short time available for this activity, we could calculate as follows

$$SROI = \left( \frac{10.200 - 17.822}{17.822} \right) * 100 = -42.77\%$$

According to this value, we do not have any return on investment for this pilot. But according to the pilots responsible we should not extrapolate since we do not have clear tendencies that support the tendency to future improvement.

### **9.3.3. Pilot in Pergine**

This pilot is carried out in the rehabilitation hospital "Villa Rosa" in the city of Pergine which is the reference point or intensive rehabilitation in the province of Trento. Services for motor recovery and pain management, cognitive and communicative disabilities and instrumental diagnosis of movement disorders are offered. For UNCAP project it is a Scenario 2.

#### **9.3.3.1. Objective and interest Group**

According D1.1 [1], the main objective for this pilot through the use of UNCAP technologies is:

“to increase safety, autonomy, dignity of patients and reduce the burden of family support through use of sensor technologies. In addition, it should provide help in everyday life actions, help with cognitive rehabilitation and postpone the institutionalization”

According this objective, the interest group o stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Informal Caregivers and indirectly Local Health Trust, public organization that delivers care services in Trentino

- **Primary End-Users**

The objective is to improve their quality of life with tools that remind them of the medication they must take, help them in their rehabilitation processes, their daily life activities, and monitor their health status Thus, that they can receive immediate assistance in case of falls, maintaining their mental efficiency and capability.

- **Formal Caregiver**

Improve work efficiency and decrease the level of stress

- **Informal Caregiver**

Reduce stress related to care of the elderly personal by being constantly informed about health/wellbeing condition of this person

### 9.3.3.2. Expenses

The investment by the Pergine pilot to purchase the UNCAP technology is shown in table 6Table 2.

**Table 6: Expenses in UNCAP technologies in Pergine.**

Technologies	Quantity	Price by unit (€)	Cost (€)
<b>UNCAP Box</b>	5	200	1.000
<b>Smartphone</b>	5	300	1.500
<b>TV set</b>	1	500	500
<b>Router</b>	5	40	200
<b>PC</b>	3	900	2.700
<b>Touchscreen</b>	3	300	900
<b>Kinect</b>	3	200	600
<b>Webcam</b>	1	100	100
<b>EEG Emotive</b>	1	800	800
<b>Blood pressure meters</b>	1	200	200
<b>Pulse oximeter</b>	1	60	60
<b>Kinect with pc</b>	3	800	2.400
<b>Sensfloor</b>	3	211	633
<b>Zigpos</b>	4	612	2.448
<b>Total</b>			<b>14.041€</b>

Total Expenses: 14.041€

### 9.3.3.3. Benefits

In this pilot quantifying benefits has been very complex given that the clinical study has taken place for a very short time. However, the pilot responsible has developed statistics that help quantify what are the possible benefits that can be obtained with the use of UNCAP technologies.

### ***Improvement in Hospitalization expenses***

During the clinical study, according to the impact analysis, the monthly average per patient of visits to the specialist has decreased by 0.22. As in the test group 8 patients participated and the average cost of a visit to the specialist according to data provided by those responsible for the Italian pilots is € 20.65, in the three months in which the clinical study was developed there is a benefit as follows

$$0.22 \text{ visits} * 3 \text{ month} * 20,65 \text{ €/visit} = 13,63\text{€}$$

### ***General Expenses***

in the purchase of medicines for the group of patients that used UNCAP technologies, there has been a saving of approximately € 29. Since the study was carried out for 4 months, the benefit obtained for this reason would be € 116.

### ***HC indicators Improvement through Atl@nte***

The impact analysis shows, as can be seen in D4.4 [8] that for this pilot, all the Atl@nte indicators for HC have improved. It is not possible, however, given that we do not have enough information, to quantify the improvement obtained but this means that UNCAP technologies seem to help reduce depression (DRS), improve cognitive performance (CPS) or activities of daily life (ADL).

Total Benefits: 129.63€

#### **9.3.3.4. Return of Investment in Pergine**

In this case, the ROI, since there is not enough information, is difficult to quantify. In addition to not having information that we can monetize we will simply offer a value for the ROI after three months of clinical study according to the information we have available. It is negative one, as follows:

$$SROI = \left( \frac{129,63 - 14041}{14041} \right) * 100 = -99\%$$

Given that feedback from those responsible for the pilot has been generally positive with the use of UNCAP technologies, we believe that the return would be much higher if the deployed technologies were used for at least one year, however, this improvement cannot be quantified either.

#### **9.3.4. Pilot in Tarzo**

The pilot in Tarzo, Villa Bianca is a long-term centre facility qualified as "Center of services for dependent elderly people of first level of care". For UNCAP project it is a Scenario 4.

##### **9.3.4.1. Objective and Interest Group**

According D1.1 [1], the main objective for Tarzo pilot through the use of UNCAP technologies is:

"Improvement in the ADL (Activities of Daily Living) and the Social relations or end-users in such a way to reduced assistance impact and consequently the charge of work and the stress due to work and the work-team".

According to this objective, the interest group of stakeholders involved in this pilot are Primary End-Users, Formal Caregivers, Informal Caregivers and indirectly administrative pilot site.

For these stakeholders, we could define next specific objectives:

- **End-Users**
  - Decreased velocity of the worsening of cognitive functionality
  - Decreased depression
  - Increased velocity of the improvement of physical conditions
- **Formal Caregivers**
  - Formal caregivers' quality of work
  - Workload of healthcare professionals
  - Decrease the workload and work-related stress.
- **Informal Caregivers**
  - Informal caregiver quality of life
  - Decreased number of days off work
  - Social free time activities
- **Administrative pilot site**
  - Reduction in hospitalization/nursing homes expenses
  - Reduction in general expenses
    - Reduction of expenditures and depreciation costs
    - Reduced investment

#### 9.3.4.2. Expenses

The expenses that were made in this pilot for the adoption of UNCAP technologies during the Clinical Study, according to the information provided by the managers of the pilot, would fall into two categories: purchase of technologies and staff training.

These technologies have been used with 10 patients.

##### *Purchase of technologies*

The investment made in Tarzo in UNCAP technologies to carry out the clinical study can be seen in Table 7. The information on the selected technologies has been extracted from D3.12 [4] and the costs thereof from that indicated in D1.4 [3]

**Table 7: Expenses in UNCAP technologies in Tarzo.**

Technologies	Quantity	Price by unit (€)	Cost (€)
<b>UNCAP Box</b>	1	200	200
<b>Smartphone</b>	2	300	300
<b>TV set</b>	3	500	1.500

<b>Tablet</b>	8	200	1.600
<b>ZigPos Wifi</b>	1	612	2.700
<b>Anchors</b>	18	112	2.016
<b>Sensfloor</b>	6	200	1.200
<b>Total</b>			<b>9.516 €</b>

### **Training**

It has been necessary to provide training courses among the Clinical Staff to learn how to use UNCAP technologies. The duration of this course has been 15 hours. Given that the average salary of this type of personnel (nurses) can be estimated at € 57,000 / year, the cost of this activity can be valued at € 485.

Total expenses: 10.000€

### **9.3.4.3. Benefits**

In this pilot, the impact analysis conducted and the information from the individual questionnaires indicate that the use of UNCAP technologies does not seem to have caused substantial improvements in the organization, although the impression on them expressed in the final interview shows a good valuation in all the dimensions studied. We can therefore see some benefits improving the general expenses, improvement in ADL and improvement satisfaction of life of all the users

### **General expenses**

- **Decrease in ambulance travel**

Although in the impact analysis the UNCAP technologies did not seem to have an effect on the number of ambulance trips, from the pilot we are told that this has decreased and that while the general average of the establishment is 8 per month for patients with ambulatory technologies, for the UNCAP test group is only 2.

Each trip by ambulance can cost € 36 (€ 23 call cost + € 26 / hour driver cost)  
6 trips \* 12 months \* € 36 / trip = € 2,592

- **Decrease hours of FCG dedicated to the care of patients using UNCAP technologies**

In this case the benefit is given by the reduction of hours dedicated by the FCG to the care of patients if they have UNCAP technologies, dedicating 20% less time than before having them. However, this decrease is difficult to quantify given that the staff of this establishment dedicates a fixed number of hours (168 hours / month) to the care of all patients and the reduction of hours does not involve a variation of personnel, therefore we cannot indicate what the economic impact of this benefit is.

Benefits: 2.952€

### **Improvement in the activities of daily life**

According to the impact analysis in the QoL, the ADL indicator suffers an improvement among patients using UNCAP, this can have a lower number of emergency calls and

therefore fewer ambulance trips that have already been quantified in the previous section.

### ***Improvement in the perception of general satisfaction of all users***

The impact analysis, as can be seen in D4.4 [8], indicates an overall improvement in satisfaction for all people who have been involved with UNCAP technologies (PE, ICG and FCG). PE group emphasizes feeling more secure, which reduces emergency calls (already quantified) and the relationship between caregivers, formal and informal improves and increases their collaboration. Given that the pilot has not collected any indicator on the participation of ICGs in the care of their relatives, we cannot quantify this benefit.

Total benefits: 2.952€

#### **9.3.4.4. Return of Investment in Tarzo**

we have not been able to indicate an economic value for all the benefits that we have detected, we will calculate the SROI with the information that we have available. The result is a negative SROI, as follows

$$SROI = \left( \frac{2.952 - 10.000}{10.000} \right) * 100 = -70.48\%$$

## **9.4. Macedonian Pilot**

### **9.4.1. Pilot in Skopje**

The pilot, Nursing Home Terzieva, is a private institution for social protection of the elderly persons, founded in 1998 and located at 8 km from the centre of Skopje. This institution offers professional nursing care and assistance in personal hygiene, nutrition and physical therapy. For UNCAP project it is a Scenario 3.

#### **9.4.1.1. Objective and interest Group**

According D1.1 [1], the main objective for Skopje pilot through the use of UNCAP technologies is:

“To help elderly persons follow their daily routine and adhere to medical treatments, to improve safety of the elderly persons (by sending alerts to care personnel) and to help carers and nurses manage and follow more efficiently health conditions of elderly patients (using bio-parameter sensors and reminders”.

According this objective, the interest group of stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Institution Manager.

- **Primary End-Users**

The goal for these users is better management of their chronic health conditions and be able to reach for help in case of an emergency with ergonomic and non-intrusive devices.

- **Formal Caregivers**

Have access to consistent health observations of each elderly patient to improve treatment. This will improve efficiency in the Service by reducing the number of medical emergencies.

- **Institution Manager**

The main objective is to improve the level of care offered to residents through the digitalization of information and the automation of some care. This will result in better organization, increased efficiency and lower costs.

#### 9.4.1.2. Expenses

In Skopje, the costs incurred for the adoption of UNCAP technologies during the Clinical Study would fall into three categories: purchase of technologies, staff training and maintenance. Being a private institution, these expenses must be paid from the institution mainly from the monthly payments made by the PE.

##### *Purchase of technologies*

In Table 8, we can see the investment made in technologies to offer UNCAP technologies to the 33 people who participated in the study. The information on the selected technologies has been extracted from D3.12 [4] and the costs thereof as indicated in D1.4 [3].

**Table 8: Expenses in UNCAP technologies in Skopje.**

Technologies	Quantity	Price by unit (€)	Cost (€)
<b>UNCAP Box</b>	4	200	800
<b>Smartphone</b>	1	300	300
<b>Tablet</b>	18	200	3.600
<b>TV set</b>	4	500	2.000
<b>Router</b>	2	40	80
<b>Glucometer</b>	5	15	75
<b>Glucometer strips</b>	28	18	504
<b>Blood pressure meters</b>	5	200	1.000
<b>Pulse oximeter</b>	5	60	300
<b>Sensfloor mat</b>	6	211	1.266
<b>Receivers SE10</b>	3	270	810
<b>Total</b>			<b>10.735€</b>

##### *Training*

The Clinical Staff has had to spend time, 80 hours, in learning to use UNCAP technologies. The cost was € 5,000.



## Maintenance

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The cost for maintenance of UNCAP technologies is € 8,000 / year.

Total Expenses: 23.735 €

### 9.4.1.3. Benefits

The possible social and economic benefits obtained in Skopje with the use of UNCAP technologies during the clinical study can be extracted from the impact analysis carried out and the information provided by those responsible for the pilot.

Despite the positive feedback on the improvement in living conditions and satisfaction, the impact analysis has not yielded figures that allow evaluating benefits in this line. We will try to quantify these benefits in a year with 33 patients, which is the number of participants in the Test Group. In this pilot, there are no informal caregivers.

### Improvement in Nursing homes expenses

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The subcategories that allow determining the benefit of this category are:

- **Decrease in visits to the specialist**

In the general questionnaires, it is indicated that with UNCAP technologies an average of 0.2 less monthly visits is made to the specialist. Since in Macedonia a person receiving a pension has to pay a € 1.5 co-payment for each visit to the specialist, we have

$0.2 \text{ visits / month} * 12 \text{ months} * 1.5 \text{ €} = 3.6 \text{ € / year per patient}$

In the case of the total number of patients who participated in the clinical study, it would be a total benefit for these patients.

$3.6 \text{ € / year per patient} * 33 \text{ patient} = 118.8 \text{ €}$

- **Decrease in the number of remote visits**

The average of the number of remote visits for the total number of patients in the establishment is 2, while in patients who enjoyed UNCAP technologies it is 1.6, that is, 0.4 fewer visits. The co-payment for this service is € 1.5

$0.4 \text{ remotes visit / month} * 12 \text{ month} * 1.5 \text{ €} = 7.2 \text{ € / year per patient}$

For the total number of patients in the Test Group:

$7.2 \text{ € / year per patient} * 33 \text{ patient} = 237.6 \text{ €}$

- **Decrease of number days in hospital**

According to the impact analysis, this indicator has been reduced by 30% among patients with UNCAP technologies, which means an average of 1.3 days less in the hospital for these patients.

We have WHO statistics for 2008 where it indicates that a night in a hospital had a cost of about € 95, assuming a revaluation of 10% now we could assign a cost of € 104. The patient makes a co-payment of 10% of this amount.

$1.3 \text{ days / month} * 12 \text{ month} * 10.4 \text{ € / day} = 126.24 \text{ € / year patient}$

For the total number of patients in the Test Group:

$126.24 \text{ € / year patient} * 33 \text{ patient} = 4.166 \text{ €}$

Benefits for End-User: 137€

Benefits for Clinical Study: 4.522 €

- **General expenses**

Although in the impact analysis some indicators did not offer clear improvement trends with the use of UNCAP technologies from the pilot if they have indicated that improvements have been detected that can be quantified as benefits in the following sub-items:

- **Decrease in spending on medicines**

Patients who used UNCAP technologies have decreased their spending on medicines by € 3 / month.

In Macedonia, there is a co-payment for some medicines of 10%. If we estimate that the co-payment affects 30%, we would have savings

0.9 € medication / month \* 12 month = 10.8 € / year

For the total of participants: € 10.8 / year \* 33 patient = € 356.4

- **Reduced ambulance travel**

Patients with UNCAP technologies have performed 0.1 displacement / month less in ambulance.

The price of these trips is € 0-3. Taking an average value per patient, the benefit can be established in:

0.1displacement / month \* 12 month \* 1.5 € = 1.8 € / year

For the total number of Test Group users: € 1.8 / year \* 33 patient = € 59.4

Benefits for End-User: 12.6€

Benefits for Clinical Study: 415.8€

Total benefits for End-User: 149.6 €

Total benefits for Clinical Study: 4.938 €

#### 9.4.1.4. Return of Investment in Skopje

Based on the information in the previous sections, we will calculate the SROI for the pilot as a whole:

$$SROI = \left( \frac{4.938 - 23.735}{23.735} \right) * 100 = -79.19\%$$

This means that in the first year, for every € 100 invested, there is only a negative return of € 20.81 could be obtained with the inclusion of UNCAP technologies.

On the other hand, at the individual level, a user who is in this establishment can save almost € 150 / year.

The purchase of UNCAP technologies and their maintenance makes the use of these technologies unprofitable unless the profitability is seen in the long term.



## 9.5. Romanian Pilot

### 9.5.1. Pilot in Baia Sprie

The pilot in Baia Sprie is an Elder Nursing Homes, located near the city limits in an area quiet. This center is funded by local city funds and provides a safe and pleasant environment for the elderly people living here. For UNCAP project it is an Scenario 3 and Scenario 4.

#### 9.5.1.1. Objective and interest Group

According D1.1 [1], the main objective for Baia Sprie pilot through the use of UNCAP technologies is:

“To detect health-related problems using wearable technologies, which allow nurses to monitor and quickly locate the patients if a health-related event occurs and help rehabilitation”

The interest group o stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Informal Caregivers and indirectly NIPH and local administration.

- **Primary End-Users**

The specific objective for this group is to provide non-invasive monitoring solutions that make them feel safe.

- **Formal Caregivers**

The nurses who are responsible for taking care of the PE want to automate the monitoring process to ensure greater efficiency in their daily work, on the other hand the medical personnel who are not in the facilities want an automated and easy to read reporting system.

- **Informal Caregivers**

The objective is to have an alert system or an easy-to-use platform that allows them to evaluate the status of their relatives, checking that they are well.

#### 9.5.1.2. Expenses

The expenses that were made in this pilot for the adoption of UNCAP technologies during the Clinical Study, according to the information provided by those responsible for the pilot, and would fall into three categories: purchase of technologies, staff training and others.

##### *Purchase of technologies*

In Table 9 we can see the investment made in Baia Sprie in technologies to be able to carry out the clinical study with 12 users. The information on the selected technologies has been extracted from D3.12 [4] and the costs thereof as indicated in D1.4 [3]

**Table 9: Expenses in UNCAP technologies in Baia Sprie.**

Technologies	Quantity	Price by unit (€)	Cost (€)
<b>UNCAP Box</b>	3	200	600
<b>Smartphone</b>	10	300	3.000
<b>TV set</b>	3	500	1.500
<b>Tablet</b>	5	200	1000
<b>PC</b>	1	900	900
<b>Touchscreen</b>	1	300	300
<b>Kinect</b>	3	200	600
<b>Webcam</b>	5	100	100
<b>EEG Emotive</b>	3	800	2.400
<b>Combain + GPS</b>	10	0	0
<b>Glucometer</b>	10	15	150
<b>Glucometer strip</b>	200	18	3.600
<b>Blood pressure meters</b>	5	200	1.000
<b>Pulse oximeter</b>	5	60	300
<b>Scale</b>	5	150	750
<b>Total</b>			<b>16.200€</b>

### ***Staff training***

In the general questionnaire of this pilot it is indicated that 21 hours of Staff training have been needed to be able to use the technologies.

To calculate the expense that this implies, we will assume that this training has been carried out by nurses or similar category whose salary is approximately 5 euros / hour.

With these figures, the expenditure corresponding to this item can be recorded at € 105.

### ***Others***

The storage of the information has been done in a CHINO.io database for which the license had to be purchased. The price of it was € 466

Total expenses: 16.711 €

This expense has been paid from the establishment's annual budget.



### 9.5.1.3. Benefits

The possible social and economic benefits obtained in Baia Sprie with the use of UNCAP technologies during the clinical study can be extracted from the impact analysis carried out. According to this, the main benefits would be improvement nursing homes expenses, improvement in general expenses, improvement of the satisfaction of the PE and improvement in the QoL of the ICG.

Next, we will try to quantify these benefits. The benefit for 1 year and 12 patients who are those who participated in the Test Group will be calculated.

The economic benefits would fall on the public health service.

#### ***Improvement in Nursing homes expenses***

To quantify the benefit, we will take into account the information on indicators obtained in D4.2 [6]. According to these, the benefit would be given by a decrease in hospital admissions per patient and the days they spend hospitalized.

The patients with UNCAP technologies, for the 12 participants in the Test Group, would have reduced 21 days each month the days of hospital stay. The average price of a day of hospitalization in 2013 was € 50 [13] and since we do not have more updated figures we will use this one. We have:

21 days a month \* 12 months -> 252 days less hospitalization

252 days \* 50 € stay / day -> Benefit: € 12,600

#### ***General Expenses***

The benefit under this heading is obtained from the following subcategories:

- **Savings in the cost of medicines**

According to the information provided by the pilot, the average cost of the patients is € 5 / month, while for UNCAP patients this cost drops to € 3.46 / month as the number of medications to be taken decreases.

This means a saving per patient per month of € 1.54

1.54 € patient / month \* 12 patients \* 12 months = 221.76 €

- **Decrease travel by ambulance**

With UNCAP technologies it has gone from 5 to 3 emergency calls per month for users of these technologies. Of these calls, 2 ended up needing a displacement by ambulance while before the clinical study the monthly average was 4.

The cost ambulance transport - emergency is € 12, we have:

2 transfers / month \* 12 months \* € 12 / displacement = € 288

- **Decrease in spending on medical device or products**

In the general report of the pilot it is indicated that there is a saving of € 13.65 per patient in the case of patients using UNCAP technologies compared to those who do not use it, Thus, the benefit can be quantified in

13.65 € month / patient \* 12 months \* 12 patients = 1965.6 €

Benefits -> € 2,475

## **Satisfaction of PE**

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According to the Satisfaction questionnaires for EPs, in a scale between 9 and 43 it has gone from 31 before the clinical study to 34. This implies a percentage of improvement in the satisfaction of the PE of 5%.

Quantifying this data with a monetary value is a complicated task and can only be done in the long term seeing how this influences the stabilization or improvement of the health of the users and the duration of the clinical study does not allow obtaining this evaluation.

However, those responsible for the pilot estimate that the improvement of this indicator will reduce the number of days of hospitalization by 5%, this means a reduction of 1 day per month.

In 12 months, this would mean a saving of € 600

They also, estimate that the cost of ambulance travel will be reduced by 20%, that is, 0.4 trips less per month, which means a 1-year saving of € 57.6.

Finally, there will also, be an improvement of 20% in the purchase of medical devices or products, with which the expense will be reduced by 0.07 €, which means a saving of 10.08 €.

Benefits -> € 668

## **Improvement of ICG satisfaction**

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Again, this indicator is difficult to quantify monetarily and in this case, we do not have information that allows us to do so. However, the increase in the quality of life of this Group we believe is a very important social benefit.

Total benefits → 15.743€

### **9.5.1.4. Return of Investment in Baia Sprie**

This return on investment will fall mainly on the national health system.

Although we have not been able to indicate an economic value for all the benefits that we have detected, we will calculate the SROI with the information that we have:

$$SROI = \left( \frac{15.743 - 16.711}{16.711} \right) * 100 = -5.79\%$$

That is, for every 100 euros invested in the installation of technologies for 12 users there is a return of € 94.21 after the first year.

### **9.5.2. Pilot in Simleu Silvaniei**

This pilot consists of a Day Care Center made available to the beneficiaries by the municipality of Simleu Silvaniei that provides rehabilitation services for elderly people after a physical trauma or a stroke. For UNCAP project it is a Scenario 1, Scenario 3 and Scenario 4.

### 9.5.2.1. Objective and interest Group

According D1.1 [1], the main objective for Simleu Silvaniei pilot through the use of UNCAP technologies is:

“To detect health-related problems in a non-privacy-invasive manner based on using wearable technology and sensors, low cost smart phone (for elders and informal caregivers) or smart phone and tablet (for professionals); it should help rehabilitation, especially for physical problems (rehabilitation will take place in one designed room in the day-care centre)”

The interest group of stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Informal Caregivers and indirectly NIPH and local administration.

- **Primary End-Users**

Improvement of their physical and mental conditions to be monitored and be able to benefit from rehabilitation exercises in the centre.

- **Informal Caregivers**

The objective for this group is, thanks to the monitoring of elders, to assure them that their elders are safe and that they will be notified in case something happens. This will result in a higher quality of life and satisfaction

- **Formal Caregivers**

The objective for the nurses is to be able to evaluate the patient's condition visualizing the monitored parameters and being able to be alerted in case the system detects adverse events related to the disease.

### 9.5.2.2. Expenses

According to the information provided in the general questionnaires for this pilot, the expenses that were made for the adoption of UNCAP technologies during the Clinical Study, would be framed in three items: purchase of technologies, installation and others.

#### *Purchase of technologies*

In Table 10 we can see the investment made in Simleu Silvaniei. The information on the selected technologies has been extracted from D3.12 [4] and the costs thereof from that indicated in D1.4 [3].

**Table 10: Expenses in UNCAP technologies in Simleu Silvaniei.**

Technologies	Quantity	Price by unit (€)	Cost (€)
UNCAP Box	3	200	600
Smartphone	20	300	6.000
TV set	3	500	1.500
Tablet	5	200	1.000
PC	3	900	2.700
Touchscreen	1	300	300

<b>Kinect</b>	3	200	600
<b>Webcam</b>	5	100	500
<b>EEG Emotive</b>	1	800	800
<b>Glucometer</b>	20	15	300
<b>Glucometer strip</b>	200	18	3.600
<b>Blood pressure meters</b>	3	200	600
<b>Pulse oximeter</b>	20	60	1.200
<b>Scale</b>	3	150	450
<b>Total</b>			<b>20.150€</b>

### ***Installation***

The cost of installing UNCAP technologies in Simleu Silvaniei is € 3,414.09 / year.

### ***Others***

The storage of the information has been done in a CHINO.io database for which the license had to be purchased. The price of it was € 466.

Total expenses: 24.030€

### **9.5.2.3. Benefits**

The impact analysis does not show significant benefits in this pilot after the clinical study but it should be noted that although the UNCAP technologies purchased have been used for the moment only with the patients who have participated in the pilot, the Day Care Centre wants to use them to provide of common medical devices like Smartphone, glucometer and pulse oximeter and UNCAP technologies will reduce cost in terms of end-users' budget.

Bearing this in mind, given that the technologies purchased can be used by the 20 patients to whom the centre can give assistance, the cost invested per patient would be € 2,015, which would be the savings that each end user will have if they do not need to buy them with their own resources.

On the other hand, the benefits obtained during the clinical study according to the indicators of the impact analysis have been a reduction of hours in time that the ICGs care for their relatives, which is estimated at 5 hours less per week.

If we take into account the average salary of Romania, 587.20 € / month, we will have a benefit of 7 months after the clinical study of

$$20 \text{ hours / month} * 7 \text{ months} * 3.61 \text{ € / hour} = 505.5 \text{ €}$$

### **9.5.2.4. Return of Investment in Simleu Silvaniei**

In this case we will determine the SROI after the clinical study that will be given by

$$SROI = \left( \frac{505,5 - 20.150}{20.150} \right) * 100 = -97.50\%$$

That is to say, for every € 100 invested there has only been a 2.5 € return that also, falls on the General Administration.

In the event that the devices are made available to all patients, the social return on the investment will be very large for the patients, since in this case with an outlay of € 0 they will obtain a benefit in technologies of approximately € 2,000.

## 9.6. Slovenian Pilot

### 9.6.1. Pilot in Maribor

Elderly Home Danice Vogrinc Maribor, where this pilot is developed, is the largest gerontology facility in the Maribor region, which functions as a public institution established by the Republic of Slovenia. It offers institutional care services for elderly people and adults and has a capacity of 809 residents, offering social services, health care and rehabilitation.

For UNCAP project it is a Scenario 3.

#### 9.6.1.1. Objective and interest Group

According D1.1 [1], the main objective for Maribor pilot through the use of UNCAP technologies is:

“to help elderly patients follow their daily routine and adhere to medical treatments (using bio parameter sensors and reminders) improve safety of their independent living (by sending alerts to care personnel), and help them overcome the feeling of isolation”.

According to this objective, the interest group or stakeholders involved in this pilot are Primary End-Users, Formal Caregivers and Informal Caregivers and indirectly Health Insurance Institute of Slovenia (ZZZS) who is the one who finances the establishment.

- **Primary End-Users**

The objective is that this group can live independently in their homes, having access to a remote care service that helps them control their illness, establishes daily routines, collects information about their health and shows them in a friendly way, alerting them in case of alerts, reducing the feeling of loneliness.

- **Formal caregiver**

Reduce the number of medical emergencies by having a more thorough and continuous control of the patient in a non-invasive way.

- **Informal caregiver**

Reduce the stress caused by the care of their relatives, being informed at all times of their state of health.

### 9.6.1.2. Expenses

The information provided in the general questionnaires for this pilot indicates that the expenses that are needed for the adoption of UNCAP technologies would fall into three categories: purchase of technologies, training and maintenance

#### *Purchase of technologies*

In table 11 we can see the investment made in Maribor. The information on the selected technologies has been extracted from D3.12 [4] and the costs thereof from that indicated in D1.4 [3].

**Table 11: Expenses in UNCAP technologies for Clinic Study in Maribor.**

Technologies	Quantity	Price by unit (€)	Cost (€)
<b>UNCAP Box</b>	1	200	200
<b>Smartphone</b>	7	300	2.100
<b>TV set</b>	1	500	500
<b>Tablet</b>	20	200	4.000
<b>PC</b>	1	900	900
<b>Kinect</b>	1	200	200
<b>Glucometer</b>	20	15	300
<b>Glucometer strip</b>	18	18	324
<b>Blood pressure meters</b>	3	200	600
<b>Pulse oximeter</b>	3	60	180
<b>Scale</b>	4	150	600
<b>AP Ruckus Xclaim</b>	22	130	2.860
<b>DLINK switch</b>	4	20	80
<b>Lenovo Y700</b>	1	1.400	1.400
<b>Monitor</b>	1	240	240
<b>Projection Screen</b>	2	200	400
<b>Total</b>			<b>14.884€</b>

In this pilot, we have also, been offered information about the expenses that would be incurred in equipping Elderly Home with UNCAP technology. For this category cost we would have € 39,400.



## **Staff training**

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In the general questionnaire of this pilot it is indicated that 25 people need to be trained at the cost of € 17,500. This figure would be for the adoption of technologies throughout the Elderly Home.

## **Maintenance**

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The maintenance cost of UNCAP technologies for the entire establishment is € 20,400 / year.

Total expenses Elderly home: 77.300 €

### **9.6.1.3. Benefits**

The impact analysis has helped, together with the information provided by the pilots, to obtain the possible social and economic benefits obtained in Maribor if the UNCAP technologies are adopted.

We will calculate the benefits for 14 patients who have participated in the clinical study with UNCAP technologies and the individual ratio per patient.

## **Improvement in Nursing homes expenses**

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This benefit would be the sum of the following sub-items

- **Decreased visits to the general practitioner**

To quantify the benefit, we will take into account the information on indicators obtained in D4.2 [6]. The average number of visits for the patients of the establishment is 3.28 visits / month, while for patients using UNCAP technologies it is 1.2 visits / month, which means a decrease of 2.08 visits / month. The price of each visit is approximately € 30, we have per patient:

$$2.08 \text{ visits / month} * 12 \text{ months} * € 30 = € 748.80$$

For the total number of Test Group patients: € 10,843.20

- **Decrease in visits to the specialist**

The decrease per month and patient in this sub-game is estimated at 1.09 visits / patient. As the cost per visit is estimated at approximately € 60, we have

$$1.09 \text{ visits / month} * 12 \text{ months} * € 60 = € 784.80$$

For the total number of Test Group patients: € 10,978.20

- **Decrease of home visits of the general practitioner**

We are told that in this case the decrease has been 3.2 visits / months. The price of the visits varies between € 70 for visits when the distance to the patient is less than 15 km, € 90 for visits when the distance to the patient is more than 15 km. We will take an average amount of € 80

$$3.2 \text{ visits / month} * 12 \text{ months} * € 80 = € 3,072$$

For the total number of patients with UNCAP technologies: € 43,008

- **Reduction of home visits by medical staff to collect information**

While the average number of monthly home visits to collect medical information is 6, in the case of UNCAP technologies it has been reduced to 0.5. This means 5.5 fewer visits per month. The cost of these visits is € 50

5.5 visits / month \* 12 month \* € 50 = € 3,300

For the total number of patients in the Test Group: € 46,200

- **Decrease in admissions and days in the hospital**

The decrease per month and patient in this sub-game is estimated at 2 days / month. In 2008, in Slovenia the cost of a day of hospital stay was € 285. If we consider a revaluation of 10%, in 2017 we can estimate this cost at € 313

days / months \* 12 months \* € 313 = € 7,512

For the total number of patients in the Test Group: € 105,168

Benefits: € 173,189.40

### **General Expenses**

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The benefit under this heading is obtained from the following subheading:

- **Decrease in numbers hours per week by ICG for elderly cares:**

In the general report of the pilot it is indicated that the relatives of patients with UNCAP technologies dedicate an average of 2.83 fewer hours per week to the care of their relatives than the relatives of patients without these technologies. As the average salary in Slovenia can be estimated at € 1,800 / month (€ 11.25 / hour), we have

11.32 hours / month \* 12 months \* 11.25 € / hour = 1528.2 €

For the total ICG of the Group test: € 21,394.80

Benefits → 21.394.80 €

### **Social Benefits**

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The responsible for the pilot have prepared the information in this section, evaluating the percentage of benefits over general expenses caused by the use of UNCAP technologies.

- **Acquainting the elderly with technology (increased digital literacy by as much as 80%)**

- Some elderly is eager to use tablets and other technologies
- It further motivates them for learning to use internet, email, and even Facebook

- **Increased socialization (~10%)**

- Cross-generational cooperation;
- Younger generation likes to help the elderly with technology, and they can both learn from each other

- **Other benefits for the elderly**

- Less stress with measurements (estimated 10%)
- More autonomy (estimated 10%)

- **Benefits for the nurses**

- Easier tracking, less manual work (than e.g., taking notes) (~10% improvement in efficiency, more for remote people)



- Less effort to monitor medical parameters in the long-term (charts, etc.) (~20% improvement)
- Less travel needed (to remote patients);
- Less room for errors (estimated ~5% reduction in errors)
- Less stress (estimated 5%)

This has been reflected in the impact analysis, for example, with greater general satisfaction in all the interest groups.

The economic benefit of this item is included in many cases in the previous items since a social welfare often implies less hospitalization expenses.

However, we can quantify a benefit of 10% in nurses, which, as FCG means, is 1,800 €, this would mean 180 € / month for each of them. As in the pilot, 25 have participated

$$180 \text{ €/month} * 12 \text{ month} * 25 \text{ FCG} = 54.000 \text{ €}$$

Benefits: 54.000€

Total Benefits: 248.585€

#### 9.6.1.4. Return of Investment in Maribor

Taking into account the information of the previous sections, the SROI for Maribor will be given by

$$SROI = \left( \frac{248.585 - 77.300}{77.300} \right) * 100 = 221.58 \%$$

That is to say, for every € 100 invested, after a year there would be a return of € 321.58 that falls on the official administrations or who manage the Elderly Home in its majority.



## 10. Conclusions

It is evident from the description of the pilot present in this deliverable that the values for the return on investment are very different and varied depending on the pilots. Diverse circumstances influence this outcome, such as the type of technologies chosen, the type of services offered and the standard of living of each country, since the costs of the technologies are the same for all countries but the costs of services can be very different.

In the pilot of Germany, it is observed that the return of the investment will be positive after at least 3 years since the installation is made. This time can be shortened if one takes into account the social benefits that could not be quantified.

In the Greek pilots, it is positive in both cases and in the case of Athens a very high figure is shown after only one year of use of UNCAP technologies. In this pilot, it is also clear benefit in the reduction of overhead costs while the Thessaloniki pilot does not seem to generate any kind of benefit in this area which is in line with the type of services they offer. It is also important in these pilots the Social benefits achieved with a general improvement in the satisfaction of users of all study groups.

In Italy, the return on investment could not be correctly quantified in the pilots of Pergine and Ovest Vicentino given the short duration of the study phase after the problems with the signing of informed consent. However, there are indications of improvements in the quality of life of patients and lower levels of stress in the medical staff, resulting in a better environment and better organization. In Tarzo and Città de la Pieve the SROI is negative after the first year, however in both it recovers part of the capital invested that can be reinvested in other services which is beneficial for the centers and regional health services that subsidize them.

In Skopje (Macedonia), the main problem is that technologies are very expensive in relation to the country's life index, So for a positive return on investment to occur, several years must elapse. Being a private institution, users must pay for Some of the services and the use of these technologies may involve a high initial outlay for the institution. In addition, the Social return is not clear at the moment. Despite good feedback from the managers of the pilot on the use of UNCAP technologies, there is no indicator indicating any improvement.

In Romania, there is a very mixed result between both pilots, while in Baia Sprie the return on investment, although negative, indicates that in the first year it could be considered recovered the investment in Simleu Silvaniei is very far from this point. We can explain this difference in that both pilots represent different types of UNCAP scenarios. From Simleu it is indicated that if UNCAP technologies are used in all the patients that need them and not only in a study group, as has been the case with this project, the return on investment will be much more favourable. In addition, there are Social benefits that have been very complicated to quantify and have not been monetized in the study.

Finally, in Maribor, the SROI has been very positive. Economically after the first year of use of UNCAP technologies a high benefit is obtained; however, it is the amount of Social benefits highlighted by those responsible for the pilot, which indicate the high success of the implementation of these technologies in this pilot.

The economic return on investment falls, in principle, on savings on the health services of each country. Patients in general have included these services within the



benefits offered by the national health system because they are quoted or have quoted via taxes for it, So only in the case of any technology that is not included will they notice any economic benefit.

In the case of the agencies that manage the Elderly Homes that have a fixed item transferred from the health systems, the investment in UNCAP technologies also has an economic return in the sense that either the expense is less than expected (with returns negative) or even obtain benefits that can be invested in other improvements to their establishment.

The economic benefit for the ICG in many cases is not visible as many of them do not perform paid work.

In all cases, however, the Social return is visible and in general improvements have been made in the quality of life, acquisition of new skills, improvements in the organization, lower levels of stress, feeling of security, less isolation and in general greater overall satisfaction. This also affects a decrease in hospitalization expenses and general expenses, which is the category where the return of these benefits is best reflected.