EKOSMART – SMART INTEGRATED HEALTHCARE AND LONGTERM CARE SYSTEM

GOOD PRACTICE - PROJECT

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Contents

Introduction to the Good Practise:

It is a national wide research project implementing telecare and telehealth services for elderly and physically less able people. Telecare is being implemented as a first part of integrated healthcare system including telemedicine treatment of chronic diseases. The services will be offered in following groups: e-care, e-diabetes, e-CHF, e-Cardio, e-astma, e-COPD.

Problem:

Due to the rapidly growing percent of elder population in Slovenia, it is estimated to reach 14% elder than 70 years and 6% elder than 80 years by the year 2020. The existing social care system is expected not to provide financially sustainable solution by traditional approach which also does not support enough care and reassurance for elderly people needed to allow them to remain living independent in their own homes.

Solution:

The project with the aim to enable elderly population, people with chronic diseases, dementia or other difficult health conditions, longer, more active and safer conditions to remain living independent in their own homes, resulted in a social care service based on IoT and person-centered technologies, available 24 hours a day. The technology supporting the service detects a need for intervention also if a user is due to falling or other difficult health condition not able to make an urgent call.

Impact:

The developed telecare service is expected to reduce 10% of total number of hospitalizations caused by patient falls in their homes. After the ongoing integration with the telemedicine service model in the pilot stage, an integrated health treatment will be available combining the effects of telecare and telemonitoring for patients with diabetes type 2, congestive heart failure, arterial hypertension, asthma and COPD.

1. Relevancy of the Good Practise (GP) project

The “Relevancy of the GP project” section provides quick check and definition of its relevancy in regards to HoCare project objectives.

Good practice of quadruple-helix cooperation in R&I?	Yes, this GP project includes good practices of quadruple-helix cooperation in R&I
Good practice of delivery of Home Care R&I?	Yes, this GP project includes good practices of delivery of Home Care R&I.
If not in Home Care R&I, describtion and proof of its potential for transferability to delivery of Home Care R&I	
Generation of innovation in home care through answering unmet needs identified by formal or informal healthcare providers?	Yes, this GP project includes good practices of innovation through answering unmet needs.
Generation of innovation in home care through public driven innovation?	No, this GP project does not include good practices of public driven innovation.
Generation of innovation in home care via quadruple-helix cooperation for quicker delivery to the market?	Yes, this GP project includes good practices of innovation via cooperation for quicker delivery to the market.

2. Quick overview of the GP project

The “Quick overview of the GP project” section provides initial overview of the good practice project (GP project) and enables readers to see if this GP project idea is relevant for possible transfer to their organization potential innovation activities.

Name of the GP project	EkoSMART – Integrated Health Care Services
Region of origin of GP project	Slovenia
5 keywords that best describe the content of the GP project	EkoSMART programme is focused on three key areas for which it was assessed that their digitalisation can bring the strongest individual and synergy effects. Those areas are: health, mobility and active life and well-being.
Relevant Programme name through which the GP project has been funded	Call for proposals “to support Research and development programmes (TRL 3-6)” issued by Republic of Slovenia, Ministry of education, science and sport.
Relevant support programme / intervention area name of the GP project through which it was funded	RIS3 – smart cities and communities
Single or multiple recipients?	multiple recipients
Type of lead recipient and its role	SME – development of Healthcare platform Think!EHR,

(SME, LME, research centre, innovation centre, network/association, university/school, municipality, other public body, other (specify)	Codevelopment of the portal and Virtual home assistant.
Types of participating partners and their roles (list all participating partner types. E.g.: hospital, social house, senior house, patient association, networks, SMEs, LMEs, research actors, business supporting organizations, public institutions/regulators, other (specify)	Marand d.o.o. - SME Alpineon d.o.o. - SME Cosylab d.d. - SME Elgoline d.o.o. - SME Inova IT d.o.o. - SME Anton Trstenjak Institute of gerontology and intergenerational relations – research institute Institut »Jožef Stefan« - research institute Iskra d.d. - LE University Clinic of Respiratory and Allergic Diseases Golnik - Hospital Medis d.o.o. - SME National Institute of Public Health – public institution Nela razvojni center d.o.o. – research institute RC IKTS d.o.o. – research institute Robotina d.o.o. - SME SRC sistemske integracije d.o.o. - LE Špica International d.o.o. - SME Telekom Slovenije d.d. - LE UL - Faculty of Electrical Engineering – University UL - Faculty of Computer and Information Science – University UL - Faculty of sport – University UL - Faculty of Medicine – University UM - Faculty of Electrical Engineering and Computer Science – University University Medical Centre Ljubljana - Hospital URI-University Rehabilitation Institute Republic of Slovenia - Hospital Dr. Adolf Drolc Healthcare Center – community healthcare center

3. Transferability

The “Transferability” section provides more detailed review of strengths and weaknesses of this GP project including description of necessary basic conditions for region and leading organization to potentially transfer it. At the end of the section, the key threats in the successful transfer open up possibility to focus on specific relevant issues important for the successful transfer.

Strengths and weaknesses of the project

What are the GP project strengths? Why it was funded?	The EkoSMART programme will have the impacts on **Innovation capacity and the integration of new knowledge** and **Environmental and societal impact:** •The creation of a strong development ecosystem that will enable the research, development and innovation in the field of smart cities in the long term even after the end of public funding. The consortium partners have the intention to participate in the joint development and innovation after the end of the programme. • Significantly faster transfer of results of the joint development of researchers from the public and private sector to the market, which will be enabled by a high concentration of competencies and research

	infrastructure in possession at the PROs and the participating businesses. •The consortium involves 13 innovative companies, some of which are even the leaders of value chains in domestic and regional markets. System integrators are a highly important factor in the economic development of Slovenia, since such companies are capable to appear on foreign markets and gain more business in the integrated solutions and create added value by themselves and together with their consortium partners. To successfully compete in the global markets in the field of smart cities one needs to provide integrated and complete solutions, which can only be offered by large international companies or consortia. Currently, there is no such company or consortium in Slovenia, however, it is one of the long-term goals of the EkoSMART consortium to become an important player in the international market of smart city platforms. The global market potential is indeed very large, the initiative "100 smart cities in India" being just one example of the scale.
What are the key weaknesses of the GP project?	Among the obstacles related to the EkoSMART programme, the most important ones are bureaucratic, legal and organisational conditions in individual areas of work, especially healthcare and home care. Even the most perfect solution, which does not receive the approval of the competent services or current political options, will not be exercised in particular in clinical settings, hospitals or homes for the elderly. Although the official opposition to the proposed solutions is unlikely it can effectively stop or slow down the adoption by slow paced issuing of permits and approvals. Given the importance of this problem we maintain close contacts with these stakeholders, where we will constantly need to check for readiness for the introduction of new EkoSMART solutions and adapt. Current legislation does not cover the telemedicine as a part of the healthcare and treatment and Legislative requirements regarding safety and privacy of personal medical data may represent an important barrier to achieving the impacts.

Basic conditions for successful transfer

Why is this GP project transferable? – innovation, impact, financial, legal, and timeframe aspects	It is a national wide research project implementing telecare and telehealth services for elderly and physically less able people. Telecare is being implemented as a first part of integrated healthcare system including telemedicine treatment of chronic diseases. The services will be offered in following groups: e-care, e-diabetes, e-CHF, e-Cardio, e-astma, e-COPD. Due to the rapidly growing percent of elder population in Slovenia, it is estimated to reach 14% elder than 70 years and 6% elder than 80 years by the year 2020. The existing social care system is expected not to provide financially sustainable solution by traditional approach which also does not support enough care and reassurance for elderly people needed to allow them to remain living independent in their own homes. The project is a home care project by design. Transferability to other countries could be perform as a transfer of tasks this project encounters in order to integrate all helixes in the R&D phase and make a market ready customer services. Each county has specifics in the legislation, user demands (in details), available income, social security system etc, however general demands and demographics is equal.

What are the basic conditions the region needs to have to be successful in transferring this good practise?	The basic precondition for a region should be an established legislation framework for the Home care services including financial/reimbursement policy. IF it has not been established yet at least there has been strong intention to establish it soon. Legislative requirements regarding safety and privacy of personal medical data may represent an important barrier to achieving the impacts.
What are the basic conditions the leading recipient from the region needs to have to be successful in transferring this good practice?	Good knowledge of advance ICT based home care services, large end-user base and strong will of the region to be advance in home care services.

Key threats in GP project transfer

What are the key potential threats for the GP project transfer?	The major question is whether the new services will be classified as priority, recommended and/or co-financed. Impact will largely depend on the system solutions or the support at the government level, relevant ministries, departments, insurance companies, especially the health related ones.

4. Description of the GP project

The “Description of the GP project” section provides more detailed information on the Good Practice project (GP project) and enables readers to get further detailed inspiration and easy ready-to-use information for possible innovation transfer to other project applications. This includes: tackled problem, time length of the GP project, objectives, phases, activities and deliverables of the GP project, its main innovation and target group.

Description of the tackled problem

What was the problem / challenge tackled by the project?	- to achieve the conditions for sustainable economic growth and safe and quality life for individuals and communities through smart management - the ageing of population - increase of patients with chronic diseases - unsustainable social and health systems
What were the reasons for the problem?	The ageing of population and increase of patients with chronic diseases are global trends that have been present for several years. OECD health indicators such as the number of chronic patients by chronic diseases, the number of chronic patients with several chronic diseases, amputations of extremities in adult patients with diabetes, hospitalisations due to chronic heart failure, blindness and increase in the number of dialysis patients are alarming since they point to unsustainable social and health systems and represent a large social and economic burden. Due to increased complexity of medical methods there are more and more complications during treatment, and the lack of funds to cover the increasing number of patients results in longer waiting times, increased levels of hospitalization and rehospitalisation and this eventually leads to a decreased quality of life. This point to the need for economically efficient artificial intelligence and ICT solutions that can meet the complex aspects of modern medicine. EkoSMART programme will devote a lot of attention to the health area, since it has been proven that appropriate use of ICT solutions can significantly contribute

	to optimising health care and efficiency of treating (mostly for chronic patients). Countries that have managed to develop and (partly) introduce patient treatment based on ICT for individual chronic diseases (e.g. diabetes, heart failure, COPD) have marked positive economic effects (savings both in individual treatments and at the macro level), significant improvements in treatment results and greater patient satisfaction.

Time length of the GP project

What was the time length of the GP project in months?	Start date: Aug 1, 2016 End date: Jul 31, 2019

Objectives of the GP project

Describe the overall and specific objectives of the GP project	To develop smart city integration platform (by using the microservice architecture) that will enable gradual inclusion of individual aspects of smart city in to a common ecosystem To develop and use advanced mechanisms for managing the smart city as a system of systems (capacity for incremental learning, self-regulation, searching balance between non-homogenous sources etc.) To examine the fields of health, mobility and active life and well-being and to identify the sectoral and intersectoral value chains To use IoT and IKT solutions to support key sectoral and intersectoral value chains and integrate them into the smart city integration platform To demonstrate the applicability and potential of developed solutions

Phases, activities and deliverables

List all main phases of the GP project including their time length	Smart Mobility – Traffic management & Control Systems Active life for overall well-being Electronic and mobile healthcare **Smart Integrated Healthcare and Long-term Care System** Testing and validation of EkoSMART prototypes
List and describe all **main activities that were implemented by the GP project**	The project “Smart Integrated Healthcare and Longterm Care System” will develop approaches and prototypes to ensure the basic conditions for effective transformation to integrated healthcare and home care system. We will provide: integration of different levels of healthcare, effective and secure exchange of information among different stakeholders of the healthcare system on the national level (national registers, accounting system, big data analysis) and basic conditions for development and sustainability of the healthcare and social system. - Development of a model of integrated healthcare provision and the establishment of related infrastructure - Development of a systemic foundations for extending the model of integrated healthcare provision at the national level - Raise the quality of life and safety of chronic patients and extended care in the home environment - Safe use of medicines and reduced number of referrals to clinical pharmacologists
List all main deliverables of the GP project	Review of key legislation and proposed amandements Proposed interoperability framework for TMT Analysis of security and privacy aspects of TMT with recommendations Appointing the project ethics committee

	National professional pharmacological guidelines and standards Proposed financial models by type of TMT KPI model Analysis of KPI and verification of financial models and proposed final accounting model List of criteria and selection of sensors Application programme interface for access to anonymised data Prototype integration of selected sensors Integration of OM2M+ platform with selected sensors Prototype of advanced applications Laboratory prototype of stakeholder alarm system Application programme interface to NIJZ Proposed improvement to user interface of the TV channel Concept of telemedicine platform Application programme interface and presentation in hospital system Prototype presentation of health data in the geographical information system Programme module for implementation of new clinical pathway in the prototype Strategy and development plan for TMT model TMT model for individual chronic diseases The plan and content of training for healthcare personnel and patients regarding the use of telemedicine services and ICT technological tools Model for operation of national telemedicine centre Model of health telecare after discharge from hospital Model for operation and establishing of assistance centre National telepharmacology model

Main innovation of the GP project

What was the main innovation of the GP project?	The main ambition of EkoSMART programme is to develop comprehensive information solutions and establish environments (chains) in the areas of smart city, health care, active life and mobility. The novelty in comparison with existing solutions is the introduction of artificial intelligence and new ICT services, the fields in which Slovenia is traditionally excellent. The fundamental approach followed by the programme is to integrate the products that are already successfully marketed in Slovenia and abroad by consortium partners.

Target group of the project

Who was the main target group of the GP project? (SME, LME, research organization, university, public institution, healthcare provider, business supporting organization, other (specify)	- Formal and informal carers - SME, business segment - Universities and institutes - Healthcare organizations
Describe the main target group	The target group is elderly having chronical illness or other kind of impairment.

5. Impact

The “Impact” section provides more detailed information on the effect of the GP project implementation and dissemination of major outputs.

Impact

<table>
<tr><td>What was the level of geographical impact of the GP project? (village, city, county, country, international, other (specify)</td><td>National (Slovenia) level</td></tr>
<tr><td>What were the final impact indicators including their quantification?</td><td>
<table>
<tr><th colspan="4">Expected programme results and impacts[1]</th></tr>
<tr><th rowspan="2">Indicators</th><th rowspan="2">Description</th><th colspan="2">Expected value</th></tr>
<tr><th></th><th></th></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Total number of RD projects</td><td>6 (5IR+1ER)</td><td></td><td>6</td></tr>
<tr><td>Total number of research hours in FTE</td><td>Consortium members and outsourcing</td><td></td><td>195,25</td></tr>
<tr><td>Number of new researchers in supported entities in FTE[2]</td><td>New employments</td><td></td><td>14</td></tr>
<tr><td>Number of enterprises cooperating with research institutions</td><td>Number of enterprises in consortium</td><td></td><td>13</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Number of innovations</td><td>New solutions in the field of open IT platform and sensorics</td><td></td><td>2</td></tr>
<tr><td>Number of patents</td><td>Slovenian patent application</td><td></td><td>4</td></tr>
<tr><td>Increase of private investments in RD as a result of the programme</td><td>More available own resources and increased cooperation among companies and RD organizations</td><td></td><td>145.000</td></tr>
<tr><td>New technology, process and organization solutions</td><td>New technologies upgraded and updated existing technologies (see 3.1a)</td><td></td><td>9</td></tr>
<tr><td>New products and services</td><td>New products, upgraded products and specifications or lab prototypes</td><td></td><td>5</td></tr>
<tr><td>New investments</td><td></td><td></td><td>75.000</td></tr>
</table>
</td></tr>
<tr><td>Describe the changes resulted from the project activities</td><td>Project is not finished yet, but is expected to reach set project results.</td></tr>
</table>

Dissemination of outputs

Describe dissemination activities of the project outputs carried out during the GP project	The dissemination of the results will take place through several channels: (1) presentations of the research and the results are planned year in October at the international conference Information Society, which will bring content, research and products, closer to the scientific community and the general public, (2) uniform website / communication platform, which will gather all the information and links about the programme and promotional materials, (3) publicly accessible repositories of data and software, which will be approved by the consortium, (4) social networks, such as. Facebook, Twitter, LinkedIn, YouTube, for ongoing information and communication with the public, (5) attendance on industry and

[1] Applicants need to complete the indicators in bold as these are the indicators for monitoring the implementation of the OP 2014-2020. The rest of the indicators are optional and can be used in case of relevance for the programme.
[2] Indicator: Number of new researchers employed at consortium partners in FTE refers the number of new researchers employed for the implementation of the RDP (in FTE) as result from R&D work requirements of the applied programme. Employments existing before the start of the programme are not relevant.

	innovation forums, where the companies will present the developed products. The success of any results dissemination type will be monitored with selected key performance indicators, e.g., the success of websites will be monitored by measuring the number of visitors, the success of public presentations will be monitored through questionnaires, etc. This consortium will enable continuous improvement strategy to disseminate the results and provide a high level of awareness among the general public as well as research and industrial spheres.

6. Risks

The “Risks” section provides more detailed review of potential risks of this GP project implementation including their defined mitigation strategies to eliminate them.

Describe risks involved in implementing this GP project including their mitigation strategies

Risk description	Proposed risk mitigation measures
A large number of project groups, their geographic fragmentation and lack of connection between them	- To lay down in detail the mechanisms for coordination and transparency of work in the organisational rules - To ensure additional on-line tools for group work and cooperation
Researchers are changing/leaving during project implementation	- To carry out stimulating measures - To ensure good working conditions for researchers - To regularly document and archive researches, procedures and results
Different working methods and project culture of researchers from public research organisations and companies	- To prescribe strict use of uniform methodology and tools for project management in the organisational rules
RD groups do not meet the time limits (milestones)	- To lay down in the organisational rules the periodicity and forms of internal reporting by heads of tasks, DP heads and RD project heads on the achievement of project goals in terms of time and content
A partner withdraws from the consortium (bankruptcy, liquidation, other)	- To ensure regular and timely keeping of project documentation and archives that will be available to the researchers who will take over the tasks of that partner
Changes in technology or technological standards for which the measuring and testing equipment is still being developed	- To timely plan the purchase or rental of such equipment - To constantly monitor the standards - At the beginning of implementation the process of innovation management will be introduced and will serve also as a system for change monitoring and management
The results of RD project and the programme cannot be transferred to the globally competitive level	- To implement the plan of transferring the results in the next phases of the project (TRL 7 – 9) - To carry out constant market and technological checks of competitiveness at the level of individual RD projects - To organise international events in Slovenia in the field of smart cities and communities (LBT and other), to attend events organised abroad - To carry out the activities of information and dissemination of project results
Not all consortium partners will manage to obtain bank guarantees to ensure the advance payment at the beginning of programme implementation; financing of costs will be disturbed until 2018	- Before obtaining the advance payment consortium partners will conclude a special agreement to ensure that all consortium partners will be able to finance the costs of RD work of their research groups in the programme

	Risk: low-quality prototype Consequence: the prototype does not meet the required characteristics (response, safety etc.)	- To plan, develop and test by stages and to start with the most demanding technical requirements early in the project

7. Budget

The "Budget" section provides more detailed review of costs regarding the project implementation as well as operational sustainability after its end. In addition, if relevant, public tenders within the project and additional generated incomes by the project are showed and explained.

Budget

What was the overall budget of the project in EUR?	8 661 820,50 EUR
List relevant budget lines of the project including their % share from total budget	Personnel cost declared as a unit cost 76,64% Costs of sub-contracting 4,20% INDIRECT COSTS declared using a flat rate 19,16%

Additional income generated by the project

Did the project create any additional income?	no, the GP project did not generate additional income
If yes, specify which type of income and what amount in EUR?	N/A

Public tender

Did the project include any public tender?	no, the project did not include a public tender
If yes, specify what kind of contract (specific contract, general contract, other)	N/A
If yes, specify in what amount in EUR	N/A
Describe the public tender subject	N/A

Financial sustainability after GP project end

Was there an operational financial sustainability plan in the project after its end?	no, the GP project did not include an operational financial sustainability plan
If yes, specify where the operational funds after	N/A

project end came from?	
If yes, specify the amount of operational funds in EUR	N/A

8. Other information

In this section, specific additional information about the GP project could be revealed.

Please describe any other relevant information about this GP project (if relevant)	http://ekosmart.net/en/ekosmart-2/

9. Information gathered by …

The information about this good practise (GP) project has been gathered for the purpose of the HoCare project (Interreg Europe Programme) by the following organization:

Region	Slovenia
Organization name(s)	Development Centre of the Heart of Slovenia
Name of the contact person(s)	Igor Košir
Contact email(s)	igor.kosir@razvoj.si

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Development Centre of the Heart of Slovenia – http://www.razvoj.si/?lng=en

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