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***D6.4 Revised Implementation plan  
Prague***

***WP 6, Task 6.7***

***January, 2018 (M36)***

H2020-SCC-2014-2015/H2020-SCC-2014:

“Smart Cities and Communities solutions integrating energy,  
transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects”

Collaborative Project – GRANT AGREEMENT No. 646578

Project Acronym	TRIANGULUM	
Project Title	<b>Triangulum: The Three Point Project / Demonstrate. Disseminate. Replicate</b>	
Project Coordinator	Damian Wagner ( Damian.Wagner@iao.fraunhofer.de) Fraunhofer IAO	
Project Duration	1 <sup>st</sup> February 2015 – 31 <sup>st</sup> January 2020 (60 Months)	
Deliverable No.	D6.7 Revised implementation plan Follower City Prague	
Diss. Level	PU	
Status		Working
		Verified by other WPs
		Final version
Due date	31.01.2018	
Work Package	WP6 Smart City Framework	
Lead beneficiary	IPR	
Contributing beneficiary(ies)	FHG, UniS	
DoA	D6.7: Development of Follower City Implementation Strategies	



Date	Version	Author	Comment
15/05/2017	0.1	IPR: Adam Pajgrt, Martin Ouzký, Marcela Janečková, Monika Uhlenbruch	First draft
09/06/2017	0.2	IPR: Adam Pajgrt, Martin Ouzký, Marcela Janečková, Monika Uhlenbruch	First draft, reviewed from FHG, SK and MCC
08/11/2017	0.3	IPR: Adam Pajgrt, Martin Ouzký, Marcela Janečková, Monika Uhlenbruch	Second draft, reviewed by FGH, UNIS, FOKUS, SK, MCC, LYSE
18/01/2018	0.4	IPR: Adam Pajgrt, Martin Ouzký, Marcela Janečková, Monika Uhlenbruch	Third draft, integrated feedback from FGH, FOKUS, SK, MCC, LYSE
29/01/2018	0.5	IPR: Adam Pajgrt, Martin Ouzký, Marcela Janečková, Monika Uhlenbruch	Fourth draft, reviewed by FGH and UNIS
31/01/2018	0.6	UniS: Marielisa Padilla	Integrated crosscheck coordination team
31/01/2018	1.0	IPR: Adam Pajgrt, Martin Ouzký, Monika Uhlenbruch	Final version, integrated control of crosscheck from UNIS



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# Abbreviations

CVUT	České vysoké učení technické v Praze - Czech Technical University in Prague
CZSO	Czech Statistical Office
e.g.	for example
ERFD	European Regional Development Fund
ESF	European Social Fund
EV	Electro vehicle
H2020	Horizon 2020 - EU Research and Innovation programm
ICT	Information and Communication Technology
IPR	Institut plánování a rozvoje hlavního města Prahy - Prague Institute of Planning and Development
OICT	Operátor ICT - Operator ICT
OP PPR	Operační program Praha - Pól růstu - Operational Programme Prague - Growth Pole of the Czech Republic
TA CR	Technologická Agentura České Republiky - Technology Agency of the Czech Republic
UCEEB	University Center for Energy Efficient Buildings
UNESCO	United Nations Educational, Scientific and Cultural Organization



## Executive Summary

In 2014, the Prague Institute of Planning and Development (IPR Prague) successfully became part of the international consortium of the project Triangulum as a Follower City. The project focuses on innovation in Smart Cities, with emphasis on ICT, mobility and energy efficiency. The ambition of IPR Prague was to be introduced to the agenda of smart cities by taking inspiration from innovative solutions demonstrated and implemented in the three Lighthouse Cities: Manchester (UK), Eindhoven (the Netherlands) and Stavanger (Norway) and to transfer and replicate them in the context of Prague. Within the framework of the Triangulum project, funded by the European program of the Horizon 2020, the key deliverable for IPR Prague to M36 of the project is the Implementation plan. The present Implementation plan is addressing the following points:

- City district area to be used for smart city implementation,
- Technologies & solutions to be implemented,
- Costs of planned implementation measures,
- Funding and business models applied for implementation,
- Reference to lighthouse cities (replication),
- Key timescales, lead partners,
- Risks & risk mitigation measures,
- Local governance & coordination structure.

Between 2015 and 2016, IPR Prague was also member of the innovation network »Morgenstadt: City Insights« and was able to link the Triangulum project to the Morgenstadt City Lab Prague that took place between May of 2015 and March of 2016 and build upon its outcome. The outcome of the cooperation between the IPR Prague team and Fraunhofer IAO is a final report that contains an in-depth analysis of Prague, which proposes a series of potential measures in the areas of governance and civil society, space, planning and mobility, energy systems, buildings, economy and innovation. These measures aim to accelerate a smart future development of the City of Prague and are integrated into a roadmap. Although the Morgenstadt report, completed towards the end of 2017, stayed at the level of discussion about the proposed follow-up projects rather than their implementation, as it lacked support from the political leadership, the key findings of the report and the associated process were transferred into the Strategic Plan of Prague and brought key input into the Triangulum project.

The initial ambition of the Triangulum project was to push for the implementation of a systematic, city-wide solution; however this was evaluated as not feasible within the timeframe of the project. The project was refocused on demonstrating a more concentrated and tangible solution on a district level in the form of a pilot project. Such a pilot project, tackling a city-wide challenge on a district level, has the potential to develop, test and evaluate a range of compact smart solutions, including such solutions of the field of ICT, e-mobility and energy efficiency with the potential to be scaled to the other districts of the city.





The Triangulum project has sought solutions to the identified negative impact of the ageing of the population. The Strategic Plan of Prague has identified the ageing of the population as one of the biggest challenges facing the city in the upcoming years. By the year 2030, there will be an increase of 17% of citizens over 65 years of age living in Prague, and a 65% increase of the population above 80 years of age. This is creating a growing pressure on the city and its services, as with the increase in the number of seniors, the number of those who depend on different levels of care also increases. IPR Prague has been inspired by the approach of all of the Lighthouse Cities, and especially the City of Stavanger and the local Stavanger consortium's focus on the smart home care agenda. This significantly contributed to IPR Prague's decision to choose the theme of smart home care as the overarching theme of Prague's pilot project designed within Triangulum. The pilot project looks at the essentials of how to ensure the safety and well-being of seniors on the verge of losing their self-sufficiency, and how to enhance their quality of life. The city district of Prague 7 was selected as a pilot city lab for demonstrating the possibilities of innovative technologies in this area.

During 2017, cross-sectoral cooperation was put into practice with the close collaboration of IPR Prague, the city district of Prague 7, and the University Center for Energy Efficient Buildings (UCEEB), which is an institute of the Czech Technical University in Prague. UCEEB was subcontracted from Triangulum budget to conduct the feasibility study in collaboration with the task force. Between June 2017 and December 2017, this working task force developed a feasibility study which examines the system of social and health care for the elderly within the city district Prague 7. Through the process of participatory design, the relevant local stakeholders were engaged and the individual needs of the represented seniors were mapped.

Integration of several analytical inputs such as the analysis of social and health care situation in Prague 7, a set of discussions and workshops as well as inspiration from partner cities in the Triangulum project have produced a comprehensive list of seven measures for implementation. The innovative measures are in the field of ICT, mobility and energy efficiency at the city district level. This implementation strategy also identifies several financing options for the measures and incorporates the measures into a high-level implementation roadmap. For a better overview, the individual measures are categorised as Measures (Ms). The deployment of technologies has to be preceded by organisational and procedural changes. These prerequisites are summarised in the Measure 0 (M0).

- M0: Project management and coordination
- M1: System for support of integrated care
- M2: Service Portal for Senior Citizens
- M3: Extended emergency care
- M4: Smart homes for seniors
- M5: Electromobility for social services and seniors
- M6: Mobility of seniors
- M7: Update of Prague's 3D model



The first seven of these measures are for the city district of Prague 7 to implement in a pilot project, while the last measure is a measure for IPR Prague; the update of the city's 3D model will have city-wide implications. The update of the 3D model will be partly financed by Triangulum budget.

As a result of this process, a quadruple helix model of cooperation was strongly encouraged, new cross-sectoral partnerships were established and important insights were exchanged. The suggested measures, combined into a pilot project as proposed in this document, have the potential to indirectly impact the whole City of Prague, as they deal with city-wide challenges on a district level. The pilot project is proposed to start during 2018. Should the implemented solution prove to be successful, it has the potential to be replicated in the other city districts. However, the implementation and potential replication is mainly dependent on whether the leadership of the district of Prague 7 takes ownership of the proposed pilot project during 2018.

# 1 Introduction

This Implementation Strategy was prepared within the framework of the international Triangulum project funded by the European Horizon 2020 program. The project focuses on innovation in Smart Cities, with emphasis on ICT, mobility and energy efficiency. During the period between February 2015 and January 2018, IPR Prague was actively cooperating within the project consortium with the Lighthouse Cities Fraunhofer IAO and the University of Stuttgart in order to develop the Implementation Strategy and thus replicate the Lighthouse Cities' solution in the context of Prague. Moreover, IPR Prague was also actively engaging with the Follower Cities while going through the process of learning together and sharing best practice.

This following Implementation Strategy of Prague draws its input predominantly from two documents that were developed as part of or directly linked to Triangulum. The first document is the Morgenstadt report<sup>1</sup>: City Insights City Lab Prague, was not funded by Triangulum, but has created substantial synergies as it has focused on the smart city agenda and involved the key stakeholders in this area. Moreover, the project involved the same working units on the side of IPR Prague and Fraunhofer IAO. In 2014, the City of Prague applied for the Morgenstadt City Challenge in order to follow the European sustainable development trend and link local innovation, value creation and sustainability in a stakeholder-centred approach. The City of Prague was selected by the Morgenstadt network partners as the first city to undergo the Morgenstadt City Lab. The final report is the result of the Morgenstadt City Lab Prague carried out by Fraunhofer IAO in cooperation with IPR Prague between May 2015 and March 2016. The report contains the city profile of Prague and an in-depth analysis of Prague based on the Morgenstadt assessment framework for sustainable urban development. It features a series of potential measures in the areas of governance and civil society; space, planning and mobility; energy systems; buildings; economy and innovation. These measures

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<sup>1</sup> cf. Fraunhofer Gesellschaft 2015



aim to achieve acceleration of the future smart development of the city and the report integrates them into a roadmap.

The second key input of the Implementation Strategy is a feasibility study<sup>2</sup> done in close collaboration between IPR Prague, the city district of Prague 7 and the University Center for Energy Efficient Buildings (UCEEB), an institute of the Czech Technical University in Prague. UCEEB was subcontracted from Triangulum budget to conduct the feasibility study in collaboration with the task force. The feasibility study examines the system of social and health care for the elderly within the city district Prague 7. Through the process of participatory design, the relevant local stakeholders were engaged and individual needs of the represented seniors were mapped. The feasibility study introduces innovative measures of ICT, mobility and energy efficiency into the city district level and indirectly for the whole City of Prague. The conceptual part of the feasibility study, suggesting measures for a smart home care solution for Prague 7, was also inspired by the Lighthouse Cities use cases. Moreover, IPR Prague is updating its current 3D model of the city and is working with a large number of open datasets of spatial data.

Finally, IPR Prague put together five financial models as a set of possible solutions to ensure the financing of the proposed measures in the feasibility study, along with a high-level implementation roadmap of the pilot project. The five proposed financial models differ from each other with regard to the source of funding and the organizations that will ensure the implementation of the measures. Smart Home Care for elderly citizens has been identified as the area of focus for the project Triangulum, as it integrates smart household services, ICT, energy efficiency and smart and electronic mobility. Moreover, it reflects the growing needs within the whole City of Prague. Prague 7 was chosen as a suitable pilot district for the approach of the demonstration of the possibilities of modern technologies. Should the pilot project prove to be successful, it has the potential for being streamlined and scaled for implementation within other districts of Prague and perhaps even beyond the city's borders.

**This Implementation Strategy document is structured as follows:**

Firstly, the chapter “City Context and the Definition of the Initial Challenge” provides an overview of the context of the agenda of smart cities of the City of Prague, the strategic framework set out by the Strategic Plan of Prague and its connection to the Triangulum project. It also provides an overview of the key actors of the smart city agenda in Prague and their responsibilities. Secondly, the chapter Morgenstadt City Lab Prague provides a high-level overview of the Morgenstadt methodology used during the City Lab Prague. It subsequently summarizes the process and results of the Morgenstadt City Lab Prague in the individual areas. It describes the proposed measures with city-wide implications in five key areas and lists the priority measures that were introduced to the Commission of the City Council for development of Smart Cities of Prague by IPR Prague. This chapter then provides an overview of the development within the Triangulum project after the Morgenstadt City Lab Prague.

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<sup>2</sup> cf. Janovský et al. 2017



Thirdly, the chapter “Pilot District Prague 7” introduces the context of the area of the proposed pilot project and the strategic aims for Prague 7. The chapter describes also the methodology for the work on the feasibility study on Smart Home Care for Prague 7, the process of identifying the needs and obstacles in the field of health and social care in Prague 7 and the developing of the pilot project and its structure.

In the subsequent chapter, the pilot project measures are described. It deals with funding issues relating to the introduction of innovation in such a way as to ensure that the proposed measure solution is feasible. The focus of the measures is mainly on the use of modern technologies from the field of ICT, e-mobility and energy efficiency. Six measures shall respond to the needs, in particular in the field of care for senior citizens in their home environments on the city district level. The seventh measure is valid for all of Prague and involves the update of Prague’s 3D model.

The last two chapters summarise the roadmap and the timeline of the Implementation Strategy into a Gantt chart overview and highlight the key objectives, dependencies and next steps in the project.

## 2 Purpose and Target Group

The purpose of the Implementation Strategy is to respond to challenges in the field of health and social services for senior citizens in Prague, specifically to those in the Prague 7 district, by proposing new innovative solutions and technology-based measures. IPR Prague has been inspired by the approach of all of the Lighthouse Cities, but it was the city of Stavanger and the local Stavanger consortium's focus on the smart home care agenda that lead to choosing it as the overarching theme of Prague's pilot project designed within Triangulum. The main question of the pilot project is: “How can smart technology and cross-sectoral cooperation enhance the home care services that the city is currently providing?” The pilot project looks not only at the essentials of how to provide safety and minimum wellbeing for seniors on the verge of losing their self-sufficiency, but also explores the means by which to enhance their quality of life. The city district of Prague 7 was selected as a pilot city lab for demonstrating the possibilities of modern technologies in this area.

Within this framework, technologies are perceived as complementary to human care, not as a replacement for it. New measures have to react to the requirements of recipients and providers of care. For this reason, the Implementation Strategy contains an analysis of requirements, attitudes and capacities of the actors in the system of care for senior citizens.

This Implementation Strategy shall serve as a proposition of innovation into the system of care for senior citizens on the level of the city district of Prague 7 and for Prague’s 3D model, for which it sets out specific objectives and also methods of achieving them. Its outputs are, however, also transferable to other city districts in Prague and



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other cities in the Czech Republic. The Implementation Strategy also addresses the role of IPR Prague, who is responsible for the implementation of the 3D model update and will be an initiating driver of the implementation process for Prague 7. Nonetheless it is Prague 7 who has to take full ownership of the proposed measures in order for the implementation to take place.

The main target group of this Implementation Strategy is the municipality of the city district Prague 7, its employees and its representatives. The additional target groups in Prague 7 include:

- Seniors and their families,
- Informal caregivers,
- State providers of social and health services,
- Contributory organisation<sup>3</sup> of social and health services,
- Doctors and nurses,
- Companies and suppliers of technical solutions and
- Experts in the field of social and health care.

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<sup>3</sup> city funded organisations



## 3 City Context and Definition of the Initial Challenge

### 3.1 Overview of the state of the City of Prague

Prague lies in the middle of Central Europe and is strategically located both within the Czech Republic and in Europe as a whole. The City of Prague, as the largest city in the Czech Republic and its capital, has an excellent position within the Czech Republic, benefits from being well-connected by existing transport corridors, and stands out as one of the main political, cultural, and economic centres of Central Europe. It is the seat of many government authorities, national and financial institutions and is home to the headquarters of a number of national and international companies. Prague is also home to many universities and R&D institutions.<sup>4</sup>

The city is both a statutory town, and one of 14 regions of the Czech Republic. The administration (central city level) is represented by three bodies: Prague City Assembly, Prague City Council and Prague City Hall. The territory of Prague spans 496 km<sup>2</sup> and since 2001 it has been divided into 57 municipal districts (boroughs with elected bodies, autonomous local government power and local administration). 22 of these districts have specific administrative responsibilities in delegated power of national government. The different roles and competencies of the municipal districts are defined by municipal decree (statute). 57 autonomous municipal districts with their own elected bodies are grouped into 22 administrative districts for the purposes of providing national administration services. The municipal districts are very heterogeneous in terms of population numbers, density, living standards and infrastructure quality: for instance, some of the districts have less than 2,000 inhabitants while others have over 100,000 inhabitants.<sup>5</sup> The city itself has a population of 1,250,000 permanent residents, which represent 12% of the overall population of the Czech Republic.

Approximately 1,500,000 people are present in Prague on a daily basis for various reasons.<sup>6</sup> According to population forecasts, the population will increase by 20% to 1,49 million by 2050, which will increase demand for new infrastructure, housing and green and commercial spaces.

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<sup>4</sup> cf. IPR Praha 2015: 40

<sup>5</sup> cf. OECD 2017: 13

<sup>6</sup> cf. IPR Praha 2015: 66





Figure 1: Map of the City of Prague<sup>7</sup>

Prague has a prominent position in the Czech Republic's economy as it contributes 24,7% of the country's total GDP.<sup>8</sup> Moreover, Prague demonstrates continuously improving living standards, relatively high social stability and a strong middle class. A characteristic feature of the labour market in Prague is that it is below the average unemployment rate. The unemployment rate in Prague is also below average in the European Union: in 2016, the unemployment rate in the EU was 2,2% while the unemployment rate in the Czech Republic was 4,0%. All in all, Prague's unemployment rate has steadily decreased since 2005, from 3,5% to 2,2%.<sup>9</sup> More than 40% of employees hold a university degree, and this number is increasing. Thanks to this, Prague has access to a highly educated labour force. The percentage of inhabitants with secondary or higher education is 85%. There are eight universities in Prague and a few dozen additional institutions of tertiary education. The scientific and research capacity of the Czech Republic is largely concentrated in Prague, both in terms of public research institutions and dozens of other organizations and businesses that deal with research and development. Tertiary industries represent more than 80% of value added.

Since the Czech Republic committed itself to the principles of a market economy in the early 1990s, Prague went from an industry-oriented economy to a service-oriented one. Currently, the main drivers of the economy in Prague are printing and food processing, manufacturing of transport equipment, construction incl. housing construction

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<sup>7</sup> cf. IPR Praha 2016

<sup>8</sup> cf. IPR Praha 2015: 12

<sup>9</sup> cf. CZSO 2018



and electrical engineering, finance and consulting, retail and trade, information and communication services, logistics and tourism, incl. conference tourism.

Prague is deeply influenced by its historical core, which spans the 10th to 18th centuries, as well as the entirety of its UNESCO World Heritage designation, which includes 898 hectares. Prague's industrial heritage also contributes to its character, and the future of the brownfields in the city is a source of constant debate.<sup>10</sup> Additionally, the Vltava River is a positive value for the city but also presents a number of challenges with regards to flood protection management. In the future, and even today, Prague is facing and will continue to face many demands on land use and the continuing growth of the numbers of both young and elderly inhabitants.

## 3.2 Strategies and concepts

### 3.2.1 Strategic Plan of Prague 2030

In 2013, IPR Prague was entrusted by the City Hall of Prague to prepare a revision of the Strategic Plan for the city. A special task force from IPR Prague which was working in the cross sectoral field and participatory design was engaged. In 2016, the Strategic Plan was finalized, and it was approved in November of 2016 by the Prague City Council. The Strategic Plan of the City of Prague is one of the key conceptual documents that articulate a shared vision of city development in the long run. Moreover, it provides citizens, investors and public institutions with a framework of how the city wants to develop, and it offers them the opportunity to realize their own activities in line with the city's objectives. The Strategic Plan is made up of 5 priority pillars, which are elaborated into 12 strategic objectives. They address the key social and economic issues of the city and draw attention to the challenges and future developments, while putting forward recommendations for the city to enable it to fulfil its vision.

Social cohesion is one of the five priority pillars and it focuses on the impact of Prague's ageing population. According to the Strategic Plan, by the year 2030 there will be an increase of 17% of people over 65 living in Prague, and a 65% increase of the population above 80 years of age. It is thus estimated that the overall population of Prague above 65 years will include 252,000 inhabitants, including 82,000 inhabitants over the age of 80. This presents great challenges for the city and its services, as with the increase in the number of seniors, the number of those who depend on different levels of care also increases.

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<sup>10</sup> cf. OECD 2017: 19





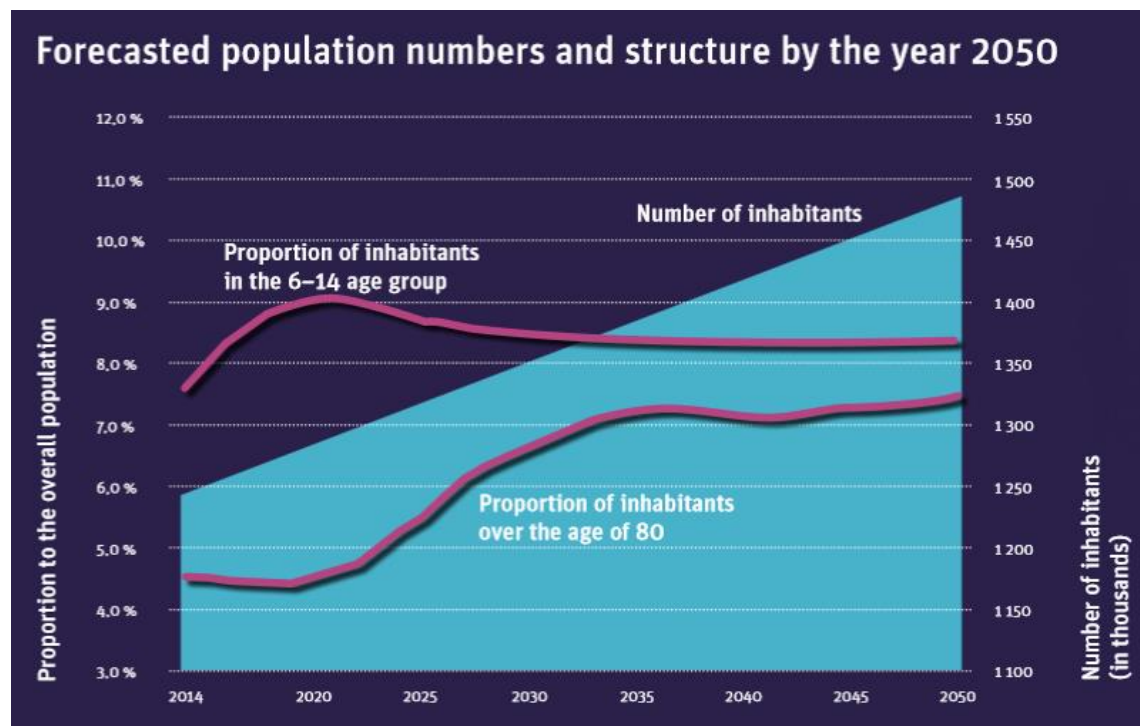


Figure 2: Forecasted population numbers and structure by the year 2050.<sup>1</sup>

Moreover, the economic analysis of the Strategic Plan estimates that the cost of one bed in home care is five times lower than a bed in a nursing home. Most of the available studies have also shown that the quality of life in home care is higher than the one in nursing homes. It is thus in the interest of the municipality to look at ways to support the provision of complex home care services that would enable seniors to stay self-sufficient for longer. This would also lead to a corresponding decrease in demand for nursing homes.<sup>11</sup> The Strategic plan proposes to put in place innovative services for senior citizens. It sets out the goals to:

- extend home care for senior citizens and link that care with day-centre services,
- introduce an information and communication system for senior citizens with home care,
- optimise the work of field workers through services on demand,
- inform senior citizens about services and activities in their area.<sup>12</sup>

<sup>11</sup> cf. IPR Praha 2016a

<sup>12</sup> cf. IPR Praha n.d., 33



The Triangulum project has been linked to the revision of the Strategic Plan as it provided international verification by giving access to the good practices of the Lighthouse Cities in the consortium. It looks at the essentials of how to ensure the safety and well-being of seniors on the verge of self-sufficiency, and how to enhance their quality of life.

The Strategic Plan also focuses on **sustainable mobility** in the City of Prague to ensure that movement of people and goods in the city is socially and economically viable and minimizes long-term impacts to the environment. A sub-strategy of the approach on sustainable mobility is the concept of e-mobility. The aim is to create and better promote charging points for e-vehicles and the wider use of e-mobility in general. Additionally, the City of Prague and its organizations aim to find ways to introduce to electromobility to regular city-based rides e.g. vehicles used by the social services or waste management.<sup>13</sup> The transport policy of the **Sustainable Mobility Plan** formulates the conceptual aims for Prague's future development in the field of mobility. The Sustainable Mobility Plan includes the area of the City of Prague as well as the surrounding areas of the Central Bohemian Region, and provides a transport policy to 2030 with a further outlook. It defines a common vision for mobility as follows: "in cooperation with the surrounding region, Prague applies the principles of sustainable mobility and focuses on more environmentally friendly modes of transport"<sup>14</sup>. Structural aims of the plan include reducing negative impacts of traffic significantly, focusing on more environmentally friendly means of transport, and increasing safety and energy efficiency. For example, to reduce air pollution, noise and the city's carbon footprint, one aim is to use new knowledge and technologies to create a transport system that uses IT segments in traffic to manage and plan the usage of traffic infrastructure like in a smart city. The plan covers the idea of promoting e-mobility to decrease the traffic's impact on the environment and of the transformation of bus routes to electric rail transport. In addition, the plan envisions improvements to transport accessibility for older and disadvantaged inhabitants in order to improve their quality of life.<sup>15</sup>

### 3.2.2 Prague and the Smart City Agenda

#### 1. Activities relevant to the Smart City Agenda

In 2014, Prague's leadership started to focus on the Smart Cities agenda by establishing a special Commission of the Council of the City of Prague for the development of the Smart Cities concept. Prague has further strengthened

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<sup>13</sup> cf. IPR Praha 2016a, 89, 102

<sup>14</sup> cf. Poladprahu 2017, 2

<sup>15</sup> cf. Poladprahu 2017, 2, 11, 14-15



its Smart Cities expertise through its membership in international networks such as EUROCITIES, ISoCaRP and the innovative network called Morgenstadt City Insights, co-ordinated by Fraunhofer Institute IAO. In cooperation with the Fraunhofer Institute, Prague was part of the Smart Cities project, namely the Morgenstadt City Lab project (2015-2016) and the city is still part in the international project Horizon 2020, Triangulum (2015-2020). Prague is also a signatory to the Green Digital Charter initiative.

At the beginning of 2016, Prague's Mayor Adriana Krnáčová introduced a series of thematically structured conferences as part of the Smart Prague Initiative<sup>16</sup> and simultaneously created a web interface for receiving suggestions for pilot projects that would help to convert Prague into a smart city by 2030. For this purpose, the municipal enterprise Operátor ICT<sup>17</sup> was appointed to oversee the Smart Cities agenda and manage Smart City projects, consultancy in ICT and implementation of ICT projects for municipal districts and other municipal enterprises. Operátor ICT has introduced a Smart Prague 2030 Framework with 5 key pillars: Mobility of the future, Smart buildings and energy, Zero Waste, Attractive tourism, People and public space.<sup>18</sup> Among other themes, the last pillar focuses on advanced assistive technologies that provide preventive monitoring, personal assistance, personal hygiene, food preparation etc., which facilitate home care for the elderly and the sick.<sup>19</sup>

## 2. Actors relevant to the Smart City Agenda

**Prague City Hall:** The City Hall of Prague is responsible for several tasks. It shall review decisions issued by bodies of the city sections in the administrative proceedings, unless the act is legally assigned to a special authority or a special law does not provide otherwise. It governs the exercise of delegated powers by city authorities; organizes and conducts inspections on selected sections of the delegated powers of city district authorities, evaluates their results and, in order to remedy the deficiencies, takes the necessary measures. It as well imposes sanctions pursuant to the Act on the City of Prague, secures the construction and operation of the information system of the City Council and of the municipal authorities compliant with the information systems of the administrative authorities, it monitors compliance with government resolutions in the work of district offices in delegated powers and provides them with expert assistance and exercises as well other powers conferred by the law. The basic organizational units of the municipality are departments, which are further divided into departments, and there are also special organizational units.<sup>20</sup>

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<sup>16</sup> cf. Smart Prague 2017a

<sup>17</sup> cf. Operator ICT 2017a

<sup>18</sup> cf. Smart Prague 2017b

<sup>19</sup> cf. Smart Prague 2017b

<sup>20</sup> cf. Praha 2017



In general Prague has a strongly decentralized administrative system that allocates a range of important decisions to the municipal district level. Many decisions that are crucial for a smart and sustainable development of the city are being taken on the municipal district level. This strong exertion of the subsidiary principle bares strong potentials for a bottom-up development process together with the local civil society. It can be – and in some cases it already is – a valuable system for a participatory approach to urban development, for strengthening the identification of Prague’s inhabitants with their neighbourhoods and for enabling a variety of development trajectories with different focus and speed within one city. On the other hand, the subsidiary principle bears a set of risks and barriers for a strong and integrated development of the city, since the Prague City Hall needs to deal with 57 districts and their representatives when pushing for strategic decisions that need to be carried out by the entire city.

Summary of relevant Operational Programmes (ERDF and ESF) covering the city:

The City of Prague receives funding from the European Social Fund (ESF) and from the European Regional Development Fund (ERDF). Prague calls the current operational programme “Operational Programme Prague – Growth Pole of the Czech Republic (OPPPR)”<sup>21</sup>.

**IPR Prague:** The Prague Institute of Planning and Development (IPR Prague) is the body in charge of developing the concept behind the city’s architecture, urbanism, development and formation. It is an organisation funded by the City of Prague and represents the city in spatial planning matters. The institute chiefly drafts and coordinates documents in the following areas: strategic and spatial planning and development, public space, transport, technical matters, and landscape and economic infrastructure. Key projects are creation of a new land use plan for Prague – the “Metropolitan Plan” – and the Prague City Strategic Plan. IPR Prague is also in charge of the important task of processing geographical data and information, both for applied research and for the creation of supporting documentation that is important for the development of the city (particularly the Prague Analytical Land Use Documentation). IPR Prague is the administrator of the geodata portal which contains numerous maps of Prague available to the general public and works with universities, scientific research institutions, and non-profit organisations, both nationally and internationally.

In collaboration with the city hall IPR Prague is partner in the project Urban Nature Labs (UNaLAB) which belongs to the SCC-2-2016-2017: Smart Cities and Communities Nature based solutions call. The project runs from 2017 to 2022. As part of the project, the City of Prague is one of five Follower Cities expected to draw lessons from the experiences of the Frontrunner Cities of Tampere (Finland), Eindhoven (The Netherlands) and Genoa (Italy), which are already employing Nature Based Solutions to help create more climate resilient cities. The other Follower Cities are the City of Stavanger (Norway), Castellón (Spain), Cannes (France) and Basaksehir (Turkey). The result of the

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<sup>21</sup> cf. penizeproprahu 2018



project will be an integrated roadmap for each follower city and a portfolio of desired implementation projects for Nature Based Solutions for the short- and long-term.

**Operátor ICT:** “Operátor ICT, a.s. is a municipal enterprise that primarily secures agenda and manages Smart City projects, consultancy in ICT and implementation of ICT projects for municipal districts and other municipal enterprises.”<sup>22</sup> The Operátor ICT was created on 27 February 2014 and is the ownership of the Capital City of Prague. The company's vision is “to be a reliable and respected partner in information and communication technologies for Prague and other business partners.”<sup>23</sup>

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<sup>22</sup> Operátor ICT 2017 b

<sup>23</sup> Operátor ICT 2017 b



## 4 Morgenstadt City Lab Prague

The following chapter provides an overview of the Morgenstadt methodology. Subsequently, it summarises the results of the City Lab Prague in the framework of the Morgenstadt. The last part of this chapter gives an overview about the next steps which were taken after the Morgenstadt City Lab within the Triangulum project. The Morgenstadt City Lab was not funded by Triangulum; however it is strongly connected to the Triangulum project, that builds on the findings of the City Lab, as it has focused on the smart city agenda and involved the key stakeholders in this area.

### 4.1 Morgenstadt methodology

The Morgenstadt is an “assessment framework for sustainable urban development, which is a multidisciplinary methodology for analysing complex urban systems and transferring this knowledge into integrated concepts and innovative solutions for future cities (Fraunhofer IAO, 2013). The Model was developed in the course of Phase I „m:ci“ and is based on the deep-dive analyses of Freiburg, Berlin, Copenhagen, Singapore, New York City and Tokyo. In order to achieve an in-depth understanding of the sustainability performance of cities both qualitatively and quantitatively, the Morgenstadt Model is structured into three levels of analysis:

1. performance indicators (quantitative analysis);
2. key action fields (qualitative analysis);
3. impact factors (qualitative analysis).

The first two levels of analysis, namely performance indicators and action fields are generic, meaning that they are to be applied with no variations to the sustainability performance assessment of every city partaking in the City Lab project. The third level of analysis – impact factors – is aimed at identifying drivers and barriers that are specific to each city and conditioned by its unique historic, cultural, economic, climatic, morphological, etc. characteristics. In this way, impact factors replenish the generic model and adjust it to the unique needs of each city thus providing for an objective performance profile and at the same time laying out the basis for an individual sustainability roadmap. In this way the combination of quantitative and qualitative means of analysis ensures the generation of an objective performance profile of the city. At the same time, the city’s individual characteristics are essential for the design of customized development strategy.”<sup>24</sup>

The in-depth analysis of Prague from the on-site assessment further consisted of 57 interviews with the stakeholders from the City Hall, institutions closely related to the city (subsidiary organisations) such as TSK, PVK, PVS, universities and also local businesses. These interviews focused on identifying current strengths, challenges

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<sup>24</sup> Fraunhofer Gesellschaft 2015, 10



and development opportunities of the city. They helped to create an analysis of systemic impact factors that help understand external pressures, underlying forces, dynamics, socio-cultural and historical implications that are present within a city and impact (often unnoticed) on decisions, structures, strategies and measures taken on the city level and on the project level.

## 4.2 Results from Morgenstadt City Lab on-site assessment in Prague

The purpose of the Morgenstadt City Lab Prague was to identify the strengths and weaknesses of the city across several sectors and action fields for a smart and future-proof development. It was also intended to identify main future opportunities, current barriers that need to be overcome, and to show possible trajectories for a sustainable development of Prague. This took place between March of 2015 with the initial kick-off conference and April of 2016 when the final results were presented to the leadership of the City of Prague. Essential part of the process was extensive data collection and assessment of 117 indicators and 86 action fields, that took place between April and June of 2015, on-site assessment that consisted of 57 structured interviews with relevant stakeholders and experts in Urban Development that took place between 8th and the 19th of June of 2015. This process led to identification of the largest challenges and proposal of 10-15 measures that would support and accelerate smart development of Prague. These measures were introduced and further elaborated during the innovation workshop with local stakeholders at IPR Prague on the September 24th of 2015.

The integration of members of the City Hall and of IPR Prague into the entire assessment and project development process was essential to ensure capacity building of the local team. As a result, knowledge and expertise with regards to the methodology, the technologies and the process were shared in order to enable a sense of ownership and an uptake of projects after the roadmap has been delivered to the city. The report of the Morgenstadt City Lab has served as a momentum for creating partnerships. Although the report so far stayed at the level of initiating discussion about follow-up projects, the report and the connected process transferred key findings into the Strategic plan of Prague and brought key input into the Triangulum project. The results of the City Lab are divided into 5 following areas:

- Governance system and civil society,
- Energy system,
- Space, planning and mobility,
- Buildings,
- Economy and innovation.

Following the areas are described more in detail.



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### 4.2.1 Governance system and civil society

The current leadership and governance system of Prague is facing a range of challenges that need to be tackled in the coming years in order to transform the traditional city administration into a strategic and transparent management unit for the entire city. The Implementation Programme of the Prague Strategic Plan demonstrates the will to take the necessary steps towards becoming a Smart City and suggests focusing on strengthening research and innovation, promoting social inclusion, and investing into sustainable mobility and energy. Yet the Prague governance system as of today is not adequate for managing a “Smart City”. There is a strong need for action on the organizational, strategic, and structural scale in order to make the strategic management system of Prague for the challenges of today and coming decades.

The administration of the City of Prague is following a traditional bureaucratic pattern of organization which manages different sectors independently from each other and relates them to political parties. In times of digitalization and a fundamental change in the economy this leads to an inefficient use of financial and human resources and to an increase in unaddressed issues, since no department feels fully responsible. Reserves are also in wider use of modern learning tools (use of ICT), knowledge sharing, use of project management methods and support for international cooperation in order to bring more innovation and inspiration from abroad. In the City Hall of Prague today there is no administrative unit dealing with cross-sectoral issues. The organizational system of the city administration is structured hierarchically and cross-departmental decisions are based on the voluntary interaction of the heads of departments or resolutions of the City Council. The city lab proposed to transform the traditional city administration into a strategic, transparent and integrated management unit for the entire city that would form the cornerstone of a “Smart governance”. Moreover, such a transformation is identified as a prerequisite for Prague's transformation into a smart city that secures strategic development topics on the political agenda.

Prague has made negative experiences with expensive public-private-partnerships in the past and is now hesitant to collaborate with the private sector. However, it is necessary to improve the relationship between the City Hall and the private sector and to establish a new partnership with the private sector. The city lab proposes - on the principles of transparency and equal treatment of all parties - to activate private sector innovation and entrepreneurship for supporting sustainable development goals of the city. Examples for adequate instruments that support this goal are:

- A clear building code for Prague that incentivizes a green and socially balanced real-estate market.
- Innovation based procurement tools like competitive dialogues or innovation partnerships.
- A continuous dialogue with the private sector on strategic development topics of Prague (e.g. facilitated through a think tank).
- Incentive systems that encourage private stakeholders (start-ups, citizens, SMEs etc.) to contribute to a positive development of the city.





### 4.2.2 Energy system

Prague has a disproportionately high demand for energy and electricity, which needs to be tackled via a bundle of measures. “Only 3.6 % of Prague’s energy demand is covered by energy produced within the city. Nearly the same value (3.5 %) is the current amount of renewable energy sources in the overall energy production in Prague.”<sup>25</sup> The solar, biological and wind energy potential within Prague and its region are not well exploited as there are various barriers for the use of renewable energy sources. The use of innovative technologies for power production and saving can help Prague increase its potential for sustainable development. Prague has the potential to increase the use of renewable energy sources and launch pilots on smart energy grids. Moreover, there is a lack of incentives for energy efficient industry within the Prague Metropolitan Region, like subsidies or tax reliefs for energy efficiency measures.

### 4.2.3 Space, planning and mobility

Prague takes pride in its very well-developed public transportation system. With almost 30% of the overall budget spending, the public transportation system represents the largest portion in the overall budget of Prague. A key issue to be addressed in Prague today is the impact of the urban sprawl on the traffic situation within the city and its suburbs. Since the workplaces of most suburban dwellers remain located within the City of Prague and since the Metro line does not reach the outer areas and is not integrated with a regional transportation concept, the new suburbanites have to commute to Prague by car. This has contributed to road congestion and air pollution. Use of private cars is still perceived as more attractive than public transportation. Moreover, reduction in car traffic has not been achieved despite significant investments.

Prague has not focused its heavy investments into the roads and the public transportation through soft mobility systems (e. g., park and ride hubs, bike & ride, car-sharing opportunities) that are linked to mobility hubs, a comprehensive bicycle lane network, or incentives to make use of more environmentally friendly modes of transportation. Prague has also refrained from introducing regulatory measures to make car-usage within the city less attractive (reduction of parking slots, congestion charges, low emission zones, high parking costs etc.). Moreover, there is no, or only little collaboration between Prague and the regional transportation system, which would coordinate an improved public transport on the regional level.

There is an especial opportunity to increase sustainability in the freight and logistics sector by modernizing the transport fleet of logistic companies with electric vehicles. In Prague, there are over 50 stations provided through electricity providers such as PRE Group and CEZ Group, but the city itself does not provide any support to electric

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<sup>25</sup> Fraunhofer Gesellschaft 2015, 68



transportation. There are no free parking slots in the public space reserved for electric vehicles (EVs), EVs are not allowed to use special lanes, e.g. the bus or taxi lanes, there is no city-wide booking system in place for the charging stations, and there are no incentives for purchasing electric vehicles. Electric car-sharing systems (station based or free-floating) are not available in the city. There is has been also strong potential in taking up a strategy for a bike-friendly city: bikes, e-bikes and pedelecs (suitable for a hilly city) require less space in the city centre than cars, they reduce emissions and noise and they increase well-being.

#### 4.2.4 Buildings

There is a lack of information on the energy efficiency of Prague's building stock, on the number of deep renovations and on the quality of building envelopes and HVAC-systems. This results from the data of energy performance assessments, which are carried out after major renovations, not being systematically collected by the city building department.

"It is assumed that about 20% of Prague's building stock had been renovated to improve the energetic quality within the last decade. Derived from this, with an estimated average spending of 12 Mio.€ per year for the refurbishment of buildings and an estimated refurbishment rate of 2%, progress in modernizing the building stock of Prague is rather slow due to a fragmented ownership structure and absence of a long-term vision. At the same time there is a high amount of vacant buildings in the inner city, leaving potential for a sustainable-development of the real estate market untapped. Further, 3% of the public buildings owned or in use of central government institutions have to be energetically modernized from 2014 to 2015."<sup>26</sup>

At the same time, there is a high amount of vacant buildings in the inner city, leaving high untapped potential for a real estate market focussed on sustainable buildings. It is therefore essential to assess the energetic quality of Prague's complete building stock and to develop a clear strategy for the refurbishment of the building stock.

There are few regulations in place that incentivize or enforce sustainable investments and behaviour. This is especially relevant in the building sector, where a clear regulation is needed in order to enforce the responsibility of investors for an integrated and sustainable development of sites in the city.

#### 4.2.5 Economy and innovation

Prague is the national centre for research. Over 35 % of all employees working in the research and development sector are located in Prague<sup>27</sup>. Prague has almost half of all the national organizations performing R&D activities in

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<sup>26</sup> Fraunhofer Gesellschaft 2015, 65

<sup>27</sup> cf. European Commission 2015b



the governmental sector and more than a 35% share in the public university sector. This setting offers a good basis for collaboration between the foreign companies and universities - a promising innovation landscape.

However, during the field research phase, entrepreneurship hindered by risk averse conservative mentality was identified together with a lack of or a very small and uncoordinated cooperation in R&D between the actors. This can be an obstacle on the way to strengthening Prague's innovative competitiveness. On the other hand, the city lab identified Prague with the potential to become an international hub for IT, creativity and culture. In order to reach this goal, the supporting adequate instruments are:

- create an innovation ecosystem and a high-level R&D hub to foster local innovations and attract international business / qualified workforce and keep home local qualified workforce,
- foster the potential of creative industries and improve their visibility,
- design incentives for the development of sustainable products and services,
- recognize the existing IT potential and establish an IT Hub: develop Prague's image towards a diverse and smart city of the future with attractive business and research opportunities in order to draw international companies and scholars.

#### 4.2.6 Key findings of the City Lab included in the Strategic Plan of Prague

The key finding of the City Lab was included in the Strategic plan of Prague. Mainly, the participatory and cross-sectoral approach, presenting a holistic methodology and emphasizing the international verification, marked a major breakthrough in the development and it created a benchmark for future attempts. The process was generally praised by the participants and it has generated a positive momentum that has resulted in establishing cross-sectoral links and clarifications. It has successfully challenged the predominant mind-set of working in silos. The experience has been directly transferred to the Strategic plan of Prague, which states that establishing a system of functional ties and partnerships among the key actors of the city and their systematic integration into urban development is a key prerequisite to meet Smart City principles.<sup>28</sup> An additional breakthrough was the establishment of smart governance as a priority and its inclusion into the Strategic plan. The Strategic plan of Prague recognizes that "the development of the Smart City concept is linked to good city management (good/smart governance), that is, with the institutional capacity of the city to manage and harmonize processes long-term strategic development, openly share information and provide data and integrate networks of business, scientific and research links and the institutional sphere into one functional unit. Such a whole allows effective interdisciplinary collaboration and project management provides access to models of financing strategic projects

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<sup>28</sup> cf. IPR Praha 2016c



that do not burden the city budget, but, in particular, it creates a consistently stimulating, stable environment for the development of innovation processes and building of an innovation-driven economy. The establishment of such cooperation is essential at the grassroots level, but no less cooperation, sharing and taking good practice among other cities.”<sup>29</sup>

Although due to politically turbulent period the specific proposed measures were supported only rhetorically by the leadership, on the 23rd of August 2016 the Commission of the City Council for development of Smart Cities has recommended to the City Council the following priority measures based upon the on-site assessment.<sup>30</sup> The measures are covering the areas of ICT, e-mobility and energy efficiency.

1. **Smartification of the historical center of Prague:** The quality of life of Prague’s residents and the stay of tourists in the historical centre shall be maximized and a more sustainable behaviour of these shall be achieved e.g. by starting a smartification process. The project focuses e.g. on redirecting of traditional touristic routes through the installation of elements of "gamification" to achieve game behaviour patterns, as well as improving the living standards of residents in the historical center, by installing sensory infrastructure of the Internet of Things, Smart Lighting and usage of mobile apps.
2. **Data-analytical center and city dashboard:** The project represents a major support for open data policy, data collection of municipal organizations, their systematic collection and evaluation. Data sets are presented on the web portal: <http://opendata.praha.eu/>, municipal organizations are required to contribute. The data thus stimulates the start-up sector and strengthens transparency but, above all, allows for better planning and management of key urban projects. The analysis of key indicators is then visualized on the virtual city dashboard.
3. **E-bus with a dynamic recharge system:** Supporting electro mobility by supporting an innovative DPP (remark: local public transport provider) project. An e-bus could be operated on a key line of the city to visibly promote sustainable, zero-emission development and demonstrate the clear support of the city for this project.
4. **Multimodal traffic hub Zličín:** The multimodal traffic hub can be a transfer station that intelligently connects several transport alternatives. The location of Zlicin could be a pilot hub that could replace the regular P + R which would serve as an example for other similar locations in Prague, such as Černý Most, or possibly other busy entrances to Prague or key transit hubs in the city.
5. **Shared electro mobility system in public administration:** The city hall and other city organizations could replace existing service cars with electric-cars and also use electro-wheels. They would clearly declare the pattern and demonstrate that they want to pursue further urban transport development, such as reducing

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<sup>29</sup> cf. IPR Praha. 2016c, 43

<sup>30</sup> cf. Praha 2016



the proportion of passenger cars and increasing the share of electric cars and electric buses. There is great potential to work with power companies and car manufacturers to build and operate charging stations in terminals, but also in the city center.

6. **Revitalization of a self-sufficient public building:** Prague owns a wide range of buildings that are very energetically +inefficient. It is the aim to transform energy-intensive urban buildings into nearly zero-energy buildings with integrated intelligent systems that enable the centralization of full-scale monitoring, control and planning of building facilities. This is an opportunity to revitalize a model building owned by the city, which can be a flagship example of the concentration of innovative smart measures such as translucent solar panels, self-regulation, organic façade etc.
7. **City Lab:** The planned revitalization of development areas such as Prague's Žižkov Freight Station or Exhibition Grounds provide the opportunity to implement a wider range of smart solutions that can be effectively tested and evaluated in the given location and then extended to other parts of the city. These revitalization intentions can be approached as an implementation of a "City Cab", a smart city in the city, a pilot area, with a broad application of smart measures.

## 4.3 Developments in Prague within Triangulum

In the Triangulum project several on-site visits in Lighthouse Cities and Follower Cities were held in 2015 and 2016. In this framework IPR Prague hosted a joint meeting with the other Follower Cities. The on-site assessment that resulted in the proposed measures by the Morgenstadt City Lab contributed to a debate about the smart city agenda on the city-wide level. Although Morgenstadt City Lab report has received positive feedback, by the end of 2017 the city council did not take ownership of the proposed measures and their implementation was not a priority. Moreover, it became clear that a change of mind-set within the public decision-making level and establishment of a competent cross-department project management unit are necessary prerequisites, in order to install the principles of smart city and city-wide smart projects. It thus became clear that the initial ambition within the Triangulum project, to push for an implementation of a systematic city-wide solution, will take place more gradually. The proposed city wide solutions were suspended and the project Triangulum was refocused. Nevertheless one city-wide project remained: the update of Prague's 3D model, for whose implementation solely IPR Prague is responsible.

A change of mindset was required and it also became clear that it is more feasible to focus on demonstrating a concentrated solution. By the end of 2016, IPR Prague refocused on a partnership with a city district of Prague which has a compact agenda, and which would enable to develop the proposed measure of a City Lab. In the City Lab a range of compact smart solutions, including such solutions of the field of ICT, e-mobility and energy efficiency, can be tested and evaluated with the potential to be scaled to the other districts of the city. The conditions of Prague 7 both, political and infrastructure wise, were identified as suitable, thus a partnership with the city district



for the purposes of project Triangulum and joint task force from Prague 7 and IPR Prague was established in the second quarter of 2017.

During 2017 the joint task force partnered up with the University Centre for Energy Efficient Buildings (UCEEB) of the Czech Technical University and conducted a feasibility study on Smart Home Care for Prague 7. The feasibility study was ordered by IPR Prague as part of the Triangulum project to ensure a fundamental analysis of the social and health care situation in Prague 7. The time required for completion of the study took from June 2017 to December 2017. For the analysis as part of the feasibility study, participatory processes with the relevant stakeholder groups in Prague 7 mapping their needs, coming up with priority pilot measures and a high-level implementation roadmap was conducted. During the working process in 2017 the principle of cross-sectoral cooperation and an attempt to apply the quadruple helix model of cooperation in the process was strongly encouraged.

### **Triangulum Follower City Training Mission in 2017**

An important part for the development of the local projects for Triangulum was the support provided by the Triangulum Follower City Training Mission in 2017. IPR Prague's partner Prague 7 and UCEEB were using as well the possibility to gain new knowledge from the training mission. The main elements of the Follower City Training Mission were:

- Follower City Days in Lighthouse Cities,
- training workshops,
- webinars,
- local on-site workshop in Follower City.

The Follower City Days were a key factor for the development of the Implementation Strategy and to set up of the projects. Especially the demonstration of technical solutions in the field of ICT, energy efficiency and e-mobility were inspiring and supported a closer focus on the own formulation of projects for Prague and creation of the Implementation Strategy. It was important to see the functionality of the technical measures, their usability and to discuss costs and the extent of equipment which is necessary for its use. The training workshops contributed to a better understanding of mechanisms and set-ups of projects and helped to identify problems in local project planning processes as well as to find solutions for these with the help of experts in the fields of ICT, energy efficiency and e-mobility. The webinars as another element could help to learn more about the Lighthouse Cities' projects and the ones beyond Triangulum which were touching the Follower Cities' interests. Furthermore the exchange with the Lighthouses and Follower Cities coordinators as well as with the Triangulum coordinator Fraunhofer IAO, the University of Stuttgart, Fraunhofer FOKUS and TÜV Süd during Follower City training session was very helpful to identify the following working steps and procedure for the own projects.



One of the most important elements of the Follower City Training Mission next to the Follower City Days was the local stakeholder workshop in Prague (31.08.17-01.9.17). The workshop was organized in collaboration from IPR Prague with UCEEB and discussed the topic of Smart Home Care projects for Prague 7. A delegation of international experts from the Triangulum consortium joined the workshop to contribute with their expert knowledge and to share their experiences in the fields of smart home care, e-mobility, ICT and business and financial models. Since the Triangulum focuses on replication it was very valuable to host an expert from Stavanger, who sharing his experiences on smart home care, emergency care and the use of technologies in Norway. In the workshop several local strategic partners participated, such as representatives of the pilot district Prague 7 and stakeholders of the field of social and health care out of the city district. The feedback on the workshop from local stakeholders was positive and they appreciated the discussion on new and smarter ways in smart home care. In the framework of the feasibility study several more workshops, interviews and group discussions were conducted.



## 5 Pilot District Prague 7

### 5.1 General information about Prague 7

The Triangulum project focuses on the area of the city district of Prague 7 (hereby just Prague 7) which became the project partner. Praha 7 is centrally located and stretches along the left bank of the river Vltava with the area of 7.10 km<sup>2</sup> (3 sq mi). It consists of the residential quarters Letná, Holešovice, Bubny, Bubeneč, Troja as well as a small part of Libeň. Prague Troja is located in the north and has the Prague Zoo. It's linked to the city centre by metro line C and is plentiful of tram connections. Other attractions in Prague 7 include the stadium of famous Czech football club AC Sparta, cultural centre DOX and the former trade fair centre Veletržní palác. It also has parks Stromovka and Letná which rank among the biggest in the capital and attract a considerable amount of people from all over the capital.

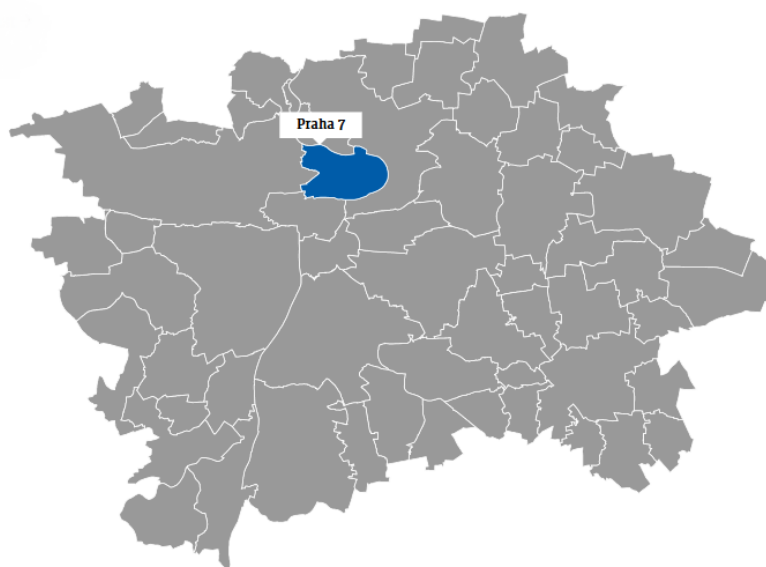


Figure 3: Location of the City District Prague 7:<sup>31</sup>

The total population in the city district Prague 7 is 45,096 (31.07.2017) and the population density is 6,112 inhabitants per 1 km<sup>2</sup> (14,900/sq mi).<sup>32</sup> In comparison with the Prague average, Prague 7 population structure does not particularly deviate. The number of seniors over 65 years old is 7,163 in the territory of Prague 7.

<sup>31</sup> cf. IPR Praha, 2016

<sup>32</sup> cf. Městská část Praha 7 2018





Population of Prague 7 District (Selected Years 2004-2017)						
Indicator	2004	2008	2010	2012	2014	2017 (30.7)
Population size	40,462	42,036	43,437	42,900	43,615	45,096
Average age of population (years)					40.8	
Born	414	513	554	553	573	300
Died	555	521	478	471	421	202
Natural increase	- 141	+ 8	+ 76	+ 82	+ 152	+98
Migration balance	+75	+ 538	+ 352	+ 218	+ 530	+291
Total increase	- 66	+ 530	+ 428	+ 300	+ 682	+389

Table 1: Population of Prague 7 District (selected years 2004-2017) <sup>33</sup>

The age structure of the population of Prague 7 compared to the City of Prague:

Population by age in Prague and Prague 7 (31. 12. 2016)				
age	0-14 years	15-64	65+	total
Prague 7 <sup>34</sup>	6,765	30,726	7,163	44,654
Prague 7 %	15,15%	68,81%	16,04%	100%
City of Prague	194,897	846,980	238,631	1,280,508
City of Prague %	15,22%	66,14%	18,64%	100%

Table 2: Population by age in Prague and Prague 7 (31.12.2016) <sup>35</sup>

<sup>33</sup> cf. Městská část Praha 7 2018

<sup>34</sup> cf. Městská část Praha 7 2018

<sup>35</sup> cf. Městská část Praha 7 2018



About 16% of Prague 7 residents are senior citizens, counted here as a group of citizens aged 65 years and more. The projection of the population of the city of Prague estimates the increase of senior citizens to 23.8 % by 2050 in the capital City of Prague.<sup>36</sup> It is thus necessary to count with the increasing number of seniors and adjust accordingly the support and care for the elderly.

Nearly half of the elderly livings in Prague manage the household as individuals, most often after the death of a partner or because of divorce. Prague 7 is not an exception and the share of households of self-reliant seniors is slightly above the Prague's average.<sup>37</sup> 36, 7% of seniors from Prague 7 live alone in their apartment, which accounts for about 2,500 seniors. Approximately 42% of the total number of persons with disabilities, fall into the age group of 75 years or more, almost one fifth of people with disabilities fall in the age group of 60 to 74 years. Within the population of Prague 7 (2016), approximately 2,500 residents aged 60 or more suffer from some form of disability. Consequently, such a portion of population is in need of some form of care or increased assistance from social and health services or informal carers.

## 5.2 Role of Prague 7 in provision of support and care for the elderly

As the municipality of Prague 7 ranks within the state administration as the municipality with extended competence, it oversees the activities within the social area. Prague 7 thus has relatively large influence on the provision of care to the elderly within its district, particularly through:

- activities of Social Care Unit of the Department of Social Affairs and Health of Prague 7,
- city funded organisations (e.g. Care Center and Health Centre),
- community planning and co-operation with local / Prague's service providers,
- and activities of other departments (culture, property, development of public spaces), which addresses themes of relevant matters relating to seniors or people with disabilities.

Prague 7 is unique in the Prague context of activities provided by its contributory organizations<sup>38</sup>: the Care Center of Prague 7 (PCP7) and the Healthcare Center (SAZ), also called the polyclinic. Care Center Prague 7 operates home help service, meals on wheels service, day center for people with dementia, flats with home help support and the residential respite center and nursery for kids under 2 years of age. SAZ as an outpatient medical facility provides classical spectrum of medical/healthcare expertise. Home health care (nursing) is provided on the territory of Prague 7 mainly by two organisations: the Parish Charity and GALIUM which are home health care agencies which are not under the direct influence of Prague 7.

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<sup>36</sup> cf. Městská část Praha 7 2018

<sup>37</sup> cf. Městská část Praha 7 2018

<sup>38</sup> city funded organisations



During 2017 the intention has been to deepen the cooperation with organizations in the area of care for the elderly and people with disabilities. The potential of the cooperation is, for example, to increase home visits by general practitioners and specialists (geriatric, internist, psychiatrist, etc.), to create a joint “local rental” of compensatory and mobility aids as well as to strengthen efforts in the field of health and social care integration and in the effective sharing of information and possibly creation of a joint IT center.

Activities for seniors are further influenced by expert commissions, which are consultative bodies of the Prague 7 Council (the Socio-Health Commission, the Housing Commission, the Cultural Commission), which for example decide on the allocation of subsidies to projects of non-profit organizations and service providers; the commissions participate in the community planning services and may also recommend to the Council of Prague 7 the need for new measures.

The majority of the providers of social, health and follow-up services for seniors or people with disabilities are operating on the level of the whole capital and their activities and funding's are influenced by the Prague City Hall and the Ministry of Labour and Social Affairs. In the area of services provided by third parties, which Prague 7 does not finance, it has relatively limited possibilities to influence the activities of these organizations and its role is more or less of coordinating.

Prague 7 as the founder and financial contributor of the Care Centre and SAZ Praha 7 (polyclinic) also has the possibility to influence the spectrum and the quality of the provided health and social service level of the city district. The identified challenges in this area include, in particular, the enhancement of the quality of the services and supporting the optimal spectrum of outpatient, field and residential services, digitization and sharing of relevant information between the city funded organizations and more intense cooperation on addressing the health and social needs of the population of Prague 7. The fact that Prague 7 is a founder and not only of the organization providing social services but also of the healthcare facility represents a great potential for the development of integrated care. For the future, closer linkages and cooperation is being planned or even a joint IT department to integrate data and to reduce operating costs of now separate IT systems. Also, greater transparency when assigning dwellings in senior housing needs to be achieved.

## 5.3 Strategic vision and priorities of Prague 7

The social and health policy development is part of the wider framework and strategic planning of the whole district of Prague 7. The mid-term concept (2018 - 2022)<sup>39</sup> reaches beyond the community planning of only social services as is usual practice, and in its scope focuses also on other policy areas supporting active and dignified life and ageing of the population, in the areas of housing and cultural policy, health care, urban development of public space and

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<sup>39</sup> cf. Městská část Praha 7. 2018



municipality. Community planning of services in connection with evaluation of the situation and needs of different groups of seniors, multigenerational families, families with children, people with disabilities or people at risk of social exclusion is undergoing more intensive work in the City of Prague 7 since 2015. Community planning and the development of the plan fall under the responsibility of the Councillor for Social Policy Ing. Jakob Hurre and is closely prepared with the Department of Social Affairs and Health and the Social-Health Commission of the Prague 7 Council.

The vision of the Prague 7 in the social and health field is defined in the Concept of the Development of Social Policy, Social and Health Services 2018 - 2022:

*"Prague 7 is a city with high social cohesion, in which people of all generations, nationalities and social groups live together. Through coordination of a network of collaborating social and health services, a system of social housing and other follow-up services, it supports those who need such support because of their age, disability or social situation so that they can continue to live in the local community and participate in its social and cultural life. The role of professional services is complemented by neighbourhood assistance, volunteering and informal citizens' initiatives. Prague 7 values this potential and strives to actively promote and develop it."*<sup>40</sup>

The concept of the Development of Social Policy, Social and Health Services, which is currently going through an official approval process and will be the next framework for planning and development of services in Prague 7, defines seven main priorities of a total of 16 objectives that address the whole area of provision of social and health services for all defined target population groups. The following strategic priorities are very much in direct connection to the Triangulum project as for seniors and citizens with disabilities, the main beneficiaries of the measures proposed with the Triangulum project, are key the following three declared priorities:

**Priority 1: Improve awareness of the services and possibilities of citizens' support in Prague 7**

This cross-cutting priority focuses on improving the awareness of citizens who find themselves in a difficult social or health situation with regard to the possibilities to get support and to address their particular life situation. Priority includes creating and managing a social, health and community e-portal / e-marketplace that will make it easier for people to address social life situations and help them effectively assess the situation. Furthermore, the creation of a single point of contact for housing and informal carers will be created.

**Priority 2: Co-ordinated cooperation between the city district and its contributory organizations and other organizations active in the social and health field**

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<sup>40</sup> Městská část Praha 7. 2018



The aim of this priority area is to deepen and systematize cooperation and to share information more effectively between the city district departments, its funded health/social care organisations, and other actors in the health and social sector so that we can best respond to the needs of the target groups of population.

**Priority 3: Supporting the citizens to live independently at home or in their natural environment for as long as possible**

Another of the priorities of the Prague 7 is to provide a network of services that will adequately support the citizens to remain living home or in the local community as long as possible, even if they are disadvantaged or restricted in different areas/activities due to illness, disability or age. The main role of the services that support citizens to remain living at home are the fieldwork and outpatient services. An integral part is support for the case management development, the increased availability of locally accessible rehabilitation and of nursing services, field respite services for carers, personal assistance, and more flexible services supporting independent living in the home environment as well as support for individual transport of people with more severe disabilities. Modern assistive technologies can also play a key role in staying at home, helping to prolong stay in the home while maintaining the quality of life of people.



# 6 Overview of the Smart Home care pilot project for the city district Prague 7 and the 3D model update

## 6.1 Overview of the process and methodology

As a basis for designing a solution in the form of a Smart Home care pilot project on the district level, a comprehensive analysis of the needs, attitudes and capacities of the relevant stakeholders in the care system for the seniors of Prague 7 was carried out by UCEEB in close cooperation with IPR Prague and Prague 7. UCEEB was subcontracted from Triangulum budget to conduct the feasibility study in collaboration with the task force. The outcome of this analysis is the feasibility study that takes into careful consideration the study of the needs of the recipients, carers and providers of services for senior citizens. Moreover, the feasibility study proposes appropriate measures in area of ICT, mobility and energy efficiency in response to the identified needs and challenges. The measures were defined in a collaborative and participatory process with local stakeholders, experts from the Triangulum consortium and on the basis of good praxis of the Lighthouse Cities. In order to secure the feasibility of the proposed solution, the legislative and procedural issues related to the implementation of innovations were examined as well. During the analysis, 20 individual in-depth interviews with 16 elderly and four informal carers were carried out, as well as individual interviews with representatives of service providers of the city district (Nursing Center, Associated Outpatient Facilities) and 5 other organizations, including interviews with field care managers and with care coordinators of the Care Center. In addition to individual interviews, round tables for individual groups of stakeholders were organized:

- seniors in residential facilities in Prague 7 (needs analysis);
- carers for seniors in the context of Prague 7 (needs analysis);
- nurses and nurses of individual providers (needs analysis and attitudes towards technologies);
- seniors interested in using technology in care (needs analysis and attitudes towards technologies);
- practitioners (doctors) and outpatient specialists in Prague 7 (needs analysis and attitudes towards technologies).

In addition to the round table sessions, two workshops in the second half of 2017 were organised. The first one was a two-day workshop (31.08.17 - 01.09.2017) and was organized in order to determine areas which should be resolved over the course of the project, the exchange of experiences and the articulation of the requirements of individual groups within the framework of the system of care for senior citizens. The local stakeholder groups, among the attendants were representatives from Prague 7 as well as social and healthcare providers, technology producers, ministry officials, and other experts on home and assistive care and services for the elderly, were discussing possibilities of implementing a pilot project of Smart Home Care for Prague 7. The workshop was joined by representatives of foreign partners of the Triangulum project from the Lighthouse City Stavanger and the Fraunhofer Institute IAO and Fraunhofer FOKUS from Stuttgart and Berlin. The international team gave an overview





about the Triangulum project, shared possibilities of usage of new technologies in emergency care and e-mobility and opportunities for financing of solutions and business models for projects. The outcome of the workshop was a verification of the direction of the project and a detailed insight into the obstacles and experiences on the district level.

This was followed by a second Triangulum workshop, which took place on the 14th of November 2017, during which the same participants as in the first workshop, were responding to designed measures responding to the analysed needs and obstacles that were identified in during the analysis that preceded. The aim of the follow-up workshop was to refine and improve suggestions on the basis of feedback from the involved participating stakeholders.

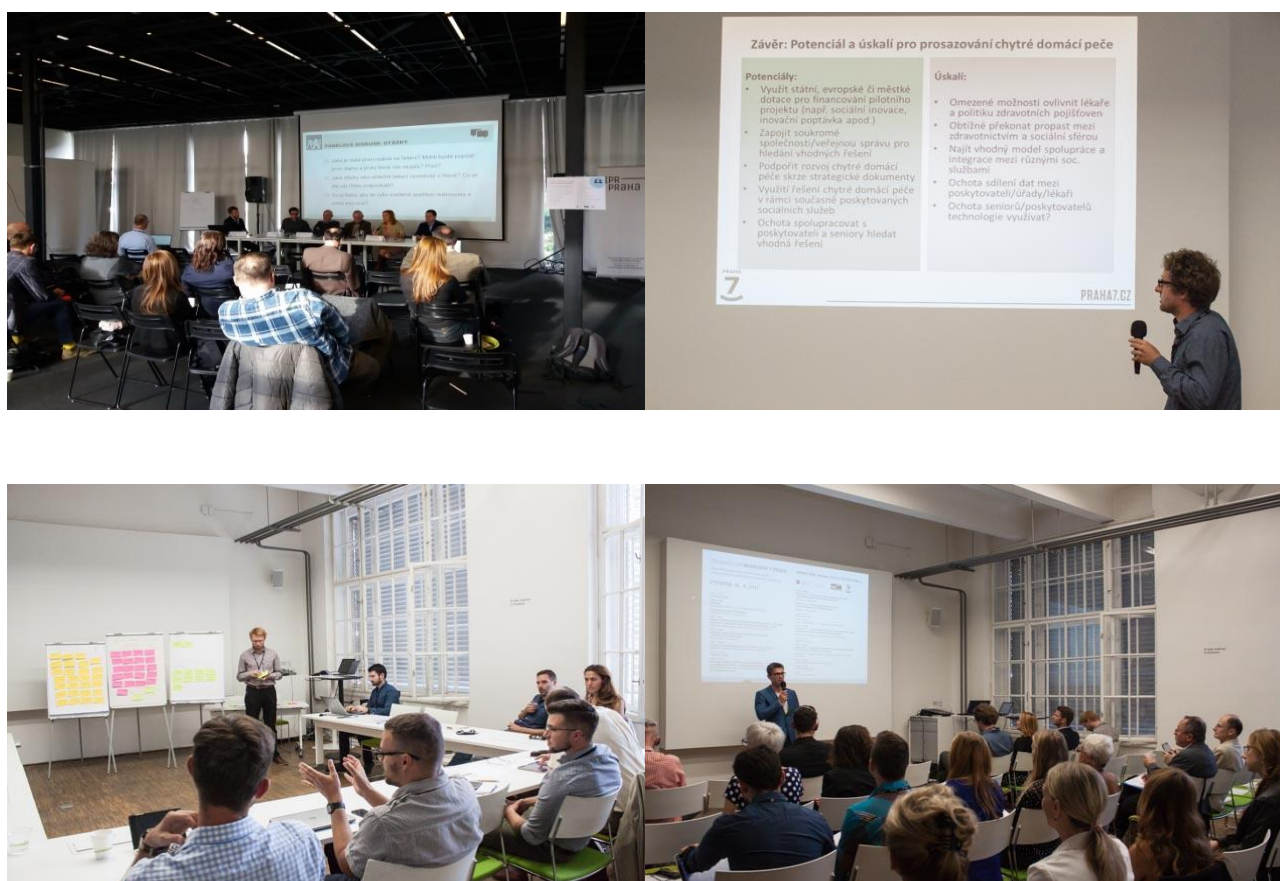


Figure 4: Workshops in the City of Prague with local stakeholders <sup>41</sup>

<sup>41</sup> Photos: Monika Uhlenbruch and Adam Pajgřt



## 6.2 Identified needs and challenges in the area of health and social services in Prague 7

**Mobility barriers and isolation:** Nearly 7,000 people over the age of 65 live in Prague 7; 36,7 % of them live alone in their apartment, which are about 2,500 seniors. This group of people can benefit the most from various forms of emergency care technology that helps to prevent the consequences of various events such as falls, etc. The vast majority of senior households live in apartment buildings where most of the flats are not barrier-free and constitute an obstacle for the elderly which have problems with mobility. While gradually investing in barrier-free adaptations of transitions, the barrier of environments, transitions and buildings still poses a considerable problem for a number of seniors. The issue of mobility is the biggest obstacle for the elderly to engage in active or everyday life. Consequently, a number of seniors therefore stays home more often than they would like to and can thus be gradually isolated with all the negatives sides that social isolation brings.

**Highly fragmented system of health and social care and lack of awareness:** Another problem that the elderly can encounter especially if they have more complex health problems is a rather fragmented and complex health-social care sector and a variety of services and providers from which it may be difficult to choose an adequate service. Seniors have little awareness of the possibilities of different services or benefits to which they are entitled to. Currently many seniors aren't informed about their possibilities for the usage of emergency care or other assistive technologies which help them to live longer and independently in their homes. However, there are also prevailing negative attitudes towards emergency care or other assistive technologies leading to the postponement of usage until after the critical situation (e.g. fall, hospitalization). Furthermore lack of information and missing awareness might prevent some seniors (especially those socially isolated) from finding the right contact point in Prague 7 that provides help and guidance in applying for the needed health and social services. Another issue that needs to be better addressed is the social isolation of a certain percentage of senior citizens that do not even seek the services or support that could cater for their needs. This represents mainly their depiction, mapping of their needs and finding holistic solution for their situation that might include array of service ranging from support to attend cultural/sports/community activities, but also the installation of emergency or other assistive technologies.

**Lack of cooperation among the service providers:** One of the biggest challenges is the fragmentation of the system of care and support among different providers and organizations of the social or health care services that often do not cooperate nor share relevant client information. The situation is confusing not only for seniors and their families, but basically for all actors involved. This is partly caused by the legislative barriers, complicated reimbursements through health insurance, but sometimes it is also fear of competition or unwillingness to share information or to cooperate with other providers.

**Lack of qualified staff:** However, the prevailing demand over supply (both fieldwork and residential services in the capacities of the capital) and the lack of qualified staff (especially nurses, personal assistants, carers, social workers) are the biggest challenges to enable the providers to maintain or strengthen the quality of services. This is a





nationwide problem is connected to the low prestige and low financial appreciation of these professions. Also a variety of fieldwork, residential and respite services are difficult to access in Prague 7; in particular personal assistance services, fieldwork respite services as well as residential services for people with dementia or more severe functional disabilities. The predominant service provided to seniors by the Care Center is the meals on wheels service and the care service (home help) and the latter currently remains still relatively inflexible in terms of activities that carers are able to or willing to provide to clients beyond the statutory tasks defined by the law. Current services are relatively formalistic and cannot flexibly adapt to and respond to the specific needs of people or their careers.

**Lack of case management:** A number of institutions (organizations) are often needed to address the client's situation, in order to successfully do so, these services need to be effectively coordinated. Thus those seniors with more complex needs or their families have to contact various providers/services within the fragmented system to arrange for the complexity of care they might need. Therefore, the biggest challenge for the municipality is to support effective coordination of services and safe sharing of data among various independent providers, care authorities and doctors that would enhance their cooperation and mutual exchange of relevant information. This is especially difficult among healthcare and social care organizations due to different and often contradicting legislation. Case management thus serves as a tool to streamline teamwork to solve the problem of a client. Although well established in western cities, case management is rather limited as it seems to be a new concept that has been only developing lately in the context of Prague. Furthermore, the intention is also to strengthen cooperation with local doctors (especially GPs and outpatient specialists) and also with healthcare facilities that are outside of the district, but serve senior population of Prague 7.

**Digital illiteracy:** With regard to challenges relevant to deployment of technologies the Care Center is facing are mainly those of low digital literacy and sceptical attitudes of carers towards usage of technologies. This is mainly connected to little experience with functional IT systems or their negative experience with new IT systems from the past that caused further administrative burden to their work. Sharing of relevant information about clients among carers between different shifts is not through the information system on a continuous basis but rather by word of mouth (on a weekly basis at meetings, or continuously during exchange of shifts). Information about clients is in a paper form, i.e. daily records are written manually. One of the challenges for technology deployment and also its prerequisite is effective sharing of relevant information between care units of the Center and lowering of administrative. Another issue is a rather extensive workload of coordinators of the care service, where the very content of the activity is not completely limited by coordination activities, and when it seems desirable to define more precisely the role of coordinators and to set the boundaries of the activities to be pursued.

It should be remembered that even in the ranks of informal carers and service workers there elderly employees, who may have limited digital literacy and mistrust of ICT solutions. In the Czech senior population, 65 years and older, 33% rank among internet users. This shows a substantial growth of elderly internet users as since 2005 when



only 2.5% above the age of 65 years were internet users. At the same time, there is a clear difference between younger and older seniors. The share of seniors 65 year and older which have never used the internet is 56.8% while within the population aged 55-64 years only 23.7% has never used the internet. Thus, the number of seniors using internet will naturally increase even without any interference. The future generations of seniors will therefore already be digitally literate and more ICT-based solutions will be possible.<sup>42</sup>

**Consolidation of information and change of mind-set:** One of the challenges of introducing innovations and simplifying reporting on work, monitoring of services and client information and its exchange among workers will be a complete consolidation of information that could be entered electronically, thus facilitating information storage and shortening administrative time. Accessibility of relevant information at different location/time will be also a key factor for success and acceptance of new technologies by workers. The aim is not to replace oral communication, but to enable to store and share information in a more simple way that facilitates the coordination of client care. The largest barriers here will be the lack of trust of workers in new technologies, digital literacy of workers, which can be however easily overcome by appropriate training and courses. Longer-term and in essence a major challenge will be an explanation of how these changes will lead to a reduction in the administrative burden that will actually take place after the learning period.

**Barriers to Internet use:** The following list of reasons for not connecting the household to the internet does not cover all possible reasons, however clearly suggests that the greatest factor is the lack of interest into the use of internet and a sense of insufficient competence:<sup>43</sup>

- do not see the benefit, is not interested: 72%
- lack of competencies: 42%
- high device cost (computer, tablet, smartphone): 27%
- high charges for Internet access: 16%
- distrust and security risks 5%.

Last but not the least, a field that needs to be addressed systematically is the provision of holistic information to senior citizens about different type of services and their integration into a simple and meaningful presentation within the City district offices, information centers and care coordinators.

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<sup>42</sup> CZSO 2017

<sup>43</sup> cf. CZSO 2017



## 6.3 Key objectives of the Smart home care pilot project and the 3D model update

The aim of the pilot project as a whole is to increase the quality, availability and efficiency of services offered to senior citizens of Prague 7 in their home environment with the aid of innovative technology. This solution should in particular aim to achieve:

- increase in safety of senior citizens in their home environment and thus delay their transfer to institutional care due to loneliness and fear of crisis situations,
- compensate the impact of signs of aging on the ability to care for oneself and thus support autonomy and quality of life among senior citizens living independently,
- reduce the burden on informal carers and allow them to participate in care to an extent appropriate to the options open to them,
- integrate information from various devices and care players into a single, secured database, which will allow simpler deployment of modern technologies and support of coordination of care,
- increase awareness of all actors within the care system about the possibilities of services provided to senior citizens and assistive technologies and to link the offer of care with demand via/with the help of a well-arranged portal solution,
- create a single user interface for senior citizens and carers which will integrate all gradually added functionalities of the solution and thus reduce the scope of the obstacle in the way of its acceptance by users,
- support use of modern solutions in the field of mobility of service workers and their clients,
- support social and cultural activities among senior citizens and their access to up-to-date, local information as well as to support socialisation and resocialization of risk groups of senior citizens by reducing the physical and technological obstacles in communication,
- support the involvement of the key actors of the care system in the process of community planning and evaluation of the services to senior citizens.
- reduce the barriers to the use of modern technologies on the part of seniors and carers.

It is important to emphasize that technologies are not considered successors or substitutes for human care. Modern technologies should increase the efficiency of the social and healthcare system, promote autonomy and independent living for the elderly, and serve as a tool to promote healthy lifestyles. To achieve the purpose of the project the communication with service providers is a key issue. Technology can precisely be used to communicate with social, health and other service providers or other related online services. Moreover, the accessibility to such technology for senior citizens with limited mobility can represent a chance to interact with each other, their families, care takers and other authorities.



The primary target group for the proposed pilot project are senior citizens, formal and informal carers in Prague 7, but in a wider scope, the aim is to replicate the future experience of the pilot project in the city of Prague. In order to maximize the economic and procedural efficiency of the pilot project, establishing its cooperation with other districts of Prague is desirable. A positive side-effect of the introduction of new technologies is the opportunity to use the technologies as a given - a fixed point - around which it is possible to discuss the required changes in the nationwide system and procedural innovations. The innovative technology thus holds the potential to stimulate further positive changes as it both pushes and enables a systematic change.

## 6.4 Role of the city district of Prague 7 in the implementation of the pilot project

The Department of Social Affairs and Health of the city hall of Prague 7 has a fundamental influence on the provision of services to senior citizens. However, this area is influenced by the agenda of the Ministry of Labour and Social Affairs, by the Ministry of Health, by the Prague City Council and by activities of non-profit organisations and health care facilities which are completely or to a significant extent independent of the city district. Despite this, the city district has tools to directly or indirectly influence use of modern solutions for senior citizens. The following list of roles, which the city district can perform helps understand the possibilities for implementation of the proposed solutions.

**Operation of ICT systems by the city district:** The city district has the possibility to invest into the development of ICT systems and ensure their operation on the technical, staffing and financial side or can ensure the technical part of system operation by usage of sub-deliveries. There are several levels on which the ICT system can be operated by the city district:

- **Service for end clients:** This concerns portals and applications which are available directly to senior citizens, their families or volunteers.
- **Level of contributory organisations:** The city district can directly influence the introduction of technologies in its contributory organisations. A single system for the Prague 7 Care Centre and HealthCare Center (Polyclinic) could be considered. Such a system would allow management of information about clients, integration of care and reduction of operational expenses on IT systems, which are currently not connected. In the same way, smart home components and emergency care can also be implemented in the Prague 7 Care Centre in the field and residential services. Contributory organisations also use solutions in services which are provided to end clients.
- **As a service provided to service providers:** This entails a similar approach as on the level of partially-funded organisations. The city district can open a solution to other service providers under set conditions. Unified solutions support cooperation between providers and reduce the financial obstacle in the way of their introduction, as costs for operation are spread among several entities.



**Participation in operation of ICT systems or their active use:** During 2018 plans proposing the creation of a Prague-wide ICT solution in the field of social and health care services are to be finalised on the level of the city of Prague. Even if the city district will not directly operate the given solution, it will be able to actively use the solution for its own requirements or ensure that the requirements of parties concerned within the territory of Prague 7 are met. These requirements have been identified within the framework of the Triangulum project. Prague 7 should actively promote these requirements and strive to ensure that the role of the city district in operation and use of the solution is clearly defined.

**Coordinator or participant in pilot projects:** For a large part of the technologies and systems, implementation of pilot operation is desirable before their full deployment. The city district may play the role of a coordinator of pilot projects or the role of an active participant, in order to be able to guarantee conformity of the solution with the requirements of the city district and parties concerned on the level of the city district.

**Contribution towards technologies, or their loan:** One of the tools which the city district already uses is the purchase of emergency care devices and their subsequent loan to clients. Other city districts offer a financial contribution towards purchasing technology or services.

**Determination and promotion of quality standards for technologies and services:** The city district can determine standards for individual services and technologies. Achieving these standards could be a criterion for provision of financial support for purchasing technology, provision of patronage from service operators or inclusion of providers in the list of verified services.

**Increasing awareness in the target groups:** One of the obstacles to use of technologies is the low awareness of the possibilities offered by these technologies both among clients and providers. The city district has already commenced a dialogue with key actors in the care system on the topic of innovation in provision of services for their clients. Technological and procedural innovations should also be a key topic for the planning of the development of social and health care services. The city district could be the bearer and the campaigner of information about good practice abroad.

**Setting the trend:** The city district could demonstrate the possibilities of the use of some solutions which may seem risky or too distant and thus provide a good example, showing that the solutions can be practically used and on the basis of its experience, help to introduce the solutions, for instance on the level of partially-funded organisations. One example of such a trend could be use of electric vehicles in social services.



# 7 Smart home care pilot project and 3D model update

## 7.1 Overview of suggested measures

Integration of several analytical inputs such as the analysis of social and health care solution in Prague 7, a set of discussions and workshops as well as inspiration from Lighthouse Cities in the Triangulum project has inspired and produced a comprehensive list of 7 measures for the purposes of city district of Prague 7 and 1 measure for the purposes of IPR Prague. The individual measures (M) are summarized in this chapter and for a better overview they are numbered from M0 to M7. The deployment of technologies has to be preceded by organisational and procedural changes. These prerequisites are summarised in the Measure 0 (M0). M1-M6 describe measures that together provide a complex solution using technologies in services provided to senior citizens of the Prague City District 7. The solution consists of the 7 measures which together form the Triangulum pilot project of Prague 7. Individual measures focus on the field of assistive technologies and ICT solutions, on solutions in the field of smart homes and on the use of electromobility in services provided to senior citizens.

- M0: Project management and coordination
- M1: System for support of integrated care (ICT)
- M2: Service Portal for Senior Citizens (ICT)
- M3: Extended emergency care (ICT)
- M4: Smart homes for seniors (ICT and energy-efficiency)
- M5: Electromobility for social services and seniors (e-mobility)
- M6: Mobility of seniors (smart mobility and ICT)
- M7: Update of Prague's 3D model (ICT)

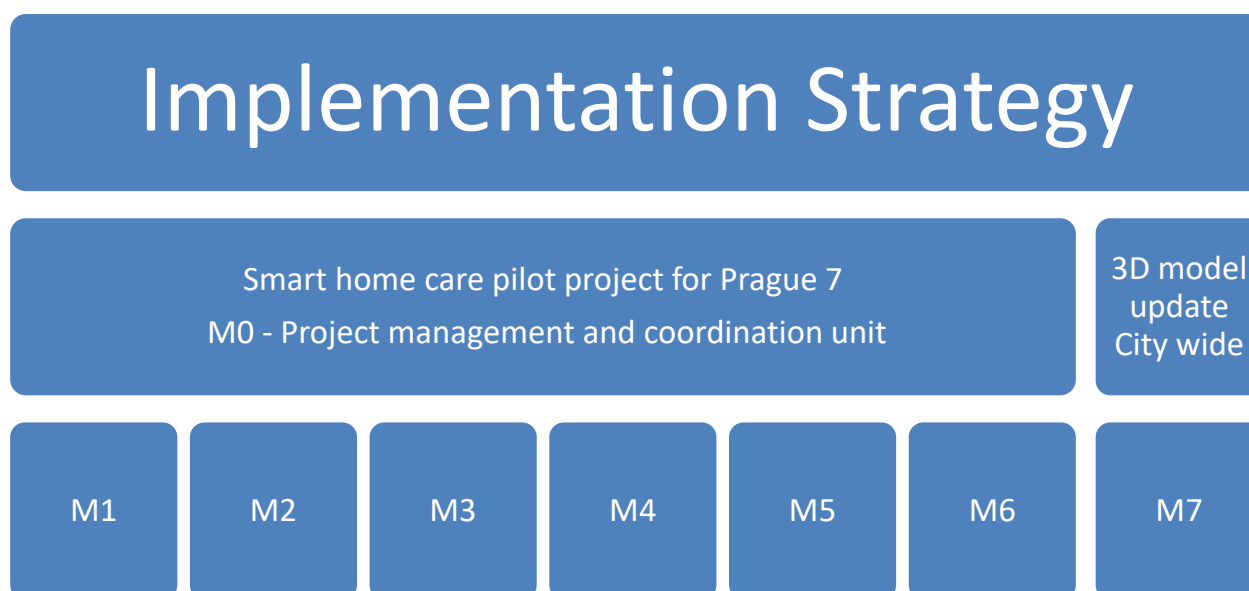
The proposed measures are primarily linked to the field of social services and informal care, but with the option of using them for coordination of social and health care, which is moreover emphasised by the Integrated Care Support System. It is important to understand that individual technological and procedural measures within a Smart Home care pilot project can create a single integrated system of support for care of senior citizens in their individual home environment. However, an integrated system can also be implemented in stages. This modular approach makes it possible to establish a more complex system transforming the proposed measure into smaller projects which are easier to coordinate and finance. M7 describes the update of IPR Prague's 3D model that is not directly connected to Smart Home Care pilot project for Prague 7. Nevertheless it can be potentially beneficial in providing input into the designing of the measures and it contributes to the improvement of the usage of data, for instance in participatory processes and in the field of city planning.



For each measure a description is provided of its benefit and function in its ideal form. It is crucial to focus on proposing measures which are feasible within the framework of the existing legislation as it is precisely the legislation and the system of financing often cited as the main obstacles to innovation in the field of care for senior citizens.

The Implementation Strategy is the blue print for a detailed project plan of the pilot project. The precondition of developing a detailed project plan is the establishment of an allocated project management and coordination unit. This unit needs to have a developed and a consolidated view and understanding of the pilot project in order to maintain an effective communication with the decision making level of Prague 7. The goals of the pilot project have to be evaluated and prioritised with a clear commitment and delivery deadline. The selection of the scope of the project and funding strategy has to be determined and subsequently a detailed project plan can be defined. Simultaneously the implementation consortium has to be formed and the technological evaluation and specification has to be undergone in order to select the technology and service providers.

The following chart gives an overview about the measures within the Implementation Strategy:



7 Figure 5: Overview on measures in the Implementation Strategy

## M1: SYSTEM FOR SUPPORT OF INTEGRATED CARE



TRIANGULUM - GA No.  
646578

triangulum  
DEMONSTRATE · DISSEMINATE · REPLICATE



Target Area	Prague 7 District		
Goal and core value of the measure	The system for support of integrated care aims to function as a platform for the exchange of information between all proposed technological solutions suggested in the measures (M2-M5). Such a data platform enables continuous development of inter-sectoral information transfer, specifically the exchange of information between the social care and health care services for seniors. The system operates within the current legislative framework of the Czech Republic which also sets limits regarding the point to which such integration is possible. An integration platform is using a modular architecture for the interconnection of micro-services that can be added, one by one, throughout the course of future. The main goal is to enable the exchange of data between various service providers. Such an exchange platform serves as an instrument for the improvement of the quality of life of senior citizens of Prague 7 district.		
Minimum viable project	A basic platform for data integration, founded on sharing selected data between the contributory organizations	Must have	
	A complex data sharing platform integrating the systems of individual providers of social and health care	Could have	
	An inclusion of the patient data from general practitioners (GPs), scaling the solution up to other city districts. The integration of the information from the Service Portal for Senior Citizens and emergency care providers.	Should have	
Technologies & solutions to be implemented	The integration platform allows the integration, collection and exchange of data in social and health care services among the individual stakeholders. The platform is based on a modular and open architecture that allows an infinite adding of modules and micro services. The platform assumes the stakeholders input the data and is able to obtain data from other stakeholders in exchange. Individual services have a strict protocol concerning the type of data they can work with and what type of data they can gain access to. One of the main benefits of the systems is the up-to-date quality of the information. The platform significantly lowers or even removes the administrative barriers caused by the need to transform the “paper data”. The senior does not need to provide the service providers with the same information over and over again and the information is available even if the senior forgets it. Further technological solutions include: <ul style="list-style-type: none"><li>○ a mobile application for the field worker</li><li>○ a desktop application for a social care/health care service worker</li></ul>		





	<ul style="list-style-type: none"> <li>○ a foundation for the integration platform</li> <li>○ the development of a complex integration platform</li> <li>○ further micro service additions</li> <li>○ a web portal</li> <li>○ a user friendly graphic interface</li> </ul>	
Costs of planned implementation measures	minimalist version: investment costs + operation costs/year (limited functionality of the field worker app, limited functionality of the platform itself, use of Prague 7's own human resources as opposed to hiring an IT specialist)	257,690 € + 2,540 €
	optimal version: investment costs + operation costs/year	455,770 € + 11,540 €
Funding & business models applied	<p>Several different models can be applied depending on the financial possibilities and priorities of the Prague 7 district and of other stakeholders:</p> <p>OWN SOURCES - The financial model uses only the financial sources of the city district, these can be potentially substituted by the sources of the OICT. The investment costs are funded fully by the Operational Programme Prague - Growth Pole of the Czech Republic (OP PPR) and consequently, Prague 7 represents the role of an initiator, investor, operator and the provider of services. The financial participation of seniors is 30-40% depending on the health and social situation of the senior.</p> <p>JOINT COOPERATION - This financial model assumes with the creation of non-formal group of providers of social care under the leadership of the Prague 7 district. The model uses the synergy of fundraising activities of providers of social care, which can have the form of financing through foundations, crowdfunding, collections, etc.). The city district can achieve having zero costs for the purchase of the hardware devices and about 5-15% costs of the software solutions. Concerning the operation costs, the providers of services cover 20 % of costs and the financial participation of seniors is between 20 and 30 %. The rest of the operational costs is covered by the city district.</p> <p>PURCHASE OF COMMERCIAL SERVICES - In this financial model, the city district demands the services for seniors primarily from private suppliers, optimally in the form of an innovative partnership. The models allow the economies of scale since the supplier of the service can offer his products elsewhere as well. In case the purchase of the hardware will be covered by the OP PPR No. 35 (or 47), Prague 7 covers only 10-15% of costs</p>	



	<p>(depending on the applicant) and zero % of the costs of software. The financial participation of seniors in this model is EUR 6.5- 21.3 / month.</p> <p>SCIENCE AND RESEARCH COOPERATION - The financial model combines the use of science and research organizations and strong commercial partner. After a correct realization and appropriate setting of terms among the partners, after the finishing the research and development phase the model does not require the Prague 7 district to cover any additional costs since the operational costs are covered by the revenues from sale of the licences to other subjects. In the investment phase, as opposed to other financial models, this model uses the funds from Technology Agency of the Czech Republic (TA CR<sup>44</sup>), the funds of the research organization and the funds of the commercial partner (depending on the structural arrangement of the cooperation). The operational costs for the city district and the senior clients themselves depend on the amount of revenues from the sale of licences. These costs can therefore be as low as zero.</p>
Activities	<p>Following activities for the implementation need to be taken:</p> <ol style="list-style-type: none"> <li>1. Establishing a coordination and a common approach with the City of Prague <ol style="list-style-type: none"> <li>a. The possibility of a development of such Platform in the cooperation with the city of Prague and the possibility of inclusion of social services and home care.</li> <li>b. Design of specific software architecture that can connect existing local and whole-city solutions.</li> </ol> </li> <li>2. Data sharing solution on the level of contributory organizations in Prague 7 <ol style="list-style-type: none"> <li>a. Familiarize the staff of contributory organizations with the possibilities of technology through excursions, demonstrations, group workshops and further systematic training of employees</li> <li>b. Creating a client cards for the Prague 7 contributory organizations</li> <li>c. Linking to the area of assisted living with a selected provider: collaboration in customer care, sharing a common data platform and technology, joint case management.</li> <li>d. Designing a user interface for entering and displaying data in the office and in the field.</li> <li>e. Optimizing solutions and setting processes in services.</li> <li>f. Purchase tablets and staff training.</li> </ol> </li> </ol>

<sup>44</sup> cf. TAČR 2018



	<ul style="list-style-type: none"> <li>g. Assessing the benefits and feedback of service staff and their clients.</li> <li>h. Gradual involvement of other organizations.</li> </ul> <ol style="list-style-type: none"> <li>3. Creating a basic functional version of the platform to support the Service Portal for Senior Citizens</li> <li>4. Creating a common portfolio of projects with key stakeholders</li> </ol>
Local governance & coordination structure	<ul style="list-style-type: none"> <li>○ Prague 7 district - overarching role of the system administrator and supervisor</li> <li>○ individual contributory organizations - provide and obtain the data</li> <li>○ service providers (health care services, social care service) - provide selected range of data based on the architecture of the system</li> </ul>
Reference to lighthouse cities (replication)	All Lighthouse Cities were inspiring this measure through their smart and innovative use cases.
Key timescales	<ol style="list-style-type: none"> <li>1. Securing the coordination with the municipal (City of Prague) solution (1-2 months)</li> <li>2. Finding a solution to share the data on the level of Prague 7's (6-8 months): pilot testing of the solution, optimization and process adjustment (2-4 months); evaluation of benefits and incorporation of feedback.</li> <li>3. Creating a basic functional version of the platform to support the Service Portal for Senior Citizens project (M2 measure). The timeline depends on the scale of the first functional version of the Service Portal and the number of subjects included.</li> <li>4. Creating a common portfolio of projects with key stakeholders (3-4 months)</li> </ol>
Risks & risk mitigation measures	<p>Through the use of the participative design, most of the risk can be identified early in the implementation process. Nevertheless, due to the design of the System of Support for Integrated Care, following risks must be assessed:</p> <ul style="list-style-type: none"> <li>○ Individual institutions and sectional offices of the district's government will not be willing to share their information with other subjects (organizations, individuals) in the system. Therefore it is necessary to continuously gain political support and to inform all the stakeholders about the ongoing process.</li> <li>○ Individual institutions and sectional offices of the district's government do not have the data in the system. In some cases, the use of ICT for processing of data is not thoroughly applied.</li> <li>○ Incorrectly selected communication and implementation strategy.</li> </ul>



Current status	As of January 2018, most of the data in social services in Prague 7 is recorded in simple chart editors, the field workers are working within the paper-pen limitations. That leads to a complicated data transfer and very commonly to the loss of information. That excludes the emergency care service workers who usually use more sophisticated data recording. Importantly, the transfer of the data between different services is very limited and complicated, especially between social care and health care services. The interlinking of these two segments is problematic not only technically, but also legislatively and structurally.
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## 7.3 Service Portal for Senior Citizens

<b>M2: SERVICE PORTAL FOR SENIOR CITIZENS</b>			
Target Area	Prague 7 District		
Goal and core value of the measure	The primary aim of the Service Portal for Senior Citizens is to integrate and present a complete spectrum of services designed for seniors in one place. It is a combination of an information portal, services, e-shop, search engine and a portal for user evaluation of the services offered. The Service Portal will not only be used by seniors and their families, it will also serve as a source of information for social workers from Prague 7 who can learn more about the qualities and availability of senior services. The Service Portal will also offer information about free time activities and up-to-date local information for seniors and non-formal caregivers in Prague 7 district. Likewise the Service Portal will be user friendly with the possibility of smart table or smart TV display.		
Minimum viable project	An information portal including information about social and healthcare services, offer of services by care providers will be offered. Its version is optimized for the use of smartphone/tablet		Must have
	<ul style="list-style-type: none"> <li>○ Possible replication and scaling for the other city districts happens</li> <li>○ extension to a video communication portal, portal of cultural or free-time and educational activities</li> <li>○ creation of a volunteer engagement portal</li> </ul>		Could have
	<ul style="list-style-type: none"> <li>○ The Service Portal is in interconnectivity with the integration platform system</li> <li>○ Clients have the possibility to give feedback for the services they use</li> </ul>		Should have
Technologies & solutions to be implemented	This measure should be the intermediary between all the service providers and the citizens of Prague 7 and managed by the Prague 7 district. The Service Portal includes an information database which aims to educate and inform about all the services offered in Prague 7. The second part of the system is architected as an e-shop which allows the users to buy services they demand and the third part of the system enables the users to leave feedback on the services they used. The system can also serve as a platform for volunteers. Furthermore, the system can be extended with a video portal application which can connect the providers of services with their clients.		



A platform built on architecture of micro services can be implemented in various programming languages. One of the most commonly used is Java EE and its React/Elm directory/functional language. Implementation of this type is customised for each project and uses a uniform architecture for work with all data. This is subsequently used in various versions of the graphic interface (web portal, desktop application, mobile application, the established systems allow access via API, etc.). Addition of micro services ensures connection of any other system or device.

The functional proposal is based on one of the complex services which are made up of sub-micro services. These serve all communication; data transfer in various formats, and serve access from various graphic user interfaces (GUI). Individual graphic user interfaces are independent of each other (light blue in colour), but work in the background with the same data file (dark blue). This ensures integration of information.

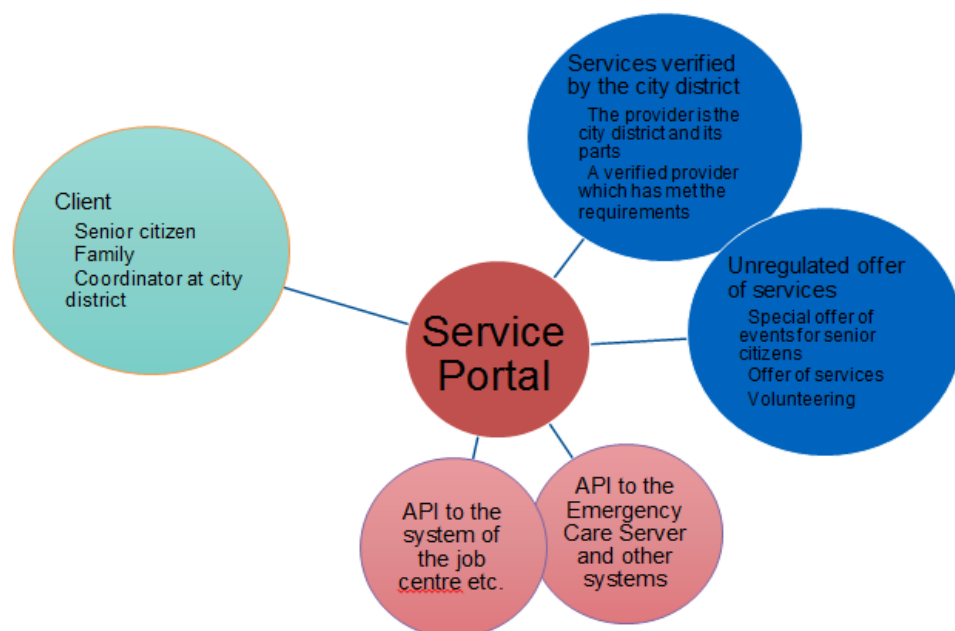


Figure 6: Example of Service market place

minimalist version: investment costs + operation costs/year

115,380 € + 16,380 €



Costs of planned implementation measures	optimal version: investment costs + operation costs/year (includes using professional internet hosting, having an IT specialist employed at a part time (0.2) to manage the system, having an service offer administrator on 1.0 time job as opposed to 0.6 part time job)	115,380 € + 35,620 €
Funding & business models applied	<p>Several different models can be applied depending on the financial possibilities and priorities of the Prague 7 district and other stakeholders:</p> <ul style="list-style-type: none"> <li>OWN SOURCES - the financial model uses only the financial sources of the city district, these can be potentially substituted by the sources of the OICT. The investment costs are funded fully by the Operational Programme Prague - Growth Pole of the Czech Republic (OP PPR) and consequently, Prague 7 represents the role of an initiator, investor, operator and the provider of services. The financial participation of seniors is 30-40% depending on the health and social situation of the senior.</li> <li>JOINT COOPERATION - This financial model assumes with the creation of non-formal group of providers of social care under the leadership of the Prague 7 district. The model uses the synergy of fundraising activities of providers of social care, which can have the form of financing through foundations, crowdfunding, collections, etc.). The city district can achieve having zero costs for the purchase of the hardware devices and about 5-15% costs of the software solutions. Concerning the operation costs, the providers of services cover 20 % of costs and the financial participation of seniors is between 20 and 30 %. The rest of the operational costs are covered by the city district.</li> <li>SCIENCE AND RESEARCH COOPERATION - The financial model combines the use of science and research organizations and strong commercial partner. After a correct realization and appropriate setting of terms among the partners, after the finishing the research and development phase the model does not require the Prague 7 district to cover any additional costs since the operational costs are covered by the revenues from sale of the licences to other subjects. In the investment phase, as opposed to other financial models, this model uses the funds from Technology Agency of the Czech Republic (TA CR<sup>45</sup>), the funds of the</li> </ul>	

<sup>45</sup> cf. TAČR 2018



	research organization and the funds of the commercial partner (depending on the structural arrangement of the cooperation). The operational costs for the city district and the senior clients themselves depend on the amount of revenues from the sale of licences. These costs can therefore be as low as zero.
Activities	<ul style="list-style-type: none"> <li>○ Creating a Functional Service Portal for Senior Citizens with limited functionality</li> <li>○ Further expansion of the solution to include more functionalities</li> <li>○ Replication and involvement of other city districts</li> </ul>
Local governance & coordination structure	<p>Roles in the system:</p> <ol style="list-style-type: none"> <li>1. Provider - Administrator of the portal: Prague 7 district, possibly the City of Prague - mainly for the organizational and legislative reasons, consent for the management of information is needed</li> <li>2. User - Client             <ol style="list-style-type: none"> <li>a. senior, person with disabilities - end user - orders the service for him/herself</li> <li>b. family, close relatives of the senior client - order the service for the senior client</li> </ol> </li> <li>3. User - Professional             <ol style="list-style-type: none"> <li>a. coordinator of services (represents Prague 7)</li> <li>b. provider of social and health services who helps the clients to find a complementary service</li> </ol> </li> <li>4. Service provider             <ol style="list-style-type: none"> <li>a. institutions run by the Prague 7 district</li> <li>b. social services</li> <li>c. home care</li> <li>d. further support services</li> </ol> </li> <li>5. Volunteers and free-time activities (offering the seniors some services on a volunteer basis, coordination of volunteers)</li> </ol>
Reference to lighthouse cities (replication)	Collectively inspired by ICT infrastructure deployed in Manchester and Eindhoven (urban and open data platforms) and by the platform initiatives by Fraunhofer IAO (BABLE and Smart Society Academy)





Key timescales	<ol style="list-style-type: none"> <li>1. Creating a functional Service Portal for Senior Citizens with limited functionality (12 months)</li> <li>2. Further expansion of the solution (12 months)</li> <li>3. Replication and involvement of other city districts (TBD)</li> </ol>
Risks & risk mitigation measures	<ul style="list-style-type: none"> <li>○ marketing barriers - the need for creating and sustaining of a communication strategy towards the providers of services, both external and internal, clients and employees of the Prague 7 city district.</li> <li>○ user barriers - overcoming the psychological barriers concerning the use of such platform</li> <li>○ organizational barriers - the need for setting up standards for social care services</li> <li>○ technological and system barriers - creating an adequate architecture that would suit the needs of clients in Prague 7</li> </ul>
Current status	<p>As of January 2018, at the level of the City of Prague or the Prague 7 city district, there is no comprehensive offer of social or healthcare services. A contributory organization of Prague 7 - the Centre for Social Services runs its own information portal which offers the services provided but there is no actual extra content for the customers/users of these services. For instance on the state level, the Ministry of Social Affairs runs several portals for an easier orientation in the area of social services. These portals often include just information about selected services. Also, one of the portals (online consultation portal for the social benefits recipients) does allow the user to calculate the amount of social benefits he/she is eligible for. This, for example is one of the functionalities which could be directly used for the Service Portal.</p>



## 7.4 Extended Emergency Care

M3: EXTENDED EMERGENCY CARE			
Target Area		Prague 7 District	
Goal and core value of the measure		The main goal of the Extended Emergency Care service is to innovate and broaden the current emergency care model which has been in use in the Czech Republic since the 1990's. The concrete goals of the measure include: improving the coordination between individual players when reacting to an emergency situation; ensuring a uniform data communication and inter-connectability of the end technologies; simplification of the emergency care with respect to the connectivity with other social and health care services; adjustability of the services to the needs of clients and client's family members. Further goals are: increasing the reliability of the technological solution and defining the standards of quality for individual components of the solution; creating a modular solution with a possible augmentation which would include new technologies and functions (video-monitoring, telemedicine solutions, and medicament use supervision) and ensuring a future inter-connectability with elements of a smart home technology.	
Minimum viable project		An emergency care server connected to the emergency unit, dispatching centre and coordination with field workers	Must have
		Telemedicine devices aiming to evaluate long term trends in a client's health status (heart rate monitors, blood pressure monitors, blood sugar monitors, etc.)	Could have
		Mobility sensors, fire sensors, flood sensors, smart TV or tablet	Should have
Technologies & solutions to be implemented		The general solution: The basic element of the solution is a Server of Emergency Care. The server, being on side of the system, manages the collection of data and requirements from users and after processing them, hands the information over to the dispatching centre and the (social) workers. On the other side, the user has a collection of devices at his/her disposal which primarily serve to transfer information about the critical situation. Secondly, the devices serve as collectors of data on the basis of which the server then evaluates the cases of emergency but also the trends of health indicators of the user. The Emergency Care unit serves as a connection between the end user and the emergency care server/dispatching centre. Therefore its usage must be as simple as possible because it mainly serves the seniors on the verge of self-sufficiency. The unit's design and function must follow the following principles: it is continuously wearable by the user, the unit is	



	<p>rechargeable during the user's sleep, and the unit must include an emergency button. The smart home technologies are connected to the Emergency Care solution by implementing the fire, flood, smoke, movement sensors and the sensors of open window/door. Telemedicine devices can further expand the emergency care solution by adding the devices capable of collecting the health related data. Mostly, the use of such devices is convenient for the patients with diabetes or cardiovascular conditions.</p> <p>The dispatching centre can be essentially divided into two main parts: supervisory centre and field workers service. The supervisory centre includes a workplace with nonstop operation which allows the operators to monitor the emergency care server and react to the alarms set of by the devices in seniors' homes. The field workers use a mobile application which is a mobile version of the supervisory centre that allows them to react to the alarms and also, to record regular social / health care service activities provided to the client.</p> <p>The direct replication possibility in Triangulum: The Blink video technology from the company Lyse from the City of Stavanger enables a TV to be used for interactive applications (rehabilitation, physical training activity) and for video communication with the clients' friends and family. Blink allows TV's to be converted into a smart TV using a compact computer with a camera and remote control. The technology as well as the system can be connected to the actual emergency care providers to allow the use of the emergency care service. This technology could be used during a pilot project in Prague 7. Such possibilities of a future cooperation are in ongoing discussion with the representatives of Lyse from Stavanger.</p>	
Costs of planned implementation measures	minimalist version: investment costs + operation costs/year + cost per senior x number of seniors <sup>46</sup>	76,920 € + 7,690 € + 73€ x n
	optimal version: investment costs + operation costs/year + cost per senior x number of seniors <sup>47</sup>	384,620 € + 9,620 € + 1,360 € x n

<sup>46</sup> Costs can be significantly lowered by renting the software solution as opposed to developing it de novo.

<sup>47</sup> Costs can be significantly lowered by renting the software solution as opposed to developing it de novo.



	provision of 5 equipments of the Blink solution for smart home care provided by Lyse (Stavanger) who further developed the technology in the framework of Triangulum and pilot testing possibility in Prague 7	
Funding & business models applied	<p>Several different business models can be applied depending on the financial possibilities and priorities of the Prague 7 district and other stakeholders:</p> <ul style="list-style-type: none"> <li>○ OWN SOURCES - the financial model uses only the financial sources of the city district, these can be potentially substituted by the sources of the OICT. The investment costs are funded fully by the Operational Programme Prague - Growth Pole of the Czech Republic (OP PPR) and consequently, Prague 7 represents the role of an initiator, investor, operator and the provider of the emergency services. The financial participation of seniors is 30-40% depending on the senior's health and social situation.</li> <li>○ JOINT COOPERATION - This financial model assumes with the creation of non-formal group of providers of social care under the leadership of the Prague 7 district. The model uses the synergy of fundraising activities of providers of social care, which can have the form of financing through foundations, crowdfunding, collections, etc. The city district can achieve having zero costs for the purchase of the hardware devices and about 5-15% costs of the software solutions. Concerning the operation costs, the providers of services cover 20 % of costs and the financial participation of seniors is between 20 and 30 %. The rest of the operational costs is covered by the city district.</li> <li>○ PURCHASE OF COMMERCIAL SERVICES - In this financial model, the city district demands the services for seniors primarily from private suppliers, optimally in the form of an innovative partnership. The models allow the economies of scale since the supplier of the service can offer his products elsewhere as well. In case the purchase of the hardware will be covered by the Operational Programme Prague (OP PPR) No. 35 (or 47), Prague 7 covers only 10-15% of costs (depending on the applicant) and zero percentage of the costs of software. The financial participation of seniors in this model is EUR 6.5- 21.3/ month.</li> <li>○ SCIENCE AND RESEARCH COOPERATION - The financial model combines the use of science and research organizations and strong commercial partner. After a correct realization and appropriate setting of terms among the partners, after the finishing the research and development phase the model does not require the Prague 7 district to cover any additional costs since the operational costs are</li> </ul>	



	covered by the revenues from sale of the licences to other organizations. In the investment phase, as opposed to other financial models, this model uses the funds from Technology Agency of the Czech Republic (TA CR <sup>48</sup> ), funds of the research organization and of the commercial partner (depending on the structural arrangement of the cooperation). The operational costs for the city district and the senior clients themselves depend on the amount of revenues from the sale of licences. These costs can therefore be as low as zero.
Activities	<ol style="list-style-type: none"> <li>1. Establishing a coordination and common approach with the City of Prague</li> <li>2. Deepening the cooperation with service providers:</li> <li>3. Detailed study of individual solutions of service providers, <ol style="list-style-type: none"> <li>a. Pilot project involving contributory organizations and service providers focused on testing 2-3 selected solutions by the living-lab method,</li> <li>b. Establish close cooperation with the most suitable providers for the extended implementation,</li> </ol> </li> <li>4. Establishment of an Emergency Care Counter at the level of contributory organizations,</li> <li>5. Pilot project on the use of video communication in services for the elderly,</li> <li>6. Raising awareness of all key actors.</li> </ol>
Local governance & coordination structure	The measure assumes the creation of a single supervisory center for the purposes of contributory organizations of the Prague 7 district.
Reference to lighthouse cities (replication)	Prague got inspired by welfare technologies from Helsehuset Stavanger, the innovative video for distance health care and for communication services (Blink) from Lyse from Stavanger and in general by the smart health and social care of CityVerve in Manchester.
Key timescales	<p><b>2 months:</b> Discussion of the possibility of a full Prague scale of the solution with the OICT</p> <p><b>6-10 months:</b> Commencing a pilot project which includes the implementation of the solution 30-50 households (30-50 seniors), evaluation of the project</p> <p><b>12 months:</b> Setting up of a dispatching call centre and scaling up for the population of senior citizens in Prague 7. Continuously possible expanding of the solution by adding further functionalities.</p>

<sup>48</sup> cf. TAČR 2018



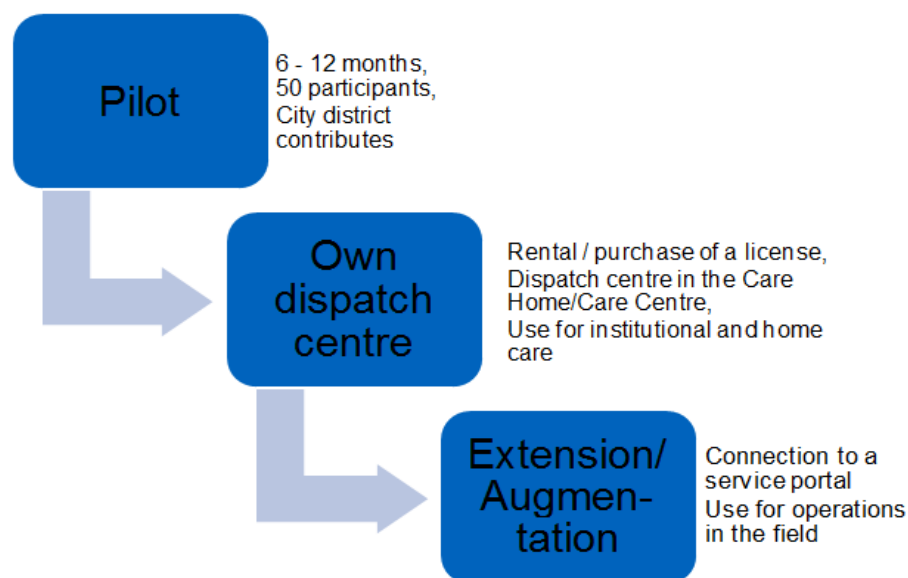


Figure 7: Key timescales for the implementation of Extended Emergency Care

solution in the framework of Triangulum project:

**6 months:** Setting up a pilot study for the implementation of the video communication into households - in cooperation with Lyse (Stavanger)

#### Risks & risk mitigation measures

Following risks need to be addressed:

- low awareness of seniors/family members/ responsible social workers about the availability of emergency care
- the use of emergency care only after a first emergency situation (fall, hospitalization), lack of preventive indication of care and consulting
- fear of technological solutions from elderly people
- financial requirements to run the service
- low indication percentage of the emergency care need by the general practitioner/ other medical doctor

The above mentioned risks can be reduced by consistent information campaign aiming to raise the awareness concerning the services of the emergency care solution. Such campaign must be diversified to target four specific groups of individuals: seniors themselves, the family and close relatives to the senior, social workers and health care individuals (GP). Each group requires a different approach concerning the measures presented in the information campaign. The barrier concerning financial requirements of the service can be lowered by a) also introducing an adequate information campaign



	which would effectively present the advantages of such service b) creating a subvention scheme with the support of the city district which would help low income seniors and their families to be able to afford such service.
Current status	As of January 2018 there are several emergency care providers who provide their services to clients in Prague 7. These providers do not operate any server or dispatching centre. Most of them only offer a device which includes an emergency button which sends a sms message in case it is pressed.



## 7.5 Smart Homes for Seniors

M4: SMART HOMES FOR SENIOR CITIZENS			
Target Area		Prague 7 District	
Goal and core value of the measure		The aim of Smart Homes for Senior Citizens for Prague 7 is to improve the quality of life of seniors and improve their safety. The smart home system enables the monitoring of different qualities in their home environment. Such monitoring also leads to the lowering of the consumption of energy through the regulation of heating, ventilation and light management. The selected elements of smart home technology are able to detect any abnormal situation, report such situation or even solve the abnormal situation right away. The project counts on installing the smart home technology in approx. 50 households in the pilot study.	
Minimum viable project		The minimalist version includes the system of a remote gas/water/energy consumption control which allows the detection of abnormalities.	Must have
		The extended version includes a complex management unit and a number of security sensors including the possibility of active elements (water intake closing valves, etc.)	Should have
		The optimal version includes several sensors and a central unit which is based on a wireless system. The system should be connected to the internet and be able to communicate with the central database of the provider of the services.	Could have
Technologies & solutions to be implemented		The smart home technology system combines traditional systems for measuring and regulation of energy, water and gas consumption (with a specific focus on detection of dangerous situations) and the possibility to add and connect e-health components that will monitor the senior. Though complex smart home solutions still come at a significant cost, a specifically limited solution designed for the needs of an elderly client does not have to be so challenging expenditure-wise. Technologically, the minimalist version includes system of remote registration of consumption of energy, water and gas where one is able to detect a number of irregular or even dangerous situations. Other functionalities will be added according to the precise solution which will be architected according to the needs of individual seniors. Such functionalities, besides the already	





	<p>mentioned energy, gas and water consumption meters can include security sensors and detectors (smoke, fire, poisonous gases, flammable gases, temperature, flooding, movement, open doors, windows), temperature regulators, eHealth components, IP cameras, data controllers and concentrators. When implementing the smart home technology into already-built apartments, the use of a wireless technology is recommended to minimize the costs needed for the implementation. Even-though most of the technology is already available on the market, the biggest challenge is to connect the technology to the system of emergency care. It is recommended to link the measure of Smart Homes for Senior Citizens with the measure of Extended Emergency Care and to interconnect it with the sensors (and other technology) described above.</p>	
Costs of planned implementation measures	minimalist version (see above)	investment costs 1,540 € x number of households + yearly operational costs 9,230 €
	extended version (see above)	investment costs 3,080 € x number of households + yearly operational costs 18,460 €
Funding & business models applied	<p>Several different models can be applied depending on the financial possibilities and priorities of the Prague 7 district and other stakeholders:</p> <ul style="list-style-type: none"> <li>○ OWN SOURCES - the financial model uses only the financial sources of the city district, these can be potentially substituted by the sources of the OICT. The investment costs are funded fully by the Operational Programme Prague - Growth Pole of the Czech Republic (OP PPR) and consequently, Prague 7 represents the role of an initiator, investor, operator and the provider of services. The financial participation of seniors is 30-40% depending on the health and social situation of the senior.</li> <li>○ JOINT COOPERATION - This financial model assumes with the creation of non-formal group of providers of social care under the leadership of the Prague 7 district. The model uses the synergy of fundraising activities of providers of social care, which can have the form of financing through foundations, crowdfunding, collections, etc.). The city district can achieve having zero costs for the purchase of the hardware devices and about 5-15% costs of the software solutions. Concerning the operation costs, the providers of services cover 20 % of costs and</li> </ul>	



	<p>the financial participation of seniors is between 20 and 30 %. The rest of the operational costs is covered by the city district.</p> <ul style="list-style-type: none"> <li>○ PURCHASE OF COMMERCIAL SERVICES - In this financial model, the city district demands the services for seniors primarily from private suppliers, optimally in the form of an innovative partnership. The models allow the economies of scale since the supplier of the service can offer his products elsewhere as well. In case the purchase of the hardware will be covered by the OP PPR No. 35 (or 47), Prague 7 covers only 10-15% of costs (depending on the applicant) and zero % of the costs of software. The financial participation of seniors in this model is EUR 6.5- 21.3 / month.</li> <li>○ SCIENCE AND RESEARCH COOPERATION - The financial model combines the use of science and research organizations and strong commercial partner. After a correct realization and appropriate setting of terms among the partners, after the finishing the research and development phase the model does not require the Prague 7 district to cover any additional costs since the operational costs are covered by the revenues from sale of the licences to other subjects. In the investment phase, as opposed to other financial models, this model uses the funds from Technology Agency of the Czech Republic (TA CR<sup>49</sup>), the funds of the research organization and the funds of the commercial partner (depending on the structural arrangement of the cooperation). The operational costs for the city district and the senior clients themselves depend on the amount of revenues from the sale of licences. These costs can therefore be as low as zero.</li> </ul>
Activities	The technologies are already available on the market; the challenge is to implement them into the system of services for seniors. The ideal scenario aims to use the current infrastructure of emergency care and to augment it using the data from the sensors which are installed in the households.
Local governance & coordination structure	The key stakeholders for the measure include the local municipal government of Prague 7, local social care workers, Senior Care Centre of the Prague 7 district, emergency care providers and possibly external services providers. The key model assumes the smart home technology could present an augmentation of current emergency care services already provided in Prague 7. Such cooperation would use the infrastructure of

<sup>49</sup> cf. TAČR 2018



	emergency care providers and possibly benefit from setting up a local dispatching centre under the supervision of Prague 7 district.
Reference to lighthouse cities (replication)	<p>Prague was inspired by all Lighthouse Cities, specifically for this measure by the smart gateway for homes and for nursing homes (Lyse; Stavanger), by the smart energy offices, smart control of individual rooms and individual floors in existing buildings (Volker Wessels, Eindhoven) as well as by the use case of sensors in public buildings for energy improvements (Siemens, Manchester).</p> <p>The replication is linked to smart home technology (smart gateway) implemented in the lighthouse city of Stavanger by one of the city's organizations, the company Lyse. The technological solution allows implementing sensoric networks and other elements of smart home technology into individual apartments. Also, the system can be connected to the actual emergency care provider to allow the use of the emergency care service. This solution could be used during the pilot project in the City of Prague; such possibilities of a future cooperation were already discussed with the representatives of Lyse in person in Stavanger where the Prague 7 representatives were able to thoroughly examine the system.</p>
Key timescales	<ul style="list-style-type: none"> <li>○ Pilot study - implementation of the smart home technology into the residential services of the Senior Care Centre of Prague 7.</li> <li>○ Pilot project using the smart home technology elements in collaboration with emergency care service providers.</li> </ul>
Risks & risk mitigation measures	The possible cooperation with external service providers presents possible risk but allows the costs to be lowered as compared to developing all-new technological solutions by the Prague 7 district itself.
Current status	Currently (II/2018), the Prague 7 district is in cooperation with local emergency care providers who are considering the implementation of some elements of smart home technology into their clients' homes. A systematic approach has not been developed yet.



## 7.6 Electromobility for social services and seniors

<b>M5: ELECTROMOBILITY for social services and seniors</b>		
Target Area	Prague 7 District	
Goal and core value of the measure	<p>Currently, the Prague 7 district uses 7 vehicles with conventional engines for the performance of local services. In the future, local services such as food delivery, journey for clients of the Care Center to doctor's offices or hospitals outside the Prague 7 area, collection of laundry and distribution of groceries could be done with e-vehicles. According to the information provided, the vehicles run up a total mileage of 2,800 km every month. The aim of the measure is the implementation of e-mobility for the specific needs of Prague 7.</p> <p>The incentive for the purchase of e-vehicles is the reductions of operating and maintenance costs of Prague 7's vehicles. Furthermore, the measure aims to protect the environment, decrease the dependence on hydrocarbon fuels and reduce the level of noise in conurbations and their surrounding areas.</p> <p>In a broader context, the project fully corresponds with strategic plans of the Czech Republic such as the National Action Plan for Clean Mobility, National Program for lowering of emissions and other strategic documents of the Czech governmental policies. In accordance with the Smart Prague programme, the City of Prague aims to install 59 new charging stations for e-vehicles (currently, there is 80 charging stations).</p>	
Minimum viable project	Purchase of two e-vehicles	Must have
	Installing of an own charging station in the Prague 7 district	Could have
	Cooperation with the City of Prague concerning the placement of charging station that are currently planned to be installed and doing so according to the needs of Prague 7 Care Center.	Should have
Technologies & solutions to be implemented	<p>Among the solutions included in the Electromobility chapter is the appointment of Prague 7 energy officer who would be in charge of Prague 7's smart energy and electromobility strategies and would overlook the activities in this area (different activities are currently administered by several different Prague 7 officials and the suggested step should help with a coherent implementation of the agenda). Furthermore a detailed analysis of actual roadmaps of Prague 7's vehicles will be administered. The feasibility study offers an</p>	



	<p>analysis that will serve as a basis for a second, more detailed one. Using the method of human centered design, the study will analyse the needs of clients, feedback from drivers, roadmaps of vehicles, load weight, load space requirements, cooling/heating requirements of the vehicle's cargo space and the periodicity of rides. Consequently, 2 e-vehicles will be purchased based on the previously acquired data. In accordance with the Smart Prague programme, the City of Prague aims to install 59 new charging stations for e-vehicles (currently, there is 80 charging stations). These charging stations could be used for the minimal viable solution.</p> <p>Regular charging stations are defined as those with an output of at most 22 kW. Stations with a higher output, i.e. in excess of 22 kW, will be known as high-performance charging stations. Records will not relate to charging stations for motorbikes and mopeds with an output of up to 3.7 kW.</p>	
Costs of planned implementation measures	Purchase of two e-cars	70,000 €
	Yearly costs for operation of two e-vehicles (assuming the cars are driven 2,800 km / month/ vehicle as declared by Prague 7)	1,820-2,360 €
	Charging station installation	4,000 - 8,000 €
Funding & business models applied	The costs and funding model includes the purchase of two fully electric e-vehicles using the Czech national subvention programme "Natural Environment" in the amount of approx. 10,000 € per vehicle. Eventually, if applicable, EU funding can be applied.	
Activities	<ol style="list-style-type: none"> <li>1. Revision of the functional requirements of the Care Center on the fleet</li> <li>2. Rental or rental of a car and trial operation</li> <li>3. Building infrastructure and gradual renewal of the fleet</li> </ol>	
Local governance & coordination structure	Since the variety of services for which the vehicles are used is very broad, it is preferable for the vehicles to be owned by the municipality of Prague 7 district. Prague 7 can then, based on the agreement with local service providers decide to rent the e-vehicles if the time table allows.	
Reference to lighthouse cities (replication)	<p>Current activities in the field of e-mobility in all the Lighthouse Cities were an inspiration for designing the measure. Following use cases inspired:</p> <ul style="list-style-type: none"> <li>○ public fast-charging infrastructure for e-vehicles (Stavanger)</li> <li>○ private home charging infrastructure for e-vehicles (Stavanger)</li> <li>○ e-vehicles and e-buses (Stavanger)</li> </ul>	



	<ul style="list-style-type: none"> <li>○ use of e-vehicles in social services (Stavanger)</li> <li>○ public charging infrastructure Strijp-S (Eindhoven)</li> <li>○ e-vehicles and e-buses, distribution-bike, freight distribution, last mile deliveries (Manchester)</li> </ul>
Key timescales	<p><b>E-vehicle:</b> The purchase of the e-vehicles to be planned in accordance with the possibilities to draw funds from the respective operational programmes.</p> <p>Firstly the functional requirements of the Care Center, on the fleet need to be revised. Afterwards a purchase or rental of an e-vehicle and trial operation can be followed. The third step is based on the identified needs by building infrastructure and gradual renewal of the fleet.</p> <p><b>E-charging station:</b> In case of dependence on the installation of a charging station by the City of Prague - to be specified.</p>
Risks & risk mitigation measures	<p><b>E-vehicles:</b> The risk for Prague 7 for starting of a pilot testing with e-vehicles is relatively low assuming Prague 7 would rent the cars for a testing period.</p> <p><b>E-charging stations:</b> Network in the “must have” solution is depending on publicly accessible network of charging stations. The risk with this minimal solution is to ensure the on-demand availability of the charging infrastructure until a professional charging station could be installed in Prague 7, as suggested in the should have solution.</p>
Current status	Currently (II/2018), the Prague 7 district uses 7 vehicles with conventional engines for the execution of local services, such as food delivery, bringing clients of the Care Center to doctor's offices or hospitals outside the Prague 7 area, collection of laundry and distribution of groceries, etc.



## 7.7 Mobility of Senior Citizens

<b>M6: MOBILITY OF SENIOR CITIZENS</b> <b>(Maps with identified routes to points of interest in Prague 7)</b>		
Target Area	Prague 7	
Goal and core value of the measure	<p>The main goal of the measure is to design the public space in Prague 7 in an age-friendlier manner and to improve the accessibility the most frequent destinations of the journeys of senior citizens in Prague 7. These areas shall be identified in Prague 7 with the help of elderly citizens in a participatory process, in which the points of interest and public spaces will be mapped. In a second step the points of interest (e.g. shops, popular spots, health facilities frequently used etc.) shall be better connected through barrier free routes, to improve the accessibility to these places for people with mobility problems.</p> <p>For the purpose is a more effective planning of service provision to senior citizens and the removal of barriers in their vicinity and the creation of a second map, depicting the distribution of the age structure of the population. This will enable the municipality to better tailor services around those areas and prioritise public space alterations within distinct areas.</p>	
Minimum viable project	Online map of points of interests	Must have
	Printouts of the routes accessible in the Info Centers of the City District and at the Department of Social Affairs	Could have
	Interactive map that enables more flexibility in identification of routs, points of interest and other places.	Should have
Technologies & solutions to be implemented	<p>Online map showing the points of interests for seniors in Prague 7</p> <p>Creation of a 3D map of P7 and distribution of the senior population (Q1 of 2018)</p>	
Costs of planned implementation measures	<ul style="list-style-type: none"> <li>○ Personal costs</li> <li>○ Material</li> <li>○ Other costs</li> </ul>	6,000 € (estimation)



Funding & business models applied	Ministry of Labor and Social Affairs grant, municipality district budget, Triangulum budget (financing of creation and printing of maps)
Activities	<p>Preparation of maps for the participative meetings with senior citizens.</p> <p>Preparation and performance of participative meetings with senior citizens in different locations of Prague 7 in order to highlight the most frequent destinations of their journeys and to identify barriers their needs in relation to public space and barriers.</p> <p>Identification of addresses of local providers and the point of interests in Prague 7 and their transcription into online maps. The maps will be printed and distributed in info centers of the city district and at the Department of Social Affairs in Prague 7 for seniors who are not using the internet.</p> <p>Identification of the age structure and location of the seniors through registry of inhabitants and its representation in a map.</p>
Local governance & coordination structure	<p>Coordination - city district of Prague 7 and NGO Pražské Matky, z.s.</p> <p>IPR Prague - creation of maps</p>
Reference to lighthouse cities (replication)	Prague was in general inspired by smart ways of mobility and e-mobility in all Lighthouse Cities. During the Triangulum project and during the work on the Implementation Strategy Prague was inspired as well by a Czech project. A similar project (barrier free online maps, participative design) has been realised in Litoměřice, one of the most progressive "Healthy Cities" in the Czech Republic. This project has been broadened on cooperation with IPR through 3D maps and modelling of senior citizens age structure representation within the district.
Key timescales	<ul style="list-style-type: none"> <li>○ Mapping of points of interests of seniors in Prague 7 (end of 2017)</li> <li>○ Creation of maps showing the distribution of senior citizens in Prague 7. (February 2018)</li> <li>○ distribution of printed maps in Info Centers of the City District and at the Department of Social Affairs in Prague 7; provision of online-maps (in 2018)</li> </ul>
Risks & risk mitigation measures	No risk





Current status

Ongoing - in progress see: key time scales



Figures 8: Participatory process with seniors in Prague 7, source: PRAŽSKÉ MATKY 2017



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Figure 9: Result from the mapping process of locations of missing benches in Prague 7, source: PRAŽSKÉ MATKY 2017

## 7.8 Update of Prague's 3D model

### M7: UPDATE OF PRAGUE'S 3D MODEL

Target Area	City of Prague
Goal and core value of the measure	3D data are an elementary part of a data platform of the City of Prague. The core value of the 3D model of Prague is its supporting function for decision making in urban and strategic planning. As well it is utilized as a data input in environmental and other analyses. In general 3D models can also serve as communication tools in participatory planning for new developments or in revitalization processes in parts of the city.

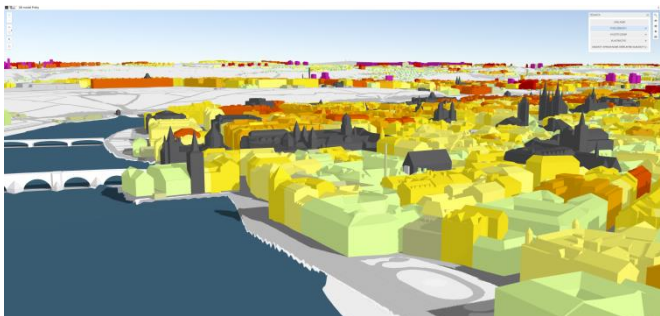


	<p>Prague's 3D data can be used across various fields and therefore the city needs reliable tools for the export of 3D data into different formats, without losing their quality. To use 3D data for planning, analytical and participatory projects, the data e.g. the topologically data, has to be correct and constantly be updated.</p> <p>Prague started to build its 3D model in 2001. In 2017 the whole area of the city is covered, nevertheless Prague is missing is a system for maintenance of its 3D data and a system for web presentation of the 3D model, another issue is a data quality. Prague needs certain software tools for the validation and the restoration of topology of 3D features.</p> <p>Therefore the goal of the measure is to update of 3D-Model, to implement a system of software tools for maintenance and web presentation of Prague's 3D model.</p>	
Minimum viable project	It is essential to have a set of software tools for storing, editing, validations, import and export of Prague's 3D model, as well as to own software tools for seamless 3D visualization of large scale data using web browser.	Must have
	It is desirable to be able to use a software tool for working with the time aware 3D data, a tool which creates models for 3D printing and a tool for creating a "virtual reality".	Could have
	Creating and implementation of strategies for using 3D model of a city in participative projects.	Should have
Technologies & solutions to be implemented	As a basis for the 3D-model update serves the already existing model, which is administered by IPR Prague.	
Costs of planned implementation measures	There are different kinds of costs which occur for the update of the 3D model of Prague.	
	Implementation of system of software tools for maintenance and web presentation of the 3D model	50,000 € VAT included
	Maintenance of the software system for 3 years	30,770 € VAT included
	The further development of the system in the next 3 years	46,160 € VAT included

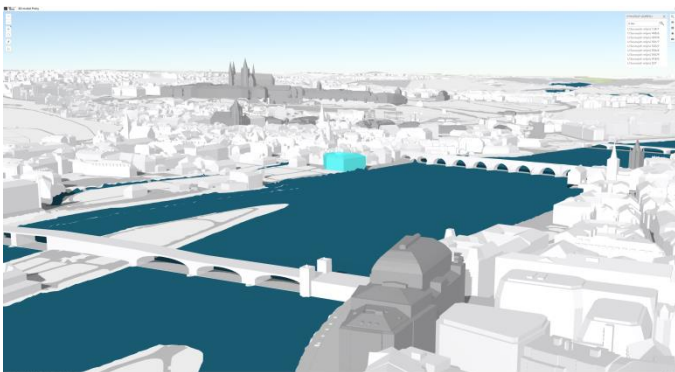


	Software licenses	46,160 € VAT included
	The maintenance of the software licenses for 3 years	27,700 € VAT included
Funding & business models applied	The cost for the update are partly covered from the Triangulum project and partly from the budget of IPR Prague. The budget for the development and implementation of a system of software tools for maintenance and web presentation of Prague's 3D model (50000 € VAT included) is financed via the Triangulum project. The other occurring costs will be covered from IPR Prague.	
Activities	<p>To implement a suitable solution following steps are necessary to take:</p> <ol style="list-style-type: none"> <li>1. Development and implementation of software tools for maintenance and web presentation of Prague's 3D model by a third party.</li> <li>2. A public tender to choose a supplier of a system for maintenance and web presentation of Prague's 3D model started in September 2017. After the selection of a supplier, the company has 3 months for the implementation of the proposed solution.</li> <li>3. IPR Praha holds the public tender and the system will be implemented in an IPR Prague's environment.</li> <li>4. The system will be used, maintained and updated by IPR Prague internally or through third party on behalf of IPR Praha.</li> </ol> <p>Before these steps an analysis of similar projects in other cities took place. For instance the 3D City Model from Berlin, Zürich and Vienna were tested and analysed. Following Web links lead to the cities' solutions.</p> <ul style="list-style-type: none"> <li>○ Berlin 3D City Model, Berlin Partner for Business and Technology; virtualcitySYSTEMS GmbH <a href="http://www.businesslocationcenter.de/en/berlin-economic-atlas/the-project">http://www.businesslocationcenter.de/en/berlin-economic-atlas/the-project</a></li> <li>○ Zürich 3D-Stadtmodell; City of Zurich <a href="https://www.stadt-zuerich.ch/ted/de/index/geoz/geodaten_u_plaene/3d_stadtmodell.html">https://www.stadt-zuerich.ch/ted/de/index/geoz/geodaten_u_plaene/3d_stadtmodell.html</a></li> <li>○ Wien Dreidimensionales Stadtmodell; City of Vienna <a href="https://www.wien.gv.at/stadtentwicklung/stadtvermessung/geodaten/stadtmodell/anwendungen.html">https://www.wien.gv.at/stadtentwicklung/stadtvermessung/geodaten/stadtmodell/anwendungen.html</a></li> </ul>	



Local governance & coordination structure	The single and lead partner of this measure is the Geodata Department of IPR Prague.	
Reference to lighthouse cities (replication)	During the Follower City Days in Eindhoven, a knowledge exchange between the IPR Prague Geodata Department of the City of Eindhoven about the 3D models of the cities and spatial data in connection to the measure. . Additionally during the working process on the 3D model update inspirations, in the Triangulum project were gained in Berlin, Zurich and Vienna.	
Key timescales	During the process three milestones will help to measure the success for the implementation of the measure. Firstly choosing and signing the contract with the supplier (app. June 2018), secondly the implementation of the new system in IPR Prague's environment and thirdly launching a web presentation of the city model.	
Risks & risk mitigation measures	low	
Current status	In the end of 2017 the tendering process for the company who will provide the necessary software was running.	 <p>Figure 10: Example for a visualization of 3D data from IPR Prague in an app 1, source: Kateřina Lochschmidtová</p>



	<p>The visualization of 3D data with help of an app is not a part of the Triangulum project, but it is a result of the preparation process for the update of the 3D model within the Triangulum project. The knowledge and experiences which were acquired through consultation during the Morgenstadt City Lab and the Triangulum process were used to create this app. The app was developed by a web app developer together with IPR Prague.</p>	
Beyond the city	<p>There is the potential to transfer IPR's knowledge and experiences with the 3D model and its use also for other city models. The possibility for best-practise learning, showing analyses, visualisation and the presentation of 3D data in general can be shared with other interested cities. For instance already a knowledge exchange during the Follower City Days in Eindhoven took place, about the use of 3D data in planning processes. As well discussions about the used technological tools and difficulties in the implementation took place. Knowledge exchanges like this can take place as well in the future, especially after the implementation of the software tools update.</p>	<p>Figure 11: Example for a visualization of 3D data from IPR Prague in an app 2, source: Kateřina Lochschmidtová</p>



## 8 Actions and roadmap of the Implementation Strategy

### Timeplan of the implementation strategy

			Year 1				Year 2				Year 3			
	Task	Person(s) Responsible	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>M0</b>	<b>Project management and coordination</b>													
	Develop a consolidated view and understanding of the pilot project													
	Evaluate and prioritize goals													
	Establish commitment for the pilot project on the level of Prague 7													
	Project team formation													
	Determine the business model and the funding strategy													
	Determine the project phasing													
	Define detail project plan													
	Involve the key stakeholders: Form an implementation consortium													
	Technology evaluation													
<b>M1</b>	<b>System for support of integrated care</b>													
	Establishing coordination and common approach with the City of Prague													
	Data sharing solution at the level of contributory organizations in Prague 7													
	Creating a basic functional version of the platform to support the marketplace													

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	Creation of maps showing the distribution of senior citizens in Prague 7																		
	distribution of printed maps																		
	provision of online-maps																		
<b>M7</b>	<b>Update of Prague's 3D model</b>																		
	IPR Prague holds the public tender																		
	Development of the software tools																		
	Implementation of the system in IPR Prague's environment																		
	Maintenance and update of the system																		



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## 9 Conclusions & next steps

The Implementation Strategy builds on a thorough analysis conducted in cooperation of IPR Prague with Fraunhofer IAO, the University of Stuttgart, UCEEB and Prague 7. The analysis was done in a participatory process by involving the relevant actors and mapping their needs and challenges. This approach managed to not only create a positive momentum for the project, raise awareness of the smart cities principles but also newly established a functional working collaboration among involved actors. Moreover, the analysis took into consideration the best-practice of the Lighthouse Cities in approaching the identified needs and challenges in their context and as well pushed for the replication of offered solutions. Simultaneously the analysis considered the specific context of the district of Prague 7. This process resulted in the development of innovative measures in the field of ICT, e-mobility and energy efficiency. Subsequently the measures were verified by the Lighthouse Cities, Fraunhofer FOKUS, Fraunhofer IAO and the University of Stuttgart as their feedback was taken into account. The defined measures form together a pilot project that has the potential to be implemented on the district level. Important experiences can be collected by running a pilot project in a city district in Prague to learn the lessons for a possible future scaling of the project to the other districts of Prague and also to other cities, as the needs identified in the analysis are of a nation-wide character.

The proposed measures have been designed in a minimalistic, a medium and an ideal scope of the implementation and were integrated into a comprehensive roadmap over the span of three years. This enables the city district of Prague 7 to approach the implementation of the pilot project in an integrated manner step by step. Most of the suggested measures are interconnected as there are causal interrelations between them, but also interrelations based on time, resources, stakeholders and technologies to be deployed during implementation.

Understanding the importance of formulating adequate funding models, concrete financing of each measure is discussed in detail in chapter 7 of the Implementation Strategy. The financing models for individual measures will depend on a specific combination in which the measures will merge in the pilot project. After choosing the right scope of implementation for each measure, these will come together in a unique scheme that will then be addressed with specific financing solution. The funding models include:

- 1) financing the solutions with the financial sources of the city district with a co-payment from the users and the use of national funds of the Czech Republic,
- 2) joint cooperation between the non-formal providers under the leadership of the Prague 7 district with the use of fundraising activities (foundations, crowdfunding, collections, etc.),
- 3) purchase of the services for seniors primarily from private suppliers, optimally in the form of an innovative partnership allowing the economies of scale and utilizing the EU funds defined above,
- 4) cooperation of science and research organizations and strong commercial partner(s) using the funding from Technology Agency of the Czech Republic (TA CR). The e-mobility measure operates with specific

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funding model which includes the use of the "Natural Environment" national subvention programme of the Czech Republic.

The Implementation Strategy especially puts a strong emphasis on an interdisciplinary, systematic and well connected development process for Prague 7. In this regard, IPR Prague will continue to be the driver of the implementation as it will facilitate the formation of the consortium for the pilot project implementation and will as well oversee the inter-sectoral management of the involved actors. The consortium will build upon the working ties that were established during the development of the Implementation Strategy, it will thus include local organisations and companies, but it may potentially include members of the Triangulum consortium. The exception is the measure of the 3D model, which IPR Prague will implement with the technology which will be provided during 2018. For implementation of the proposed pilot project it is essential, that the city council of Prague 7 takes the ownership of the project and becomes the enabler of the implementation. For this purpose the process of designing of the measures was done in close collaboration with the representatives of the city district of Prague 7 and their feedback was incorporated into the Implementation Strategy. Subsequently, Prague 7 will need to base the implementation of this roadmap within an overarching strategic management process, which is directly attached to the decision making level of the city district. Additionally the integration of the key stakeholders from local companies, universities, civil society and important local organizations and municipal enterprises into an implementation consortium is essential. The Implementation Strategy is the blue print for a detailed project plan of the pilot project. The precondition of developing a detailed project plan is the establishment of an allocated coordination unit.



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