IRIS

Integrated and Replicable Solutions for Co-Creation in Sustainable Cities

Project Acronym:	IRIS
Project Full Name:	Integrated and Replicable Solutions for Co-Creation in Sustainable Cities
Grant Agreement:	No 774199
Project Duration:	5 years (starting 1 October 2017)

Deliverable 3.6

IRIS City innovation management performance and roadmaps

Work Package:	WP3 Development of Bankable Business Models and Exploitation Activities
Task:	T3.3 Business model advancement and Smart Cities innovation management task forces
Lead Beneficiary:	IMCG
Due Date:	30 September 2020 (M36)
Submission Date:	20 January 2021 (40)
Deliverable Status:	Final
Deliverable Style:	R
Dissemination Level:	PU
File Name:	IRIS_D3.6_IRIS_City_innovation_management_performance_and_roadmaps.pdf

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 774199

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Version History

Version	Date	Modifications made by
0.1	200825	
0.2	200922	Pels/Massink
0.3	201121	Massink
1.0	210120	Final version to be released to the EC

Disclaimer

Executive Summary

This report aims to enhance the IRIS cities' innovation management capacity. It provides the baseline and the initial performance of the IRIS cities innovation management, showing best practices and Achilles heels. There is also a list of focus areas that relates to all IRIS cities and WP3 implies that it will benefit replication activities if the cities take action on each bullet.

The report is especially of interest for the IRIS city authorities responsible for creating the scene for a more innovative city. The recommendations are for each city summarized as individual city road maps, with the aim of the expected impact being a movement for improving the cities way of handling innovation, thus, being able to replicate what is being demonstrated in the project.

The results of this report, which is in line with D3.2 Dashboard tool, D3.7 Financial instruments and D3.8 Exploitation plan and operation, feeds in to WP8 Replication as well as D3.9 IRIS Beyond business plan. The study has gained input from available lighthouse city launch reports on Transition Track activities (D5-7.3-7).

Deliverable D3.6 is part of the outcome of Task 3.3 Business model advancement and Smart Cities Innovation Management Task Forces. The task is focusing on how cities facilitates city change efficiently in practice by developing approaches to systematically, investigate business models, identify successes and draw lessons that can drive business model exploration elsewhere. The deliverable addresses: The cities present innovation management performance and initially; a base line on where the lighthouse cities were at the beginning of the IRIS project, an insight on how the follower cities are working with innovation management. Achilles heels as well as best practices in efficient innovation management have been identified.

D3.6 presents a tool that can be used when, in the end of the project, one wants to see the different cities development regarding innovation management. The objective is for the IRIS cities to find means on how to increase their present innovation management performance. All this is presented as a tool for assessment of a city's innovation management performance.

The content is based on interviews with the IRIS cities. The smart city innovation management task force, who performed the interviews, consists of partners operating in the different cities.

All Lighthouse projects in EIP-SCC collaborate in the Business Model Task Force Group. The learnings from this group and by having the IRIS cities in focus, D3.6 describes an adaptation of business model assessment frameworks to IRIS conditions. This includes the work on reaching a higher level of detail in business model mapping, applying the frameworks to develop fine-grained descriptions of current business models, using the mappings as a basis to interact and jointly learn about new options to alter business models. All this is presented as a tool for mapping actual business models and possible variations therein.

WP3 is a horizontal work package meaning that the tasks and objectives are joint efforts for the Lighthouse cities. The cities will present their achievements on these joint tasks and objectives in their

two upcoming deliverables: *Preliminary report on lighthouse demonstration activities (M48)* and *Final report on lighthouse demonstration results and lessons learnt (M60)*

So far in the project the Lighthouse cities have mainly focused on tasks and objectives in their vertical work packages. Many of the joint tasks and objectives in WP3 are not yet addressed by the Cities. It is recommended that the Lighthouse cities start developing plans on how to initiate this work and how to initiate WP3 experts in these processes.

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Table 1 List of Abbreviations and Acronyms

Abbreviation	Definition
EU	European Union
WP	Work Package
EIP-SCC	European Innovation Partnership on Smart Cities and Communities
D	Deliverable
MS	Milestone
T	Task
SME	Small and medium sized enterprises
IP	Intellectual property
SDG	Sustainable Development Goals
GIS	Geographic Information System
ICT	Information and Communications Technology
LH Cities	Lighthouse Cities
FCs	Follower Cities
TIS	Technological Innovation System
TRL	Technical Readiness Level
UNS	University of Nice
UN	University of Utrecht
KER	Key Exploitable Result
VCD	Value Chain Design
BMF	Business Model and Finance task group
CIMI	Cities in Motion Index
SBM	Sustainable Business Model
BMC	Business Model Canvas
MaaS	Mobility as a Service
NUTS	Nomenclature of Territorial Units for Statistics

CIO	Chief Information Officer
NGO	Non-Governmental Organisation

1 Introduction

The purpose of D3.6 is to recommend enhancements to the IRIS cities' innovation management. The deliverable describes how the IRIS cities' baseline and performance of innovation today, identifying Achilles heels and best practises. This section is especially of interest in terms of replication, why the follower cities might benefit from this section.

Methods for improving innovation and impact management for individual transition tracks have been assessed from published transition track launch report. The methods for assessment are previous work of WP3 and are described in the context they are to be used.

Roadmaps for each IRIS city are presented as a recommendation and conclusions in the end of the deliverable. The roadmaps are based on the methods described in the report.

The report is especially of interest for the IRIS city authorities responsible for creating the scene for a more innovative city. The recommendations are for each city summarized as individual city road maps, with the aim of the expected impact being a movement for improving the cities way of handling innovation, thus, being able to replicate what is being demonstrated in the project.

The results of this report, which is in line with D3.2 Dashboard tool, D3.7 Financial instruments and D3.8 Exploitation plan and operation, feeds in to WP8 Replication as well as D3.9 IRIS Beyond business plan. The study has gained input from available lighthouse city launch reports on Transition Track activities (D5-7.3-7).

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1.1 Comment on the interviews due to the Covid -19 crisis

The interviews presented in this report was conducted before the Covid-19 crisis had started in Europe. Covid–19 brings a new and uncertain world to us. Things will not be the same – for regional and for local governments, for public service delivery, for the economy, for society, and for governance of all of this as a whole. It will be dynamic and go through some known (e.g. from health to economic and social crises), and unknown changes (e.g. 2nd peak, societal behavioural response, cyber- attacks).

Coming out of this, digitisation will undoubtedly play far more of a vital role. Indeed, this could speed and heighten the need for digital transformation:

- Organisations will work increasingly remotely

- Public services will go through a variety of different states of change (& monitoring)
- Society will need to play a more integral and contributory role in matters
- Technology infrastructures, architectures, and applications will be put under greater strain

New goals and targets will be needed. New modus operandi must be developed. A focus must be put to what is core priority and what might be optional.

All of this must be taken into account when evaluating the results from the interviews as well as for the suggested roadmaps. The Covid-19 is not over at the due date for this report. The authors recommend any city representative to use the report as a basis for planning forward after the Covid-19 has ended in their region.

The IRIS project supports the Lighthouse cities of Utrecht, Gothenburg and Nice Côte d'Azur and their Follower cities Vaasa, Alexandroupolis, Santa Cruz de Tenerife and Focsani to address their urgent need to deliver energy and mobility services in their cities that are cheaper, better accessible, reliable, and that contribute to a better and more sustainable urban quality of life. The expected impacts of IRIS are an open innovation ecosystem motivating citizens to act as prosumers; more effective urban planning and governance of integrated solutions; exploitation of validated innovative business models based on multi-stakeholder collaboration; more stable, secure and affordable energy and mobility services for citizens, with improved air quality.

In order for the IRIS cities to succeed in implementing and enabling new innovative solutions being part of the city environment, it was clear, already at proposal writing stage, that tools are needed for this.

1.2 Scope, objectives and expected impact

This deliverable provides the baseline and the initial performance of the IRIS cities innovation management.

The objective is to, during the years of the IRIS Smart Cities project, enhance the cities innovation management capabilities. The expected impact is to see a movement in the right direction to improve their performance.

The target group for D3.6 is primarily the IRIS city authorities. However, the content can also be of interest to solution providers, as they, by reading the report, get an understanding on how the cities handles innovation. The expected impact is for the IRIS cities to learn from each other's best practices and to understand what the Achilles' heels are to avoid or to work with in order to minimize.

Innovation management is a combination of the management of innovation processes and change management. It refers to product, business process, marketing and organizational innovation.

Innovation management helps an organization grasp an opportunity and use it to introduce new ideas, processes, or products industriously. Improvement is the basis of innovation management; the end goal is a change in services or business process. Innovative ideas are the result of two consecutive steps, imitation and invention.

Impact management is version of change management where the most important question is Why are we doing this? This is the impact goal we are trying to achieve.

The impact goals should be clearly related to the transition track and packaged solutions with a story of Why the decision makers aim for this, How the targets will be reached and What the future city will consist of. The impact goal should also clearly describe the future business ecosystem in the city region.

1.3 Contributions of partners

IMCG Sweden AB (Impact Management Consulting Group) is the main author of this deliverable. Great contribution to the content has been provided through 12 transition track launch reports, interviews and involvement from the different IRIS cities;

- Nice: Nice Metropole côte d'Azur, Nice University
- Utrecht: Gemente Utrecht
- Gothenburg: The city of Gothenburg
- Alexandroupolis; Energy Hive, CERTH, Kriton Energy
- Santa Cruz de Teneriffe; Sustainable Building Center (CCS), Municipality of Santa Cruz de Teneriffe
- Vaasa; Municipality of Vaasa, Merinova, University of Vaasa
- Focsani; Municipality of Focsani, Polytechnic University of Bucharest, ICEMENERG (National Research and Development institute for energy)

The follower cities together constitute our Smart City Innovation management task force group, as they themselves set up interviews and identified relevant city authorities to interview.

About a year into the project IMCG, lead of WP3, tried to get in touch with the person responsible for innovation management in each light house city. In Gothenburg there was such a person easy to identify, since she (Gunilla Åkerström) had participated in the previous consortium meeting arranged in Nice. In Utrecht it proved a bit more difficult to identify the right person, but together with project management, WP3 agreed upon open data and digitalisation playing an important role in an innovative city, and interviewed the responsible for that from the Utrecht side is part of IRIS (Thomas Kruse). In Nice WP3 were not able to reach the person that might be the one responsible for innovation management. The IRIS lighthouse project manager of Nice (Jean-Charles Maleyson), provided IMCG with documents regarding innovation and the city of Nice.

- Gothenburg – Interview with Gunilla Åkerström, Innovation Manager, City of Gothenburg, November 18, 2018.
- Utrecht – Interview with Thomas Kruse, Strategist, CIO office, city of Utrecht, February 8, 2019
- Nice –Jean-Charles Maleyson, city of Nice, provided information material March-April, 2019

Note; By January 2020 Gunilla Åkerström no longer works as innovation manager, but has started a new job position in the city of Gothenburg. As of August 2020, there is no information about replacer.

Note; During 2019 Jean-Charles Maleysson left the city of Nice for another job opportunity. He is replaced by Celine Gindre and Estelle Michele.

The Follower Cities of IRIS were activated by October 2019. To make this work most efficient partners located in the follower cities were engaged as being the City Innovation Management Task Force;

- Alexandroupolis; Energy Hive, CERTH, Kriton Energy
- Santa Cruz de Teneriffe; Sustainable Building Center (CCS), Municipality of Santa Cruz de Teneriffe
- Vaasa; Municipality of Vaasa, Merinova, University of Vaasa
- Focsani; Municipality of Focsani, Polytechnic University of Bucharest, ICEMENERG (National Research and Development institute for energy)

Deadline for information sent by WP3 (IMCG) was set to February 28, 2020. A friendly reminder was sent out January 14, 2020. By the beginning of April all partners had answered.

1.4 Relation to other activities

Work packages

The lighthouse work packages; WP5/6/7; Utrecht, Nice and Gothenburg, are very much aligned with this deliverable as they have a direct interest in the result. This is also the case of the work package regarding the follower cities; WP8 Replication, led by Vaasa. The aim is furthermore for WP10 Communication, to find the content of this report of interest and highlighting the content when addressing the target group; cities.

Deliverables

D3.2 Sustainable business dashboard tool, delivered by University of Nice, part of WP3, contributes to this deliverable with valuable information regarding the IRIS cities innovation ecosystem.

D3.9 IRIS Beyond business plan – some of the content of D3.6 feeds into D3.9; especially the methods adopted regarding key exploitable results and value chain design. When working on business models, you start off your journey of planning for the future of the solution providers.

Milestones

MS4 Business Model Adaptation tool, delivered by IMCG, lead of WP3, contributes to this deliverable.

Tasks

One of the outcomes of T3.1 and D3.3 European cities and district market analysis was a shortlist of top potential follower cities of IRIS. This list is used, however aligned with the work of the Business Model Task Force Group for gaining a wider perspective, for the work of D3.6 regarding business models.

Business Model and Finance Task Group

There are now 19 SCC01 Lighthouse projects, all tackling much the same scope. There is a Board of Coordinators and 5 Task Groups that seek to address common themes and strengthen collaboration across the programs. The Business Model and Finance Task Group (BMF) is establishing, as a community for cooperation and supporting, knowledge sharing between cities. The BMF task group will be important for the replication of IRIS solutions in other cities. It will be more effective to work through this community than with the IRIS original strategy based on a short list of potential follower cities.

1.5 Structure of the deliverable

This deliverable presents a baseline of the cities' present innovation management performance – in the lighthouse cities as well as the follower cities. It also presents conclusions drawn from other deliverables and milestones, as they are used for the conclusion in this deliverable. The Achilles heels and best practices within this field is presented. There is also an introduction to tools that can be used for enhancing innovation management.

The deliverable structured in the following way:

Chapter 1 - Gives an introduction to the deliverable.

Chapter 2 - describes the methodology used. Here you will find methods for measuring the innovation ecosystem performance and for analyzing them. You will also find methods of replication (adaption) of business models.

Chapter 3 - analysis of baseline and performance of IRIS cities are presented.

Chapter 4 - describes the conclusions and recommendation presented as roadmaps for cities and transition tracks.

Chapter 5 – shows collaboration with other work packages giving information on what output the IRIS cities can get from the horizontal support of WP3.

2 Methodology for IRIS city innovation management performance and roadmaps

To identify the baseline (M0 in the IRIS project) the TIS analysis and spider graphs were used.

To analyse the performance (M0-30 in the IRIS project) of the innovation management performance in IRIS cities, IMCG has interacted with both the lighthouse cities (Utrecht, Nice and Gothenburg) and the follower cities of IRIS (Alexandroupolis, Focsani, Santa Cruz de Teneriffe and Vaasa). When engaging with the follower cities, WP3 Smart City Innovation management task force group was activated. By that WP3 means the partners in the FCs, so that they themselves set up interviews and identified relevant city authorities to interview. The authors of this report have also read the 12 transition track launch reports covering transition track launch activities from transition track 1- 4 in Utrecht, Nice and Gothenburg.

2.1 Methods for measuring innovation ecosystem performance

2.1.1 Technical Innovation System analysis and spider graphs

In D3.2, provided by University of Nice, a Sustainable Business Model Dash-board tool was developed. With this dashboard tool, cities are able to position themselves:

- The LHs can do it based on their past and current smart city achievements
- The FCs can identify their position based on their expectations of current and future smart city achievements.

The dashboard consists of spider graphs based on the TIS (Technological Innovation System) methodology. TIS is a tool developed by the University of Utrecht and is largely familiar to Chalmers and the University of Nice.

One of the major tasks for the dash-board tool is to identify the actors and rules that are key in the process of replication. The market conditions in smart cities for sustainable business models can be studied from two key subjects represented by:

- the market conditions allowing Sustainable Business Models (SBMs) for solutions in the transition tracks to emerge in the considered lighthouse (LH) smart city, and
- the premises for a replication process from the LH cities to the follower cities (FCs).

In the context of IRIS, a successful Sustainable Business Model can be defined as a long-term plan for the sustainable development of solutions in a smart city, and which involves all the actors acting in the ecosystem of the smart city. Each solution encompasses specific elements which are present inside of the local ecosystem of a smart city and which refer to different aspects such as market formation, knowledge exchange among actors, entrepreneurial experimentation, and so on.

These aspects are well described by the TIS (Technology Innovation System) methodology, an analytical tool which categorizes through an exhaustive taxonomy all these aspects within the framework of seven different functions. The advantage of using the TIS methodology is that it allows to investigate the conditions for an SBM to emerge in the LH city with reference to a set of different functions, depending on the positioning of the LH city in terms of strengths held in a particular function describing a certain IS. The TIS is based on 7 different functions, The report D3.2 Business Model Dash-board tools for the IRIS cities, indicates in which type of areas that there is a higher chance for replication, looking into the ecosystem of each city, taking into account the following aspects:

- Entrepreneurial Experimentation and Production (F1)
- Knowledge Development (F2)
- Knowledge Exchange (F3)
- Guidance of Search (F4)
- Market Formation (F5)
- Resource Mobilization (F6)
- Resistance to Change (F7)

Table 2 Description of the seven functions of the TIS methodology, and how Sustainable Business Model pillars are proxied by F1, F5, and F7 (elaboration from Hekkert et al., 2011).

Function	Noun	Definition	Pillar function
F1	**Entrepreneurial Experimentation and Production**	Dedicated to identifying the initiatives at the local level and the appropriate quantitative and qualitative efforts in respect to the objectives of the LH city. Basically, this function identifies the way in which the local ecosystem innovates and the degree of involvement of the major actors in this innovation process.	Captured by questions (F1 section in the TIS questionnaire) referring explicitly to the degree of innovation, technological breakthroughs, opportunities of technological development, large scale production,

			and related uncertainties.
F2	**Knowledge Development**	Focused on whether knowledge development is sufficient for the development of the innovation process, and whether the type of knowledge generated, fits with the targeted objectives.	
F3	**Knowledge Exchange**	Investigates if links between science and industry, or users and industry, are effective, and if knowledge exchanges are sufficient across geographical boundaries.	
F4	**Guidance of Search**	Evaluates the presence of a clear vision on how the industry or the market should develop, if the strategy is grounded on a clear policy goal, and if the expectations of the different actors are sufficiently aligned.	
F5	**Market Formation**	Assesses the current and expected size of the market, and if the different actors diverge or converge in future market appraisal	Captured by questions (F5 section in the TIS questionnaire) on market size, expected market size, exploration and long-term opportunities, exploitation and short-term opportunities, barriers to development.
F6	**Resource Mobilization**	Focuses on how resources can be included in the project of the ecosystem, and above all if key resources are available within the ecosystem or outside of it	
F7	**Resistance to Change**	Denotes whether there are limits in the development of the project, as this may entail a change of habits in consumption, development and production	Captured by questions (F7 section in the TIS questionnaire) on 'soft regulation' like ethics, standards

			and behaviours, as well as legal issues or 'hard regulation', such as legislations, intellectual/property rights.

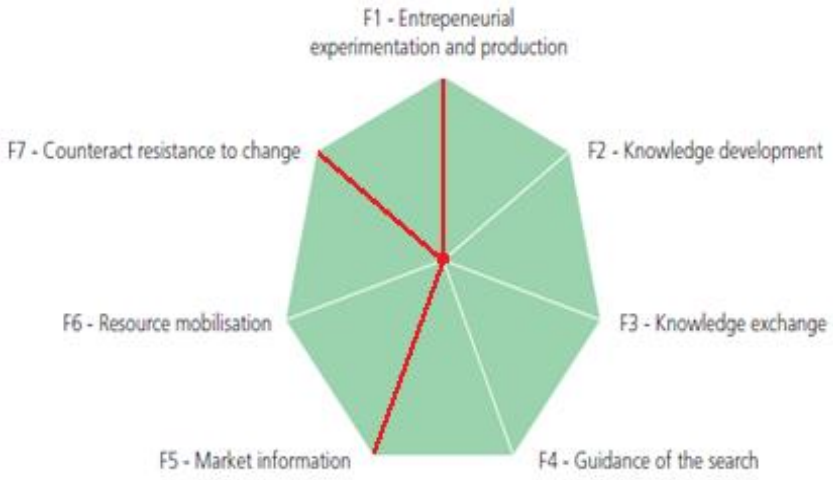

Figure 1 Overview of functions fulfilment in a spider graph (source: Hekkert et al., 2011).

For further reading and deeper understanding of the dash-board tool, please read D3.2 Sustainable Dashboard Tool. In the report a benchmarking is done on how Utrecht, Nice and Gothenburg are doing in each transition track compared to the follower cities.

At the ecosystem level, i.e. all transition tracks and integrated solutions included, the dashboard tool indicates for each pair of cities considered (i.e., Nice and the FCs, Gothenburg and the FCs, Utrecht and the FCs) where is the technical, economic, environmental, social or legal advantage to be replicated by FCs, and which dimension should be improved in creating the conditions for the emergence of a sustainable business model, scaling up in districts before proceeding to replication. In order to be able to do all this, the city needs to be able to handle innovation management.

This tool can thus be used for innovation management benchmarking, for comparison of cities performances in handling innovation. The spider graphs used in this tool are suitable for this matter. Here are some hints on how you may use it:

WP3 (UNS) has elaborated the spider graphs from the material we collected from the questionnaires, but you could also perform interviews with the different cities (especially FCs) for instance during a workshop where you invite them to rank the different pillars of innovation (innovation, TRL and regulation).

The questionnaire we used is exhaustive, but you could restrict yourself to a limited number of questions (as was done in D3.2). You could also make a link with the business canvas through the IRIS KPIs, as this is suggested in D3.2, p. 20.

2.1.2 The Entrepreneurial Ecosystem

A second method used for assessing innovation ecosystem performance is the measuring of the quality of the Entrepreneurial Ecosystem (UU), which focuses on the micro dynamics of the entrepreneurial ecosystem. The Entrepreneurial Ecosystem framework operationalizes 10 elements that determine the conditions in a region that influence local entrepreneurship. These 10 elements are; Networks, Leadership, Finance, Talent, New knowledge, Support service/intermediaries, Formal institutions, Culture, Physical infrastructure and Demand (see Fig 2). This is an assessment from T3.1.

WP3 created an index that allows for the measurement of these ecosystems in all European NUTS2 regions.[1]This index is extremely useful in understanding the potential of regions to scale entrepreneurial projects beyond the IRIS regions. This index provides the performance on each element for the 273 regions. It can be used by regions to better understand their points of improvement and allows a quantitative starting point for qualitative deep dives, supporting entrepreneurship in the region. Currently WP3 is working on better understanding which elements of the index align particularly with sustainability and smart city entrepreneurship. This allows for a zoom in from general to IRIS specific entrepreneurship.

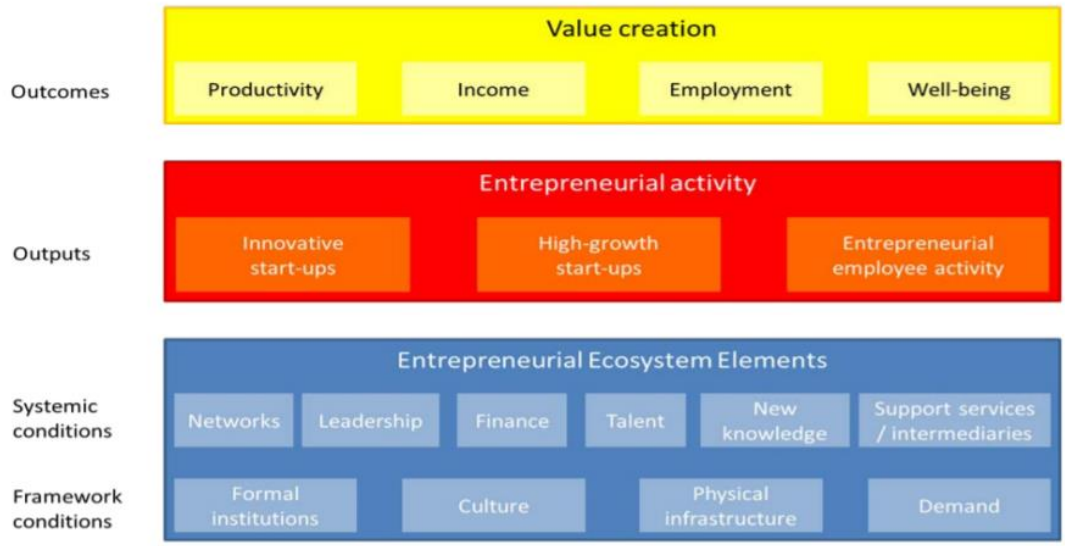

Figure 2 Measuring the quality of the Entrepreneurial Ecosystem – 10 elements

[1] https://www.uu.nl/sites/default/files/REBO_USE_WP_2020_01%20update%20May%202020.pdf (200820) Measure twice, cut once. Entrepreneurial ecosystem metrics.

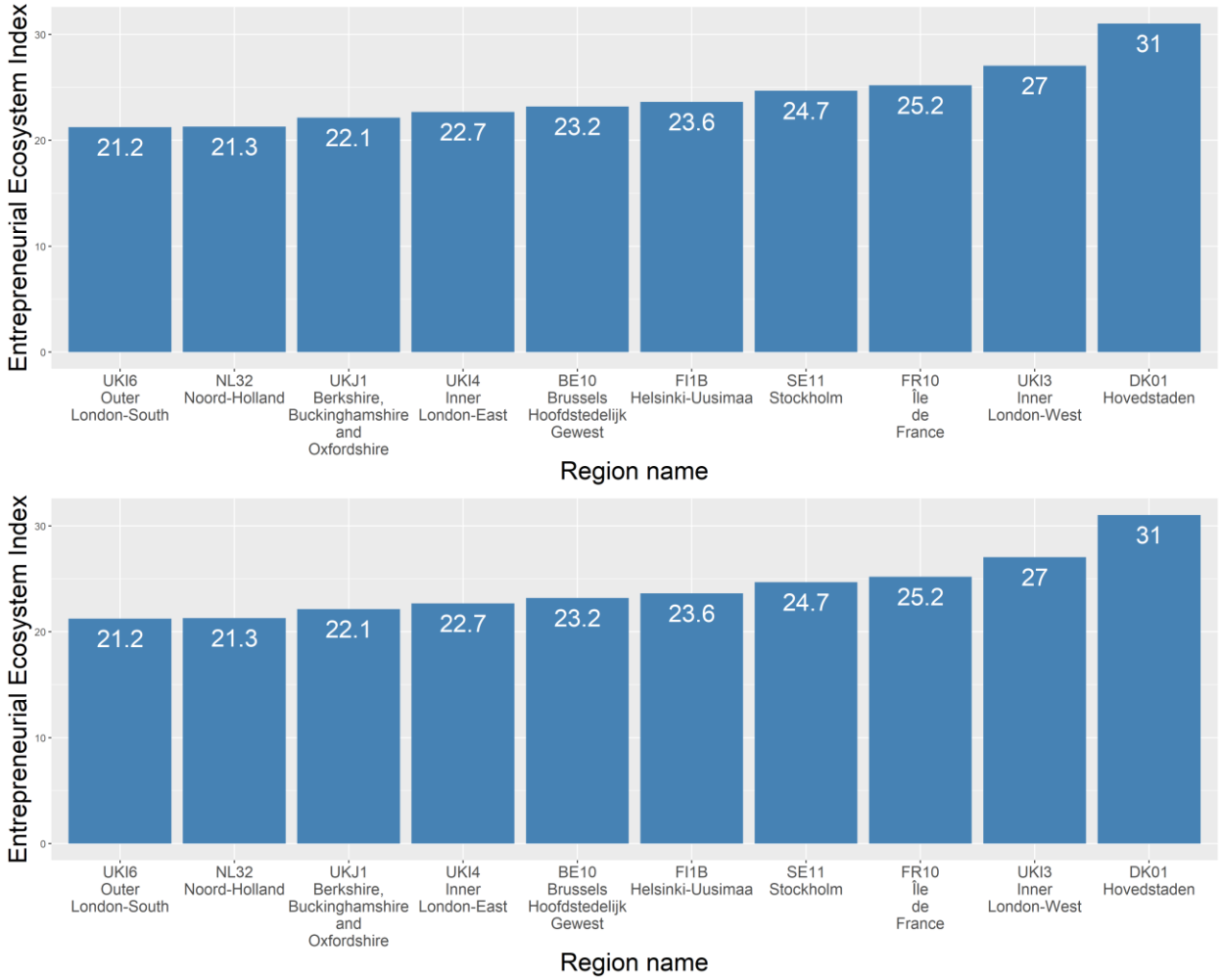

Figure 3 Entrepreneurial Ecosystem index

This Entrepreneurial Ecosystem index method is presented here in order to also show a benchmark tool on which we see the top potential FCs listed below as an assessment from D3.3.

2.1.3 IMProve method to assess and improve innovation management of organisations

The IMProve Approach[2] , integrates innovation management assessment, capability-building based on training and certification scheme as well as consulting and technical assistance of innovation actors. Since almost 10 years IMProve helps public and private clients to enhance innovation management practices for growth. Emerged from the European Commission's flagship program "IMProve", it is now a "born global" company that serves as an international knowledge hub for better innovation management support services.

The IMProve method covers all dimensions of innovation management:

- **Innovation strategy**
- **Innovation organisation and culture**
- Innovation life cycle processes
- **Factors enabling innovation**
- Results from innovation

Innovation Strategy

An innovation strategy gives an organisation direction and focuses all innovation management activities for maximum impact. It ensures that the most promising innovation projects are pursued.

Innovation Organisation and Culture

An innovation capability is the ability to innovate in a consistent, systematic and sustainable way. This often involves setting up an in-house team, a governance structure, enabling tools and processes, and leadership support. In order to create large and broad impact, it's also important to integrate innovation management in the company's culture.

Innovation Life Cycle Processes

An innovation normally goes through an innovation life cycle processes including idea management, product/service and process development, launch, continuous improvement and usually the discontinuation of what you developed, when it's replaced by something new.

Enabling Factors

In order to accomplish an innovation strategy, organisation, culture and process you need to have a lot of enabling factors in place such as IT-support, project management, intellectual property rights and human resource management that can be leveraged for increasing the impact of innovation management.

Innovative Results

[2] IMProve, https://www.improve-innovation.eu Jan 15, 2020

The purpose of the innovation process is to have a large and positive impact on the organisation in terms of for example reduction of cost, higher incomes from sales, new revenue streams, growth of number of employees, employer branding.

The IMProve method[3] is originally designed to be used on companies. In this deliverable we have used the main ideas of IMProve, but we have adapted the approach to the smart city concept. In this deliverable WP3 is mainly looking into Innovation strategy, Innovation organisation and culture, and Factors enabling innovation. It's those topics that has been used when interviewing project partners.

2.1.4 Interviews as assessment tool for the IMPRove method

Interview with each Lighthouse and Fellow City innovation management representative were held to assess the innovation management performance of each city. The interviews followed the structure of the IMProve method to analyse the performance of each city on the five dimensions of innovation management.

The interviews presented in this section was conducted before the Covid-19 crisis had started in Europe. Covid–19 brings a new and uncertain world to us. Things will not be the same – for regional and for local governments, for public service delivery, for the economy, for society, and for governance of all of this as a whole. It will be dynamic and go through some known (e.g. from health to economic and social crises), and unknown changes (e.g. 2nd peak, societal behavioural response, cyber-attacks).

Coming out of this, digitisation will undoubtedly play far more of a vital role. Indeed, this could speed and heighten the need for digital transformation:

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[3] A.T Kearney, https://www.atkearney.com/operations-performance-transformation/innovation , December 4, 2018

2.2 Methods for replication (adaptation) of business models

2.2.1 CIMI ranking and IMCG listing (shortlisting cities outside IRIS)

From T3.1, in D3.3 IMCG and WP3 presented a shortlist of top potential IRIS follower cities. The original plan was to focus on this list of cities together with the IRIS cities and through D3.6 describes an adaptation of business model assessment frameworks to IRIS conditions.

The short list of potential IRIS FCs presented 2018 consists of those cities that are both represented in our list of nearly 100 cities and in the top of the CIMI ranking (Cities in Motion Index, presents smart cities from all over the world). The cities that fulfil these criteria are presented in the table below in no particular order. We chose not to put Gothenburg on the list since Gothenburg is already a part of IRIS.

Table 3 Shortlist of Top potential FCs – all with focus areas Energy, mobility and ICT (first presented in D3.3, Sept 2018)

Country	Cities	Location of city	Smart City District
Austria	Vienna	West-European City	The district is located in a central part of the south-eastern district of Simmering between Simmeringer Haupt-straße & the eastern railway line (district areas of Geiselberg, Enkplatz, Braunhuberviertel).
Czec Republic	Prague	West-European City	Morgenstadt City Lab (not really a district)
Finland	Helsinki	North-European city	Vanhankaupunginlahti (old Town Bay)
France	Lyon	West-European City	Lyon Confluence
Germany	Hamburg	West-European City	The borough of Bergedorf
Germany	Munich	West-European City	Neuaubing-Westkreuz/Freiham
Italy	Milan	South-European City	Porta Romana/Vettabbia
Netherlands	Rotterdam	West-European City	The Heart of the South Area
Norway	Oslo	North-European city	Økern
Spain	Barcelona	South-European City	22nd District
Sweden	Stockholm	North-European city	Årsta
United Kingdom	London	West-European City	The Royal Borough of Greenwich

However, 2,5 years into the 5-year lighthouse project of IRIS Smart Cities, IMCG believes that the emphasis should not be on the top FC list that was created almost 2 years ago. It seems more rational to work with cities engaged in the SCC-program.

2.2.2 Porters five forces, Business model canvas, Impact mapping (business model adaptation tool))

When replicating IRIS Integrating solutions value chains and business models will be adapted to the market conditions in the city for replication. The business model dash-board tool describes the differences between the original city and the replication city and based on this the business model can be adapted to the new conditions. If the City authorities are engaged in the replication process they could also support replication by also adapt market conditions in line with the market conditions in the city where the solution was demonstrated.

The Business Model adaptation tool was hence constructed from three well-known methodologies used together during a workshop in Gothenburg with all important stakeholders participating. The methodologies are:

- Porters five forces – to describe the market competing alternatives
- Business Model Canvas – To describe the value chain relations
- Impact mapping – to describe the scale-up process

The Business Model Adaptation Tool used in IRIS is a tool for adapting innovative business models for an integrated IRIS solution to city district specific context, primarily aiming at a city-wide scale-up. The business model adaptation tool is useful for obtaining especially three objectives:

- It will help the city partners to understand their individual roles in the process of scale-up of demonstrated IRIS solutions, in the IRIS district and throughout the city.
- It will contribute to the process of producing roadmaps for scale-up of demonstrated IRIS solutions, in the IRIS district and throughout the city.
- It will help identifying necessary support from city authorities.

It has been very useful to share business modelling experiences with Business Model Managers for the other Lighthouse projects funded by the EIP-SCC (Smart Cities and Communities program). A major insight has been that the Business Model adaptation will benefit from being as simple as possible. It is important to make sure that all stakeholders understand and engage in the activity that has to take place when using the tool. The complexity can increase as the work proceeds.

The business model adaptation tool is also useful to add to the replication package. Replication of an integrated solutions will in most cases be based on a model where a facilitator within the city leads a demonstration project to create a first local reference of a successful implementation of the solution. (*More information on the business model adaptation tool can be found in the MS4 milestone report. Month 18 in the IRIS project, IMCG, lead of WP3, presented Milestone MS4 Innovative Business Model adaptation tool for cities*).

2.2.3 Key Exploitable Results

IRIS has adopted Support Service for Exploitation of Research Results's (SSERR's) method regarding the development and validation of Key Exploitable Results (KERs). This method puts focus on the problem, not merely the solution. Through workshops that WP3 arranged during online consortium meeting 2020, the IRIS project identified four KERs;

- Urban Data Market (Utrecht; Civity)
- Asset Delivery – a bridge to CIP (Gothenburg; Tyréns)
- Smart Solar Charging/Management (Utrecht; Lomboxnet)
- Energy service via Energy Management System (Nice; EDF)

KER Characterisation Table (a table for each key exploitable result – KER)

KER name: *Type here the KER name, avoiding acronyms as much as possible so that everybody can understand what the KER is abut)*	
Problem	*Describe the problem you are addressing (the problem your "customer" has).*
Alternative solution	*Describe how your customer has solved the problem so far*
Unique Value Proposition (UVP)	*Describe the competitive advantages, innovative aspects. What does your solution well, what are the benefits, what does the user/customer want, how does your solution solves his/her problem, what distinguishes it from the competition / current solutions?*
Description	*Describe in a few lines your result and/or solution (i.e. product, service, process, standard, course, policy recommendation, publication, ...)*

Figure 4 KER Characterisation Table for Key Exploitable Results

The KER method will be used throughout the project in order to further investigate business models and enhance existing ones. The KER method is an excellent parallel method to work with at the same time that you work with the business model canvas.

2.2.4 Value Chain Design

The integrated solutions in IRIS are delivered from an ecosystem of suppliers joined together in a value chain. It is important for all in the ecosystem to understand their joint business goals.

Each actor in the value chain should use the KER and a Business model canvas (BMC) to create a successful business with many more customers than just the demo case. For some actors it is an additional business to an established business model (business model enhancement) and for others it is a newly started business.

The value chain design (VCD) is tool for a workshop for all actors in the ecosystem to together design and understand the value chain to scale an integrated solution in the city region. The tool is based on the business model canvas but follow the revenues to answer: Who is your customer? And Who is your key partner?

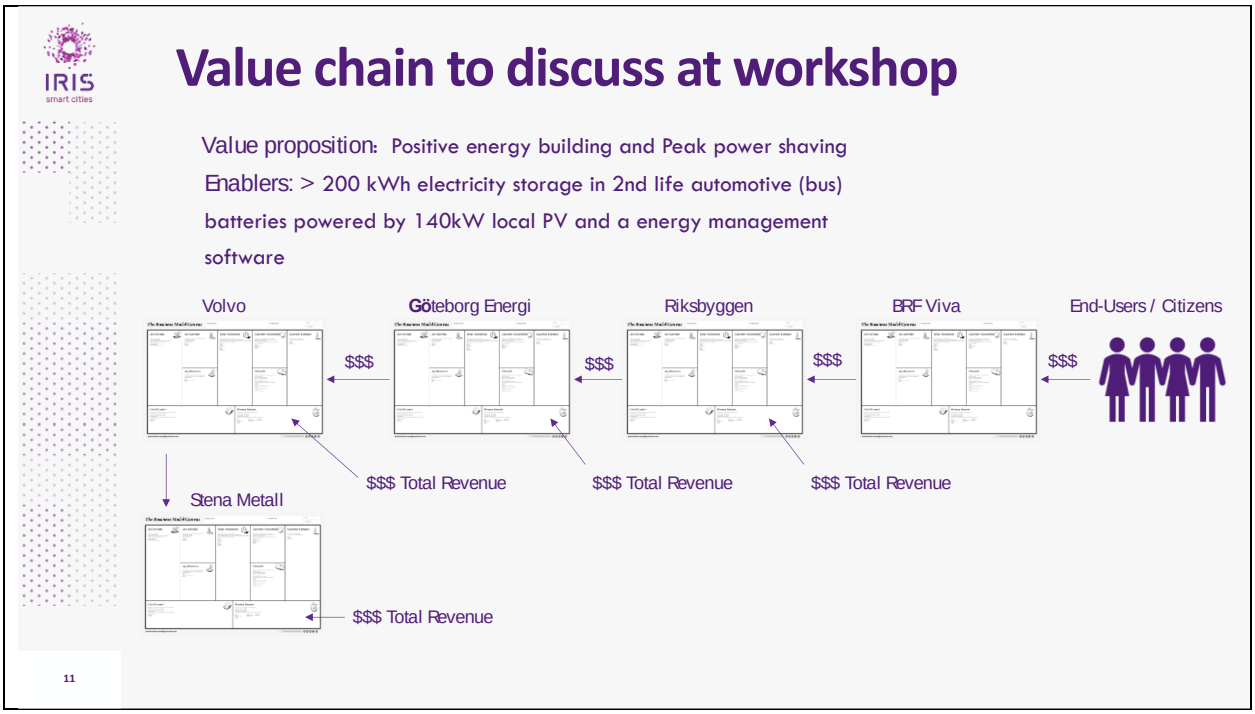

Figure 5 An example of a value chain to discuss at the design workshop. At the end of the workshop there will be a joint understand of business relations and (most important) that it is a joint undertaking to deliver end-user value.

The result from a VCD describes what the value chain at the demonstration site looks. A value chain involves the collaboration between suppliers and buyers and their customers. The introduction of new technology not only builds on new suppliers, but the buyer must also develop internal expertise to be able to receive technology and in turn be able to deliver to their customers. The value chain is also affected by other conditions, such as laws and regulations and access to infrastructure. Here authorities and municipal companies have important roles. Actors and roles in the value chains demonstrated in IRIS:

- Solution Managers: the actors that purchase solutions demonstrated in IRIS from suppliers and offer the solution service to their customers, or to the citizens if the manager is a city authority. The most common solution managers in IRIS are property developers and property managers. The recommendation to solution managers is to reach out to solution managers in other cities listed in D3.3, with interest of implementing similar solutions. Establish a communication to exchange knowledge and experience.
- Solution Providers: the private companies offering the solution demonstrated in IRIS or the technology necessary to set up a solution. The recommendation to solution providers is to study the list of cities in D3.3 to evaluate the business potential for their offering in various cities. Are the necessary conditions for a solution to be implemented fulfilled? What does the competition look like? Their own research will give input to their business plans and their strategies to expand business.

By establishing a value chain based on business relations and revenues it is possible also discuss the potential bankability for investments in different actors along the value chain. The integrated solutions demonstrated and evaluated in IRIS Smart Cities generates end user (citizen) value through cooperation in ecosystems and along value chains with several partners. Each partner focus on a specific value generation and optimize its business model from this perspective.

The market demand for the end user value is dependent on market factors such as competition, regulation and stimulation. High demand increases the possibility for profit and success and thereby also the interest in investment in partners and their business model.

Business Model Bankability is thus dependent of several actors and the bankability will vary over time, except for very regulated markets. An important factor for bankability is the build-up of demand and the communication of this demand.

The first test of a bankability is to describe the market demand for a certain end-user value. Can the offering and the business model be competitive and successful on its own, taking shares on an established market? Does market demand need to be created by regulations? How fast will demand grow? The faster the more profitable for investors.

Under the first test on bankability there are a number of sub-category test. Such as:

- Investor relations
- Technology solution verification
- Ecosystem stability
    - Is there risk for competition along the value chain, where suppliers jump to end-user relations?
    - Is there a need for public investments in infrastructure, necessary for end value delivery?
- Regulatory verification

2.2.5 Packaging (SCC01 TG BM&F)

Smart City market stimulation package is the sum of all actions that city authorities take to support market development of prioritised quality criteria e.g. fossil free mobility. Including promotion of solutions, policies, regulations, financial support to entrepreneurs, investments in infrastructure, data donation platforms.

WP3 has developed a questionnaire to use when investigating the local city market situation for a specific solution or set of solutions forming an ecosystem of products and services. The questionnaire consists of a set of basic questions and statements which needs to be updated and tuned to fit the solution in focus.

A questionnaire can be a tricky tool to use. WP3 experiences it important to ask the receiver in advance when she/he have time to answer the questions. It should not take too long time to answer all the questions. Preferably should it possible for one person to answer all the questions. If she/he needs to

ask other colleagues about the answers, either she/he is the wrong person to answer the questionnaire or are the set of questions to broad.

Below you find the questions used.

Governance

- Is there a clear city vision for the challenge addresses by the solution, which is politically communicated to the citizens?

Market size

Evaluation of city readiness and tool to offer

- No example of integrated solution on the city market
- One demonstrator
- Several established integrated solutions in a district. Supported by city policy exceptions.
- Established integrated solutions and a small market established. Supported by an official city policy.

Market stimulation measures

Hard measures (for value creation)

Policies and regulation

- City investments in infrastructure
- City lead open data platforms and organised, data donation platforms.
- Knowledge database from research and demonstration projects

Soft measures (for value capture)

- City promotion of integrated solutions
- City organized training and knowledge transfer between solution managers
- City funds for financial support to entrepreneurs
- Networks and meeting arenas
- Open innovation projects
- Competitions and hackathons

The municipality of Utrecht have tested a soft measure engaging the local start-up scene. The municipality of Utrecht ran a Startup in Residence challenge in 2017, at the start of the IRIS project. The result was a range of concrete products and services, which were pitched to the municipality of Utrecht. The measure is described in a Cookbook called *Ideation tools to create successful (smart city) ventures.*

To target the ambitious impact goals, cities would benefit from direct or indirect cooperation with other city regions. The SCC program Task Groups support such cooperation and collaboration between

lighthouse projects regarding business models have proved to be a successful method. The business model and finance (BMF) task group works considers three interconnected levels of thinking when focusing on impact management.

- That of setting ambitions (impact goals) – somewhat beyond the SCC01 remit, however an essential backdrop to each city and program's success
- That of converting vision to reality – the transition path a city can follow
- And the various components that can be plugged into that roadmap with suitable financing to ensure they are implemented at pace and scale

With the large and increasing number of demonstrated solutions in the SCC program communication between stakeholders will be more effective with a thematic sorting of the solutions. In the IRIS project Transition Track has been used to thematically sort the different demonstrations. Professional stakeholders can follow the development of business opportunities on several markets no matter if they are investors, property developers or technology suppliers.

Experiences from the BMF Task group show that engagement from the buying community is based on confidence which in turn build from explicit impact goal for the city region. The impact goal should be communicated in policies and regulation and be prioritized in infrastructure investments.

For up-scaling and replication of successfully demonstrated solutions (measures) the methodology of packaging been developed. With packaging it is possible to for a specific solution design business and financial models for different city contexts. The packaging methodology has shown to support the spectrum of cross-city collaboration through to aggregation of demand and joint procurement.

In this framework impact goals should be clearly related to the transition track and packaged solutions with a story of Why the decision makers aim for this, How the targets will be reached and What the future city will consist of.

Experiences from the BMF Task group show that innovation management could benefit from organizing work along transition tracks and on district level. By setting clear targets for climate emissions for a district property developers and tenants can optimize their investments, business models and profit forecast based on this.

There now are 19 SCC01 Lighthouse projects, all tackling much the same scope. There are a Board of Coordinators and 5 Task Groups that seek to address common themes and strengthen collaboration across the programs. The Business Model and Finance Task Group (BMF) is establishing as a community for cooperation and supporting knowledge sharing between cities. The BMF task group will be important for the replication of IRIS solutions in other cities. It will be more effective to work through this community than with the Iris original strategy based on a short list of potential follower cities. This includes the work on reaching a higher level of detail in business model mapping, applying the frameworks to develop fine-grained descriptions of current business models, using the mappings as a basis to interact and jointly learn about new options to alter business models. All this is presented as a tool for mapping actual business models and possible variations therein.

3 Analysis of baseline and performance of IRIS cities

In this section some highlights regarding benchmark results for each IRIS city is presented. To read the full text, please see D3.2 Business model dashboard tool. This section is especially of interest in terms of replication, why the follower cities might benefit from this section.

3.1 Assessment of baseline with the Business Model Dash-Board Tool (D3.2)

3.1.1 Assessment with Business Model Dash-Board Tool Nice

From the dashboard tool, WP3 (UNS) draw the following conclusions regarding Nice:

Nice has strong replication opportunities in F1/type of technological innovation, as the entrepreneurial experimentations that are developed in the ecosystem of Nice meet the ambitions of the FCs. This means that for FCs, the technological innovations that are developed in Nice (all transition tracks included) appear as of great interest for replication in their own location.

Alternatively, although there is replication potential in FCs of the technology provided by Nice, market maturity (F5) that is observed in the location of Nice, as well as change inherent in behaviours and legislation (F7) implemented in Nice, seem to be largely behind the current development of market and regulatory context that is observed in FCs. As a consequence, if Nice technologies are seen among the best by FCs, the related market and regulation contexts do not seem sufficiently mature at the FC level to allow a replication in a short time span from Nice to the FCs, as these market and regulation components have still to be adapted to the local market and legal context of the FCs, and ultimately require further efforts of scaling up before (successful) replication.

3.1.2 Assessment with Business Model Dash-Board Tool Utrecht

Utrecht has also replication opportunities in F1, meaning that the solutions developed at the level of the LH of Utrecht entail replication potential in FCs in terms of entrepreneurial experimentation/type of technological innovation. Another good point is that the experience in terms of market formation (F5) developed in Utrecht seems replicable in the FCs, and to fit with the local context in FCs.

Market characteristics in FCs seem to be not far from what is required to the deployment of solutions developed in Utrecht, probably because these solutions have already been scaled up in different Utrecht districts, and in this way both the technological side and market side Utrecht characteristics do not seem so difficult to deploy in the local context of the FCs. Alternatively, resistance to change (F7) is perceived as different in the LH of Utrecht and FCs, leading to a lesser impact in terms of replication, due to local regulation and consumers' habits that represent a constraint at the level of FCs.

Although Utrecht does a lot of efforts in scaling up from district to district, involving better replication opportunities both in the field of technology and market requirements, regulation still represents a limit for successful short-term replication. Replicating from country to country is obviously constrained by different (national) regulatory contexts that limit the opportunities of replication.

3.1.3 Assessment with Business Model Dashboard Tool Gothenburg

Gothenburg has strong opportunities of replication in F1 entrepreneurial experimentation and some opportunities of replication in F7 resistance to change. This means that the FCs value these efforts of Gothenburg as strong, both from the technology side and regulatory side. Technology developed in Gothenburg entails replication potential in FCs, and the associated regulatory context observed in Gothenburg – presumably more 'soft regulation', i.e. ways to involve citizens, than 'hard regulation' which again is highly country specific – are likely to be replicable.

In the meantime, the definition of F5 market formation in the LH is not seen as immediately replicable in the context of the FC and need probably some further refinements. This mean that market requirements in view of replication in FCs need to be better refined through scaling up.

3.1.4 General results comparing Utrecht, Nice and Gothenburg

These results are summarized in the Tab. 22 below, with assorted guidelines of action, i.e. Replication or Scaling up.

Table 4 Higher opportunities vs lower opportunities of replication at the level of each ecosystem.

Higher opportunities of replication from the LHs to the FCs	Lower opportunities of replication from the LHs to the FCs
Nice: F1	Nice: F5, F7
Utrecht: F1, F5	Utrecht: F7
Gothenburg: F1, F7	Gothenburg: F5
Guidelines of action: Replication	Guidelines of action: Scaling up

These results suggest that much is expected from the FCs with regard to the entrepreneurial experimentation developed in the demonstrators of Nice, Gothenburg and Utrecht, while successful replication in the local context of the FCs depends on market conditions, as well as legal framework and consumers' involvement in the respective FCs, that need to be further improved through scaling up.

As a general conclusion WP3 (UNS) can see is that:

- All LH cities are well positioned to replicate in a short or longer time span their solutions in FCs and, conversely, FCs are keen to import the solutions developed in the LHs demonstrators.

- Utrecht is ready to deploy the solutions in the FCs in a short time span, in all transition tracks except TT4 on city innovation platform where F1 entrepreneurial experimentation, F5 market formation and F7 resistance to change need to be further improved by scaling up, prior to successful replication.
- Nice is well positioned to replicate the solutions in all transition tracks, with especially distinctive forces in F1 entrepreneurial experimentation and F5 market formation, while F7 legal adjustments and characteristics of citizens engagement will be necessary in view of successful replication, presumably after some additional scaling up efforts.
- Gothenburg offers good opportunities of fast replication in all transition tracks, with strong experience on F1 entrepreneurial experimentation and F7 resistance to change, while F5 market formation needs to be further calibrated through further scaling up efforts, in view of replication in the FCs.

3.1.5 Assessment with Business Model Dash-Board Tool for Alexandroupolis

Spider graph from Business Model Dash-board tool

Alexandroupolis ambitions the development of a Smart multi-sourced low temperature district heating. The construction of a geothermal district heating network will start in early 2019 for Traianoupolis area for heating 22 public/municipal buildings. Lower operational temperatures and other sources of energy will allow the system to expand to more customers. In the meantime, Alexandroupolis is keen to learn from other smart solutions and related business models.

Challenges and barriers for replication are described and can be interpreted as follows:

- At the technical level (F1), novel technologies may present a technical barrier and a challenge for local engineers, technicians and operators.
- At the financial level (F5), Capital intensive interventions highlight the challenge to finance solutions.
- At the environmental level (F5), there is no barrier or challenge recognised here.
- At the legal level (F7), there is a lack of legislation for novel technologies.
- At the social level (F7), Energy transition will happen from citizens. Acceptance and engagement to innovative solutions is always perceived as a challenge.

In that respect, Alexandroupolis expresses the need for guidelines in the following fields:

- Clear and simplified technical description of the solutions tested/implemented in LCs (for presentation to non-technical audience)
- Investment costs, operation & maintenance costs
- Detailed information regarding business models applied
- Citizen's engagement activities, stakeholders' involvement
- Decision making process

3.1.6 Assessment with Business Model Dash-Board Tool for Santa cruz de Teneriffe

Spider graph from Business Model Dash-board tool

Santa Cruz de Tenerife targets the following promising solutions:

- Prepilot sun houses and Krokslät office building.
- Prepilot near zero energy retrofit in social houses
- Prepilot ElectriCity (Electrical bus).
- Bus and tram priority

For Santa Cruz de Tenerife, the challenges and barriers are the following ones:

- F1, F5, but also F4: Criteria to take decisions, especially in the choice of the best energy efficiency systems and amortization periods, and in combing household energy management measures with global measures.
- F1 and F5: Learn for other technical solutions, business models, running of operations, decision making process
- F7: Communication with and education of households/residents, in the field of energy saving, and make them accustomed to using their own vehicle and not public transportation, which demands to do educational activities as well as improving public transport.

Santa Cruz de Tenerife is expecting collaboration from the IRIS partners in the following fields:

- Description of decision-making process, stakeholders involved, citizen´s engagement,
- Follow up of solutions
- Technical solutions and calculations, capacity, power, investments, running costs, etc. related to selected solution and possible options.
- Cost-benefit information of the technical solutions in order to compare.
- Business solutions, incentives

3.1.7 Assessment with Business Model Dash-Board Tool for Focsani

Spider graph from Business Model Dash-board tool

Focsani's ambitions the replication of the following solutions:

- Near-zero energy buildings applied for administrative buildings: energy efficiency measures + renewable energy sources
- Increasing energy efficiency of the district heating system: energy generating facility + district heating network
- Development of innovative mobility services: e-buses, bicycles

- Implementation of City Innovation Platform data acquisition and management for: city traffic, district heating system, public lighting system

In that process of replication, Focsani identifies challenges and barriers in the following areas:

- Legal framework (F7)
- Population awareness (F7)
- Financial issues (F5)
- Energy poverty (F1)

The collaboration within IRIS should relieve the challenges and barriers of Focsani, especially in:

- Implementation of legal framework –buildings, district heating, public transportation
- Project financing possibilities
- Examples of population awareness campaigns

3.1.8 Assessment with Business Model Dash-Board Tool for Vaasa

Spider graph from Business Model Dash-board tool

For Vaasa, the most interesting solution to be replicated is the smart multi-sourced low temperature district heating. Low temperature district heating is planned for Ravilaakso area where construction will start in 2020. Planned network consists of waste heat utilization, heat storage (+1 GWh) and cooling (absorption pumps). Vaasa wants to learn from other solutions and related business models.

Major challenges and barriers identified by Vaasa are:

- F1: Decision criteria for selecting energy solution: Justification of additional costs comparing to normal district heating (energy storage, absorption pumps) and profitability of investment versus not business-related criteria as CO2 neutrality, innovations etc.
- F1 and F5: Financing of investment: How to get investment back for investors without increasing cost for households.
- F1 and F5: Business model: Who will be the operator? In Vaasa local energy company hesitates to take responsibility of developing/using the technological solutions, but in the meantime does not want others to enter the market.

For Vaasa, the most important reasons for collaborating within IRIS are to be better equipped on:

- Technical solutions, especially in getting more efficient in calculations, capacity, power, investments, running costs
- Business models, especially Background of business solutions, subsidies and incentives, operator, profitability calculations, funding, etc.

- Running of operations, costs, maintenance
- Decision making process, especially in the identification of the stakeholders involved, citizens engagements, reporting
- Follow up solutions

3.2 Assessment of innovation management performance in IRIS cities through the IMProve method using interviews with city innovation managers

The interviews with Gothenburg, Nice, Utrecht, Alexandroupolis. Focsani, Santa Cruz de Teneriffe and Vaasa are presented in this section. The questions used are the same as with the lighthouse cities, thus the interviews were structured, highly influenced by the IMProve method, focusing on the following aspects:

- Innovation Strategy
- Innovation Organisation and Culture
- Innovation Life Cycle Processes
- Factors Enabling Innovation
- Results from Innovation

3.2.1 Assessment of innovation management in Gothenburg

Interviewee and relation to IRIS

Gunilla Åkerström, Innovation manager at the City of Gothenburg by the time of the interview.

Innovation strategy

By 2023 there are 3 objectives that should be fulfilled:

1. Work systematic and structured way with innovation to ensure results and benefits for residents, visits and businesses
2. Employees shall have good prospects of being innovative and to help in developing our business (now they have a difficult time being heard and they work in silos)
3. Others will look at Gothenburg as an innovation-leading city

The city of Gothenburg has 5 strategies to increase innovations:

1. Focus and prioritize for innovation – on common objectives and goals. However, the city doesn't have this strong focus today since the city prioritizes "everything", not special things.

2. Collaborate for innovation – contribute to strong innovation eco system by driving innovation in collaboration with industry, academia, civil society and other public organisations. Example of

strategic innovations platforms; Mistra Urban Future and Sahlgrenska Science Park, Johanneberg Science Park and Lindholmen Science Park ,

3. Processes and tools for innovation – develop processes
4. Organisational culture for innovation - this is the hardest one to establish, and also what the innovation strategy is based on. Åkerström says that the city needs to change how its' being lead today and embrace the willing to face the unknown, curiosity
5. Organize for innovation – Åkerström describes the city as today being divided into different organisations and administrations. She sees the need for collaboration within the city and a need for a small coordination team facilitating this.

The City of Gothenburg has an Innovation Programme for 2018-2023, that has been published in both Swedish and English[4] (abridged version). IRIS is one of the projects promoted through the programme. The Innovation Program was decided by the town council, has a high profile and is well aligned with other initiatives.

The material has been used in a change process where representatives from the program management team have met with people from many of the administrative units and companies owned by the municipality, around 60 in total. They meet regularly with the persons responsible for innovation at the different units.

Gothenburg considers its innovation programme to be aligned with the UN sustainability goals and believes privacy and democracy as core issues and objectives for the city and thus also for the innovation programme. There is also an emphasis on sustainable growth.

One of the city's core strategies is to cooperate with other organisations, although there isn't a special policy regarding working with small companies. However, Business Region Göteborg (part of the city of Gothenburg's organisation and partner in IRIS) is responsible for the business development and they have a special focus on SMEs. It is clearly stated in the programme, that collaboration between the public sector, academia, the business sector and the civil society is needed in order to create innovation.

Creating and establishing the innovation programme has been going on for more than two years. Now focus is on transferring it into a more permanent position in the organisation with more people including specialists. The program management is organized with only a few generalists as coordinators, but they have worked informally with individuals with similar work in the municipal companies and administrative units. Right now (February 2019), the city of Gothenburg is waiting for the politicians to make decisions regarding the future.

The science parks play an important role in the innovation programme, since they are collaboration platforms where the city participates and invests money. Already the city is engaged in three science

[4] https://goteborg.se/wps/wcm/connect/3d7ef32d-975f-4334-a533-08b5117fba46/180403-004-010+Innovationsprogrammet+populärversion++Broschyr+eng++högupplöst.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=3d7ef32d-975f-4334-a533-08b5117fba46

parks (Johanneberg (representing the city of Gothenburg, lead of WP7, in IRIS), Lindholmen and Sahlgrenska) but a fourth one is under discussion where the focus will be on social innovation.

In general, Gothenburg regards itself as much better at planning than on execution since the Innovation Programme is rather new. The city is interested in learning more about different kinds of models for how to prioritise among initiatives and manage them, where one strategy is to have a portfolio. For inspiration Gothenburg looks at different locations such as Silicon Valley and Amsterdam. The city is also looking into the Smart City concept, since it's used in various ways and includes more than digitalisation. Another area for improvement is communication, where the innovation programme team needs to be able to adjust their elevator pitch depending on who they talk to even more, and also become even better at listening to the questions posed in order to create learning.

Innovation organisation and culture

Organisational culture is all about starting to ask the right questions, every manager has a discussion with their employees every year. Cultivate an innovation organisation slowly and ask questions like "Have you had time to test a good idea that you have had?" etc.

As part of the change management process, more than 2000 managers in the city administration have received a presentation regarding the importance of creating a culture supporting innovation. In addition, more than 600 have replied to a questionnaire measuring culture aspects based on the Barrett model[5]. It indicated that many people want to work with innovation, but do not have the means to do it. They have also been inspired by the work done by Mats Tyrstrup, researcher at the Center for Advanced Studies in Leadership, Stockholm School of Economics. Furthermore, the city of Gothenburg has been inspired by similar work in Denmark and Norway, and Gothenburg has also developed a questionnaire focusing on innovation together with SKL (Swedish Association of Local Authorities and Region), called the Innovation Barometer[6].

In the future, the city of Gothenburg would like to increase the managers ability to support innovation by making it easier for ideas to flow through the organisation, bring down the silos, provide encouragements of different kinds and so on. Gothenburg also wants to focus on collaboration, attraction and diversity.

Another part of the change management process has been to provide good examples from different parts of the organisation. They are considering this as an important success factor for the innovation programme work.

Much effort has been put into relating the innovation programme to the established work on quality improvement. The core message is that both quality assurance and innovation is needed in order to create double loop learning. Still, much of the innovation work is done by a few enthusiasts.

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[5] https://www.valuescentre.com/mapping-values/barrett-model

[6] https://skl.se/naringslivarbetedigitalisering/forskningochinnovation/innovation/innovationsbarometern.14635.html

Innovation Life Cycle Processes

The City of Gothenburg has a schematic innovation life cycle process described in the innovation programme:

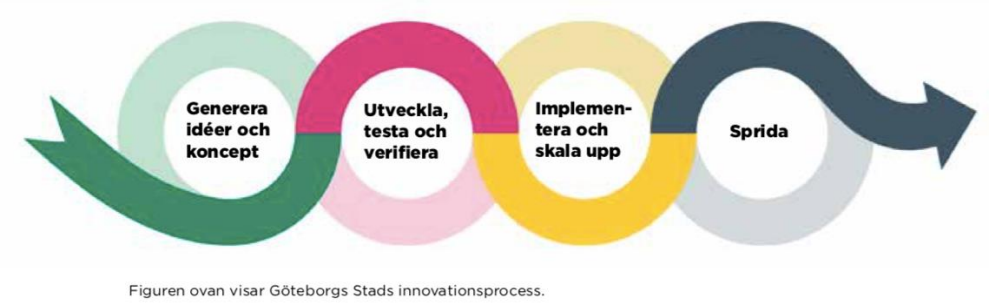

Figure 6 City of Gothenburg Innovation process

It demonstrates that the following steps are interwined;

- Generate ideas and concepts
- Develop, test and verify
- Implement and scale up
- Distribute

Enabling Factors

Regarding support for the innovation process, a toolbox is under development. There is a general IT support system for project management, and the toolbox will also include IT support. A new HR program is on its way, as well as a new program for the business development in the city with connections to the innovation program. One success factor is to what extent responsibility for innovation is clear and communicated.

By the time of the interview, the innovation programme had not yet been evaluated, although plans and objectives are monitored. The Innovation Barometer will be used again, as well as the regular employee questionnaire. There are also plans to participate in competitions regarding innovation to measure themselves against other cities.

Innovative Results

A toolbox for the 4 steps in Gothenburg's innovation process is under development including a project model. These tools will be developed and maintained by the departments "Intraservice" and "Consumer & Citizen support". What issues will be dealt with at the unit level and what should be managed at a higher level is important and under discussion.

Summary

Gothenburg rates itself as an organisation with respect to the dimensions in The IMProve Method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 5 Gothenburg rating, based on The IMProve method.

GOTHENBURG	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	5	2
Innovation Organisation and Culture	4	1
Innovation Life Cycle Processes	4	3
Factors Enabling Innovation	2	2
Results from Innovation	4	-

3.2.2 Assessment of innovation management in Nice

Interviewee and relation to IRIS

Jean-Charles Maleyson, manager of IRIS lighthouse city Nice at the time of the interview. But almost all of the content here is based on documents that Jean-Charles provided WP3 with, not actual statements from him.

Innovation strategy

While continuing to consolidate its image as a leading tourist destination, Metropole Nice Côte d'Azur has established itself as a pioneering innovation metropolitan area. In 2015, it joined the ranks of the top five smart cities in the world, competing with London, Barcelona, New York and Singapore. Its pioneering approach has been praised both in ministerial reports and by specialist consultancies: its economic model and governance have now been officially recognized and can be found in all the global smart city benchmarks. Nice has published the document Digital Innovations7, where various dimensions of the "Smart City" concept and how the city is addressing them are described.

The city was one of the first French cities to initiate major experimental projects. It has gradually built up a portfolio of projects based on four major urban challenges that are not only shared with other cities but also reflect the specificities of the territory:

- energy management
- resilience and risk management
- the environment
- new forms of mobility

[7] http://www.nicecotedazur.org/uploads/media_items/brochure-innovations-english.original.pdf

In real-life conditions on the coast, in rural areas and in the mountains, these experimental projects test the new services that will make Nice a smart and sustainable city with the prospect of being replicated in other cities in France and the world. The geography - France on a small scale with sea and mountains – makes it a unique Europe-based experimental site for French or foreign projects, start-ups and major manufacturers. The European Commission confirmed its quality in May 2017, when from among thirty European projects it selected the IRIS project presented by Metropole Nice Côte d'Azur, Utrecht, and Gothenburg.

The innovation strategy for Nice Côte d'Azur is described in a document called SMDEII8, that stands for Schema Metropolitain de Développement Economique, d'Innovation et d'Internationalisation". SMDEII says that « Metropole Nice Côte d'Azur's position is complementary to, even inseparable from, the regional economic development, innovation and internationalization strategy (SRDEII -Schéma Régional de Développement Économique, d'Innovation et d'Internationalisation).

Developed and adopted jointly by the Region and Metropole Nice Côte d'Azur, the Provence-Alpes-Côte d'Azur SRDEII sets the guidelines for the regional economic development strategy. The Region is the territorial authority responsible for determining the focus for economic development. Like other French and European cities, Metropole Nice Côte d'Azur wanted to develop a metropolitan economic development strategy. Its title "metropolitan economic development, innovation and internationalization strategy" clearly demonstrates that it is the metropolitan area's interpretation of the regional strategy.

The SMDEII sets the guidelines for the coming years and calls for collective reflection in redesigning the city's levers. The various levers available to support areas of excellence and more broadly the metropolitan economy are as follows:

- Governance and partnership engineering (smart city dynamics and metropolitan data policy)
- Urban testing approach (living lab territory)
- Territorial demarcation of excellence ("hotspots" dedicated major urban and real estate projects)
- Support for innovation and entrepreneurship (economic activities, offer of services for businesses, etc.)
- Territorial marketing and attractiveness action (brand equity)
  Structural levers (land and real estate, mobility and communication infrastructures, urban planning and investment).
- Support for training

[8] http://business.nicecotedazur.org/wp-content/uploads/2018/03/SMDEII-2017-ENG.pdf

Some levers have been well used, while others need improvement. The objective is now to re- examine these levers in order to consolidate strengths and limit weaknesses. The introduction of territorial economic governance is their next challenge.

Sustainability goals are addressed in a document called “Plan CLimat” (for Climate plan”), led by the Directorate in charge of Environment. Such document is binding by a national law voted in 2015. A new version has just been approved in March 2019 and aims at making Nice a carbon neutral city by 20509.

With the regeneration of economic activity sites, the development of structures hosting start-ups (CEEI incubator, business hotel, etc.), increased aid for business, support for international attractiveness and for businesses moving to the area through the promotion agency Team Côte d'Azur, Metropole Nice Côte d'Azur has become an attractive territory both in terms of quality of life and for business.

In just a few years it has become a large-scale innovation laboratory, a "living lab", building a smart city and developing collaborations between the various economic actors in the territory. Firstly, industrial partners involved in cooperation programs – for example IBM, EDF, Enedis (formerly ERDF), Veolia, Orange, Cisco, Bosch, Schneider Electric, etc. Next come local SMEs and start-up entrepreneurs with over 91 start-ups and 400 jobs alone created since 2009 by the enterprise and innovation center (CEEI - Centre Européen d’Entreprise et d’Innovation European) in Nice. This dynamic has held the French Tech Côte d'Azur label since 2015. The Université Côte d'Azur (UCA), and schools such as EDHEC, the Sustainable Design School and public research institutes are grouped together within the Université Côte d'Azur under the IDEX (Initiative d’Excellence) label; the Institut Méditerranéen du Risque, de l’Environnement et du Développement Durable (IMREDD) and its "Smart City Innovation Center" now perfectly illustrate this cooperation. The collaborative "Smart City Innovation Center" platform is the first concrete realization of this encounter between R & D activities, major partner groups, SMEs, microenterprises, start-ups, and research laboratories. And finally, the numerous competitiveness clusters (Cap Energies, SAFE, Eurobiomed, Optitec, Mer, SCS) also partner the approach, making the Metropole Nice Côte d’Azur territory a full scale or real-life innovation demonstrator.

Nice has created a cross-cutting organization integrating both an urban management center and smart-city-dedicated governance (the Smart City Center of Excellence). This management model increases the operational efficiency of the local authority’s activities (pooling resources, cross-cutting actions, reducing infrastructure spending, as well as forecasting and anticipation for operational management and crisis management) and offers citizens a better quality of service (a range of personalized services, involvement in the development of the city). This smart city strategy is mainly rolled out in four areas: Risk management, The environment, Smart mobility, and Energy. The Directorate in charge of Digital Services and Smart City (DSNS) has been created in 2018. Since then, DSNS must be consulted by any Directorate launches a new digital project. Additionally, the DSNS has started to establish a repertory of digital services deployed by NCA.

[9] https://www.nicecotedazur.org/environnement/l-%C3%A9nergie-et-le-climat/plan-climat-air-energie-territorial

Innovation organisation and culture

To prepare tomorrow's "smart city" experts, the "engineers for smart cities" course delivered by IMREDD in partnership with the city offers a multidisciplinary curriculum focusing on innovation and the entrepreneurial culture in the smart city. The objective is to train expert city "turnkey operators" able to develop integrated offers and support innovative smart city projects: a smart city that is sustainable, connected, attractive, and inexpensive in terms of resources. Awarded after 5 years, this university qualification is open both to students in initial training and professionals and executives in continuing education. The skills acquired will enable past students to work in a company, local authority or design office on development projects for smart city related products or services.

Innovation Life Cycle Processes

For Nice, innovation has become a governance model in terms of a solution for creating and managing the urban experience, and the driving force behind the city's economic development strategy. The implementation of innovative solutions is a prerequisite for their duplication and deployment at regional level, making it possible to validate the city's role as a regional economic driving force, increase the national and European visibility of its "Smart Metropolis" strategy, and raise the Provence-Alpes-Côte d'Azur region to the rank of first smart region in Europe.

Enabling Factors

Nice has introduced new forms of governance with its partners and in its internal organization, as proved by opening of the smart city center of excellence (Centrex). It is also creating favourable conditions for project promoters to successfully implement their urban innovations. At the same time, they have mobilized several levers: a major urban project dedicated to the Smart City (Mérida technopole); the deployment of very high-speed networks on the territory; smart city theme for one of the three Université Côte d'Azur (UCA) reference centers; new digital entrepreneurial dynamics through French Tech Côte d'Azur; and integrating the smart city strategy as a further asset that can be highlighted in the metropolis' international attractiveness strategies.

The metropolitan area's ambition in its areas of excellence (smart and sustainable city, health, tourism) is implemented through major urban structural projects. These development projects make it possible to provide an appropriate real estate offer (offices, laboratories, etc.) and focus investments in order to reach a critical mass in key sectors. The flagship sites act as catalysts for the economic excellence ecosystems while also contributing to their visibility and international standing.

Innovative Results

The entrepreneurial dynamic and its support have significantly expanded with the creation of the European Business and Innovation Center (the flagship space for entrepreneurs in the city) and the emergence of a private support offer demonstrating local dynamism. Key players (start-ups, support professionals) are now involved in networks (French Tech label in 2015) and the university is developing

and hosting new entrepreneurship programs (European Innovation Academy). The possibilities for entrepreneurship and support have also greatly increased with the support of the promotion agency Team Côte d'Azur and the creation and increasing importance of the European Business and Innovation Center.

Start-ups and those supporting innovative and digital entrepreneurship in the territory can join the French Tech and Nice Start-up networks. In parallel, the university is developing and hosting new entrepreneurship programs such as the European Innovation Academy (350 students from around the world hosted annually by the university for an entrepreneurial challenge organized in partnership with Samsung, Google, Amadeus, Credit Agricultural and Orange). A metropolitan "small business act" that facilitates access to public markets for small and medium-sized businesses in the area in order to support the local economy is also rolled out.

Summary

Nice has not rated themselves as the information above is based more on documents than interview.

3.2.3 Assessment of innovation management in Utrecht

Interviewee and relation to IRIS

Thomas Kruse involved in the city information platform from Utrecht's side were the interviewee.

Innovation strategy

In Utrecht, the innovation strategy is an integrated part of the general "business strategy" for the city where departure is taken in the societal challenges. From that the city can argue that there is a need for innovation, that new solutions are needed. In general, Utrecht considers itself better at executing than planning when it comes to innovation strategy and capacity.

Utrecht does not have such an explicit plan for technology adoption, since they believe one size does not fit all. The development often depends on to what extent the city owns the infrastructure and can be innovative, and the work is often dependent on the drivers of the other players in the ecosystem.

Regarding sustainability, the city of Utrecht consider itself connecting the SDGs to the goals of the city using a bottom-up approach. They see SDG as a kind of common language to talk about ambitions within and between cities, but there is not a very clear focus on them.

Innovation organisation and culture

Utrecht has put a lot of emphasis on capacity building and culture development. For example, the last years the city has developed the capacity of data-driven solutions and developed awareness at the council and other levels of the capabilities needed for this. The city has created a culture where the managers see the ability to innovate their processes, which often involve digitalisation. It is an emergent strategy that comes from the challenges.

In Utrecht, top management had several mandatory master classes on innovation. They also have a program for four years for data-driven solutions where managers had to do two pilots regarding data-driven solutions, working with smaller companies. Now in the next phase, they try to re-organise by involving the innovation agents. New projects are started as a consequence of initiatives in the cities, and these are realised with different European partners. They consider projects to create a good infrastructure to spread ideas and experiences.

Utrecht has a very strong commitment on the CIO level to innovation, to start innovation processes. However, the downside is that a lot of ideas are generated but there is not always the capacity to deliver everything. They try to manage the innovation processes more clearly in order to align initiatives and make sure they have the right competences and resources. The city has created awareness and enthusiasm, but do not have the capacity to do everything in a right way.

Utrecht city has 40 business units. The CIO has central staff but there are also service centres for project management. They have scrum agents, laboratories, platforms, design thinkers and much more. From an IT perspective, the business units have an IT manager who has support for innovation. Utrecht is also part of a national initiative, where the public sector tries to become “one government” instead of different agencies and municipalities. They address that by being part of laboratories and networks in order to learn from other cities. These are communities of practice for energy transition, mobility and more.

Utrecht has also worked hard to adapt the national strategy in this area. The bigger cities in the Netherlands do now have a better understanding of the national strategy although they don’t have their own strategies for how to adopt it.

Innovation Life Cycle Processes

The Utrecht City Mayor decided to focus on IT and data-driven solutions, which is why now the city has a much larger capacity to develop this and are able to combine data from different sources. When it comes to energy, Utrecht is a front runner in creating solutions, but they also work on other important challenges: inclusiveness and ethics, cyber resilience, and digital economy when it comes to infrastructure.

Enabling Factors

The Chief Information Officer (CIO) office tries to support the innovation agents and help them with approaches regarding how you go about innovating your process, with a focus on agile principles. Emphasis is put on becoming smarter at defining and describing the problem they are facing. The Office teaches them how to do design sprints focusing on the problem and help them with structuring the process and the disciplines they need involved. Using the design thinking process they take small steps, with small cycles, work multidisciplinary, focusing on minimal viable products, consider stakeholder management and how to fund your solution, and thus create an understanding the business model of the service they are developing.

The work takes departure in the principles for digital development10 for example that it should be scalable and open. They are often creating open solutions but are aware of that IP as something that could be of value to others and an obstacle if you don't own it. They collaborate with universities to get multidisciplinary knowledge and try to involve them in projects and programmes at different stages.

Innovative Results

Utrecht has a program in place for connecting SMEs to their initiative and our challenges, where they challenge them to come up with solutions. However, it is not an explicit strategy but implicit policy. They try to form teams where SMEs are involved since they consider them more equipped to go into an innovation process. Start-ups and scale-ups need to advance their business, and the city creates an eco-system where they can connect to each other.

Summary

Utrecht rates itself as an organisation with respect to the dimensions in The IMProve method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 6 Utrecht rating, based on The IMProve method..

UTRECHT	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	3	3
Innovation Organisation and Culture	3	4
Innovation Life Cycle Processes	3	4
Factors Enabling Innovation	3	4
Results from Innovation	3	4

3.2.4 Assessment of innovation management in Alexandroupolis

Interviewee and relation to IRIS

Interviews with Ms Intzepelidou Eleni, Vice-Mayor of Energy and Natural Resources of Municipality of Alexandroupolis. As the deputy mayor for Energy and Natural Resources, she is the head of the project team of Municipality of Alexandroupolis for IRIS project.

What IRIS means to Alexandroupolis

IRIS is important for the city of Alexandroupolis because as a Fellow City, Alexandroupolis will have the chance to

[10] https://digitalprinciples.org

- conduct feasibility studies on how to adapt innovative solutions towards energy transition demonstrated in IRIS project and also
- plan and develop the city bold city vision for 2050
- share experiences and knowledge with other similar cities
- share experience from frontrunning smart cities in the EU; Gothenburg, Utrecht and Nice.

Innovation Strategy

The Department of Planning, Innovation and Growth of the city of Alexandroupolis has developed an operation program for 2015-2019 with specific measures (Measure 3.3) on supporting entrepreneurship and trade (https://www.alexpolis.gr/wp-content/uploads/2018/07/epix2015_2019.pdf). Furthermore, within the Strategy of Sustainable Development the City of Alexandroupolis is expected to establish a business incubator for supporting entrepreneurship and innovation (https://www.alexpolis.gr/anaptyxiakos-schediasmos/sbaa/).

The city does not have the financial nor the human resources to conduct innovation. The city often partners with both private and public organization such as the Democritus University of Thrace and other research organizations and academic institutions and subcontracts innovation processes when required. There is no IPR management policy.

The city aligns its strategy with the UN Sustainable Development Goals and during the implementation of various measures, the impact is measured also with respect to a) providing equal opportunities for all, b) giving people better healthcare, c) achieving equality for women and d) using more renewable affordable energy.

Cooperation with other organisations is performed through Memorandums of Cooperation or subcontracting. Any company regardless of its size can participate in the calls for tenders published by the City of Alexandroupolis

Innovation Organisation and Culture

In Alexandroupolis, currently, no organizational structure for innovation is established. The city targets to establish one in the near future.

The city of Alexandroupolis will study and exchange knowledge and experience and will be trained from the learning experience of the demonstration results of the innovative solutions that enable the energy transition and citizen engagement. The city will have the chance to conduct feasibility studies, plan its bold city vision and replicate some of the solutions selected in IRIS.

The City of Alexandroupolis is participating in Horizon 2020 projects and as such has developed an innovation culture towards planning and implementing actions that facilitate its sustainable development. The city has also established a business incubator for supporting starts ups to develop their first steps. However, it still needs to become more proactive in designing innovations and implementing innovation procurement.

Communication of project activities is very important for raising awareness and engaging citizens. The City of Alexandroupolis is regularly communicating with its citizens through consultation, workshops and

p2p communication of the members of the municipal authority with citizens. Furthermore, the city is regularly communicating with its citizens announcing IRIS project news and results through the Municipal press office, local news media, social media.

Innovation Life Cycle Processes

Regarding quality management and innovation-driven change management the issue of quality assurance is monitored for the measures and actions implemented by the City of Alexandroupolis through national legislation and the specific provisions and technical guidelines developed for the implementation of each project.

Within an innovation life cycle process then IRIS project would be at the stage of identifying a process that works for the city of Alexandroupolis towards replicating the integrated solutions of IRIS and engaging relevant stakeholders and citizens in the solution development process.

Enabling Factors

Alexandroupolis is strong regarding human resources management. Areas where improvement is needed are IT support, project management and IPR management.

The barriers to implement new innovations and replicate are the relatively large bureaucracy, the lack of funding and the lack of know-how to raise funds through European mechanisms supporting the energy transition (eg European Investment Bank).

The main challenges of the city of Alexandroupolis will face within the IRIS project are

a) the lack of funding and

b) the development of innovative business models for the energy solutions that will be selected to ensure the sustainability of these projects.

The City of Alexandroupolis is already in search of relevant funds and is exploring alternatives. Through the experience gained in IRIS and the good practices that will emerge, it will be able to adapt to the characteristics of the city and comply with national legislation solutions that will be viable.

Innovative Results

The results expected from the city's innovation activities are that it will increase effectiveness and efficiency of the organization, reduce costs and find new sources of revenues.

The expected results of IRIS include increased capacity of municipality staff and stakeholders involved to design and implement novel integrated solutions towards energy transition and energy sustainability. The next steps include to identify funding sources to realize the integrated solutions supported by sustainable business model in order to foster the roll out.

Summary

Alexandroupolis rates itself as an organisation with respect to the dimensions in The IMProve Method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 7 Alexandroupolis rating, based on The IMProve method.

ALEXANDROUPOLIS	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	3	2
Innovation Organisation and Culture	3	2
Innovation Life Cycle Processes	3	2
Factors Enabling Innovation	3	2
Results from Innovation	2	2

Example of best practice

Alexandroupolis here gives an example in terms of the city's strategic innovation work, that IRIS can use as a best practice case.

The sustainable urban development plan of the Municipality of Alexandroupolis includes the development of a business incubator as well as other actions/activities for the promotion of entrepreneurship and innovation. The implementation of the plan is on-going, and the results will be soon available.

3.2.5 Assessment of innovation management in Focsani

Interviewee and relation to IRIS

Adrian Imireanu , head of the department called "Projects", in the structure of Focsani Municipality. In IRIS Project he has the role of Focsani Site Manager.

What IRIS means to Focsani

IRIS is important for many reasons, mostly because it is targeting a new approach facing current issues – energy efficiency, mobility, ICT, citizens participation etc. It's also important for the city because it's an important project of international cooperation, inside EU. For me it's important because, we, the Projects Department, have already started or preparing different projects related to IRIS activities – electric buses, bike sharing, building retrofit etc. So, the knowledge received through IRIS project is useful for all of us.

Innovation Strategy

At this moment Focsani doesn't have an innovation strategy. The city has developed a City Strategy and a Urban Mobility Plan, but no innovation strategy.

The Municipality is not expected to develop any innovative solution by itself, but we do have a lot of ideas and we are always trying to find the right service providers for filling our needs, including implementation of new, innovative solutions/ideas.

Innovation Organisation and Culture

There is no innovation organisation in our local administration. We are working under specific laws and procedures and there is none mentioning anything about innovation. Still, innovation is present in our organisation but not as a separate structure. Each department has its own specific field of activity– energy, traffic, mobility, ICT, human resources, quality management etc. Most of them are related to Projects Department.

IRIS Project has a local team formed by 5 people, 2 of them – the site manager and the local coordinator – working in the Projects Department. All the other related projects that benefit from IRIS are managed by teams leaded by Projects Department.

For a local administration, things are completely different compared to a company. Still, to have an innovative culture for us means to be opened to new, to search for partners that can solve different challenging issues, to be interested in applying new solutions that can increase the quality of life in our city. And yes, we do believe that, in this regard, we do have this culture.

Communication is one of the most important factors that can support an innovation culture. Actually, without communication any new solution could be rejected by the organisation or by end beneficiaries – citizens and companies. Communication is also important in the early stages – to help collecting information, necessary to develop projects.

Focsani uses communication on both ways – internal and external communication. We need internal (inside organisation) communication to explain what this project is about, what are the activities and the expected results.

Innovation Life Cycle Processes

There is not a specific strategy or other documents related to that. Our processes in this area are not different from other projects and it is not documented.

Quality Management is dealing mostly with already existing activities and procedures. Since innovation is not something existing or intended to be developed, there are no specific procedures or connections for quality management related to innovation process.

IRIS Project is under implementation now, and Focsani is now preparing the Replication Plan. Next stage will be to present the Replication Plan to as many other local administrations as we can from Romania, but not only. We will collect observation and suggestions regarding our Replication Plan. We will also use it to disseminate the information to different specific organisations – like Romanian Municipalities Association – and different other cities where Focsani already has contacts.

Enabling Factors

Focsani has good IT support but it could be improved, mostly referring to human resources. Our department is specialised on project management but we also have a lack of personal, having many projects already in implementation.

Barriers to innovation and implementing new solutions are specific laws and regulation at national level are not encouraging local administration to pay more attention to innovation. Focsani hopes to overcome this by promoting some local council decision that could support this approach.

In order to be able to replicate innovative solutions, like the ones in IRIS, first, most important is the support of the local council and the mayor. Having this support, Focsani is certain that other factors will be there. So, Focsani is certain that the meeting to be held in Focsani will be very important. The city intends to have, at this meeting, an important communication event, to ask our friends and colleagues from other IRIS cities to use this opportunity to present important ideas and projects developed/implemented/replicated in each IRIS city.

Innovative Results

Along the innovation process that must come through IRIS and such innovative projects that Focsani engage in, the most important thing for Focsani is to:

- offer better services for the citizens and to make a better use of public money.
- increase the quality of life, through environment protection,
- increase the security of the citizens
- allow better health and education systems

All projects have specific targets and yes, we do measure and analyse follow-ups. The expectation on IRIS is successful implementation of Focsanis's projects, that will benefit from IRIS results and new projects ideas, arisen from IRIS. Follow up will be done through annual reports, statistics and questionnaires addressed to beneficiaries.

Summary

Focsani is rating itself as an organisation with respect to the dimensions in The IMProve Method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 8 Focsani rating, based on The IMProve method.

FOCSANI	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	1	1
Innovation Organisation and Culture	1	1
Innovation Life Cycle Processes	1	1
Factors Enabling Innovation	2	2
Results from Innovation	2	2

Example of best practice

Focsani here gives an example in terms of the city's strategic innovation work, that IRIS can use as a best practice case.

Focsani implemented a specific project on financial accounting, that involved all 42 subordinated public institutions – public companies, schools, culture institutions etc. Project was a pioneering one, to create

a unique ICT system for this purpose, for all 42 partners and the local administration. It took about 2 years of hard work, together with a soft developing company and an ICT data transport provider. High effort, information collecting, testing, training, all specific aspects but at the end it was a success and becomes a model for all Romanian municipalities that as.

3.2.6 Assessment of innovation management in Santa Cruz de Tenerife

Interviewee and relation to IRIS

Manuel Pérez Coca, Head of ICT Service.

Javier Fernández Rodríguez, Head of Service of Public Services.

Jaime Rodríguez Ceballos, Technician on Environment Services.

Ibaya Pérez Sanz, Technician on Development Society.

What IRIS means to Santa Cruz de Teneriffe

The IRIS project represents an opportunity to learn from the Lighthouses' projects and facilitate Santa Cruz's local replication projects. It also brings over innovation processes from LC to the city's administration. This helps to reflect on internal processes in order to improve. Furthermore, there is an interesting knowhow exchange in technological level.

Innovation Strategy

There is not a formal innovation strategy. There are innovation actions that are carried but there is work to be done in order to go further on this. There are many coordinated initiatives in different areas but there is not a plan for technology adaption. All city actions, including innovation, are developed considering the goals of the Covenant of Mayors as well as the Sustainable Development Objectives.

For instance, Santa Cruz municipality has an open Geographic Information System (GIS) where there is much of the information relate to the city, but in order to access to it there are limitations regarding the privacy regulation for de data. Hence, a public worker could access to private data to do its job but not the general public, whom has access to all public information on the GIS, this is in accordance with EU and national regulation.

Santa Cruz municipality has several collaboration agreements with public universities and local non-governmental organisations (NGOs). On the hand of the companies, the public procurement does pursue competitiveness for a better efficiency and democracy, so there is not further cooperation with companies except from public procurement process. Nonetheless, the municipality is starting to explore public-private partnerships in order to help local innovation ecosystem accordingly with the regulations.

Innovation Organisation and Culture

The competencies in innovation in the City Council of Santa Cruz de Tenerife are centralized in the General Directorate of Technological Innovation, which in turn has the following Sections within its Technical Service for Informatics and Telecommunications:

- Applications section

- Infrastructure section

- Electronic Administration Section

The city's contribution to innovation is especially focused on the concept of IT. Implementing new technological products in internal management (digital transformation, electronic administration), or in the city (smart cities). The Computer and Telecommunications Technical Service is made up of 17 people.

There is an innovative culture and it consists of developing skills and abilities in the City Council to generate new services of value for the citizenry, as well as to improve and make our internal processes more efficient. That way of working is what people involved in IRIS try to instil in their collaborators.

Communication is a very important role within an organization where innovative culture is encouraged. It is necessary to:

- Encourage the sharing of ideas.

- Clearly communicate the objectives pursued, and achieve employee involvement

- Promote collaboration and meetings.

- Provide positive feedback to employees, thus improving motivation

IRIS contributes to an innovative culture as the project has helped to boost actions and increase the collaborative and transversal work with the teamwork launched thanks to the project.

Santa Cruz de Teneriffe is intensively using in cloud services and other ICTs in order to celebrate meeting, share working documents and collaborate in general.

Innovation Life Cycle Processes

The IRIS project is aligned to the DUSI project which enables 17 million Euros on ICT and sustainability investments for the city. IRIS is a fundamental project in letting the municipality reach the goals of quality or the focus on specific areas.

Incorporating IRIS knowhow regards not only technical but also innovation procedures, on long term municipal employees. Municipal workers involved on IRIS might translate the knowhow and procedures to their different areas. Furthermore, by demanding all private contractors must comply with innovation criteria.

Enabling Factors

Santa Cruz is strong on project management, which is good when it comes to improving IT-support as well as the general innovation culture of the organization.

The complexity of the administrative structure and the difficulties to create a useful need definition sheet, are examples of barriers to implement new innovations.

Factors enabling success in the IRIS project are, for instance the exchange information, cases demonstrations and knowhow transference. The interaction with experienced actors is key.

Through the innovative activities of IRIS the expected results for the city is to be able to provide an efficient, sustainable and effective service to citizenship.

In other projects impact has not been measured by setting targets, but Santa Cruz de Teneriffe is now planning to do it regarding IRIS investments though by creating an IRIS KPIs web public information service.

Santa Cruz de Teneriffe expectations as an outcome of being part of the IRIS project;

- An improvement on public-private partnership initiatives and policies.
- An increased awareness regarding sustainability and the opportunity of RES and other smart solutions.
- An improvement of the innovation culture in the organization.

Summary

Santa Cruz de Teneriffe is rating itself as an organisation with respect to the dimensions in The IMProve method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 9 Santa Cruz de Teneriffe rating, based on The IMProve method.

SANTA CRUZ DE TENERIFFE	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	2	2
Innovation Organisation and Culture	1	1
Innovation Life Cycle Processes	1	1
Factors Enabling Innovation	2	2
Results from Innovation	2	2

Example of best practice

Santa Cruz de Teneriffe states that the city has no examples in terms of the city's strategic innovation work, that IRIS can use as a best practice case.

3.2.7 Assessment of innovation management in Vaasa

Interviewee and relation to IRIS

Teemu Lehtonen, ICT director, City of Vaasa

Comments included from:

Maria Backman, Strategy and Project Specialist, City of Vaasa

Johanna Kalliokoski, Project Researcher, University of Vaasa. Johanna wrote a master's thesis in Finnish in 2019 about the City of Vaasa's role in the regional innovation ecosystem. The research material consisted of ten interviews with staff members from different sectors. https://osuva.uwasa.fi/bitstream/handle/10024/9266/osuva_8831.pdf?sequence=1&isAllowed=y

What IRIS means to Vaasa

IRIS is a really good and important project and it fits very well in the larger framework "Carbon neutral Vaasa 202x", which is part of the City of Vaasa's strategy. Projects like IRIS are important because they enable innovation, for instance by providing networks for knowledge sharing. This means that Vaasa do not have to do all work themselves. Instead, the city can pick the best solutions and implement them in to their own context.

Hopefully, IRIS can help Vaasa to open up a little bit of the data of the city and open up the ways of doing things within the city. Hopefully, the project will lead to innovations and good ideas. We could for instance see what data the city has regarding the region and how it can open to cooperation partners, for instance to start ups, which might make it possible to save money or do things more efficiently. It does not have to be very big things, for Vaasa also small things and changes can make it possible to save for instance 100 working hours a year. That is already a big thing for the city.

Innovation Strategy

The City of Vaasa does not have any innovation strategy. Therefore, the different pieces are divided between a many different departments and teams. Hopefully, Vaasa will have a strategy in future. It should be developed in close cooperation with for instance the regional development company VASEK or similar partners in order to create synergies and link it very strongly to the interest of companies in the region. It should cover the actions going on in the region, not just that what the city is doing.

Regarding digitalization, there is the DIGI group consisting of staff members from different sectors and led by the ICT director working on the "the bigger picture", i. e. what the services look like, to what extent the services have been digitalized, what the process looks like within the city, how the digitalization will be carried out etc. So far, the group has developed a digitalization vision for the city. This is really a step forward, now there is a much better understanding of what to do next. In addition, the group has developed a deployment plan prioritizing the next steps. Since the vision has just been developed, there is no clear picture yet of what to develop within the city, where a joint ownership

could be used etc. The ICT director has some first ideas about this, but there is still work to do regarding these aspects.

Furthermore, the ICT director is responsible for planning how to access, transfer and use data in the city. In addition, citizens' perspective is also taken into consideration regarding digitalization for instance by providing face-to-face services for citizens, which are for some reason not able to use digital services.

The city is attending a national Sustainable Development Goals project in order to integrate and follow up SDGs in the city strategy.

The City of Vaasa has long tradition in triple helix cooperation, and cooperation between companies, academia, public sector and NGO are a natural part of daily work as well as acknowledged in the city strategy. Vaasa aims at being a front-runner when it comes to regional cooperation and is aiming for support in both directions, that the organisations the city is supporting are supporting the city in some way, for instance by improving Vaasa's image or increasing the number of working places in the region. Vaasa wants to be an active and agile cooperation partner, which has also been shown in practice for instance in Wärtsilä's Smart Technology Hub project. Wärtsilä decided to invest 200 Million Euro in the area Vasklot and Vaasa was able to get the required planning process ready in a very short time. The flexibility of the city and the Vaasa eco system as a whole was one of the reasons for Wärtsilä's choice to invest more in Vaasa.

In practice, the cooperation is carried out by different departments within the city. One challenge is to communicate smaller cooperation projects internally between the departments. There is a platform for ongoing projects, but it is not always so easy to find the right information via that platform and to keep it updated.

Innovation Organisation and Culture

Vaasa is, on a national level, seen as a frontrunner regarding pilots. The pilots carried out in Vaasa are often presented and discussed in events organized by The Finnish Innovation Fund Sitra, the Association of Finnish Municipalities, and also in events abroad. Vaasa has been developing processes for how to carry out and finance pilots including the engagement of citizens, local politicians etc.

The city reorganized its structure from January 2020, and the position of the ICT director now includes the responsibility for digitalization and innovations. However, the resources are currently extremely limited, in practice only the director's position includes these tasks. The staff members, which used to carry out this kind of work, have now been placed in other parts of the organization. However, the idea is that the new structure will make it clearer where innovation management related tasks will be found in future, but in order to get it functioning, more resources are needed. As before the restructuring of the functions within the city, there are still other departments as well working with pilots and other innovation activities. A next step would be to recognize staff members in different city sectors with a desire to innovate and to get the communication between the director and these persons going.

The IRIS project initially engaged the technical sector and the city development department with the common aim of streamlining certain aspects and functions. The IRIS project has now engaged both the Innovation and digitalization department as well as other important stakeholders.

Vaasa has many skilled staff members, which are moving things forward and are happy to try out something new. This is the basis for a good culture for innovations. In addition, there must be a culture allowing failure and recognizing that you can learn from failures as well. Vaasa has people with the right mind set and that is a very important basis for an innovative culture. The culture is in general supporting innovation platforms allowing thinking out of the box can be found in different parts of the city structure. The city management has an overall approach supporting innovations. However, there could be better structures in place providing for instance a clear process and good tools for people willing to think in new ways and willing to try new things out. Currently, the economic challenges of the city have slowed down the innovative activities.

The results of Kalliokoski's master thesis showed that there are on the one hand staff members experiencing a strong innovative culture and on the other hand staff members seeing a need to improve the innovative culture. In some cases, the staff members would like to include more innovation activities in their daily work, but the lack of resources makes it difficult in practice.

Communication is very important. In order to innovate, there is a need to include people from all sectors and everyone needs to talk to each other. This will not happen if there is not a good culture of discussing things and just throwing ideas out. If there is a good communication culture in place, and platform for discussion, suggestions for improvement will for instance normally not be interpreted as points of criticism. Furthermore, by communicating successful cases within the city internally, the innovation culture can be improved, since good cases help others to understand what could be done in a new and more efficient way in their own working environment. In addition, a good communication culture is a way to get away from strict hierarchical structures, which are not that typical anyway for Nordic countries.

IRIS stimulates innovation by the solutions demonstrated in the project and the network cooperating in the project. Locally, the IRIS content and messages are raised in communication activities internally and externally as much as possible.

Innovation Life Cycle Processes

A process has been developed for the smaller pilots, which have been carried out. However, they have been small scale and all step have not necessarily been part of the pilots. When larger projects are considered, they should be carried out together with cooperation partners. The city could for instance initiate a project and make the first tests, and if they seem to be promising, another actor can take it further with the support of the city. In a perfect world, we would have the resources and the people to carry out the whole life cycle, but taking a more realistic view on this, the city of Vaasa will probably never be able to carry the whole process by itself. The process is not that well communicated, but the city has the knowledge and a good process which has been used and tested.

The IRIS project can give input in different parts of the life cycle process, even though it is probably situated mostly in the beginning of the life cycle. In the fellow city context, the next step is to replicate and adapt suitable integrated solutions. The replication plan should ensure the large-scale use of that what is developed in the project. At the same time, the IRIS project is a learning process for H2020 project knowledge as well as a potential initiator for innovations and solutions.

Enabling Factors

Vaasa need to start developing an innovation strategy, since this is missing. This is something Vaasa needs to improve. However, Vaasa has the IT support needed and skilled staff members within project management. All these aspects are quite easy to get working, the most difficult part is the culture behind everything. Even though Vaasa one day decides to work in a new way, it can take years to change the behaviour of 5 000 staff members. This is the hard work and for this, Vaasa needs an innovation strategy and a plan for implementing it in the everyday working life. In addition, there is a strong need to start pushing an innovative culture even more and to create better platforms for internal communication and knowledge exchange. The City have strong cooperation networks, which are working with innovation from different angles, which could be used more strategically from the city point of view.

One barrier for implementing new innovations is the available basic funding. This is a barrier for ideas coming both from our organisation and outside the organisation. This barrier is higher in economic challenging times. It is very important that the city has a system in place, which enables at least some funding for innovative initiatives, but this will always be a barrier. Resources in terms of staff members with the needed skills can also form a barrier. In addition, the lack of efficient internal communication channels can be a barrier. The city is constantly working on overcoming the recognized barriers. In difficult economic times, the importance of external funding increases.

The city is a frontrunner on many levels and could be even more engaged in applying for external funding for larger projects, but due to limited staff resources, this is not fully realized.

It is important not to let one project work alone, but to identify links to other ongoing activities and projects are very important to identify in order to ensure project success.

Innovative Results

Two major results that are important regarding innovations activities:

- The reduction of costs since it is a main factor to convince people that there is a need to do something. If it is possible to show that a new way of doing things will lead to lower costs, changing things will not be a problem.
- The employer brand. It is very important to give a good impression to people outside of the organisation, for instance it is hard to convince people that an organization is very innovative if computers and phones are from the 90s. The brand will affect which employees we will be able to recruit. An innovative culture is very important also in this respect. In the larger picture, the city services including schools and kindergartens will affect which people Vaasa can attract as new inhabitants and taxpayers. The city should be even better to promote Vaasa as the place to live and work. The first step is to get people to consider moving to Vaasa.

Furthermore, it is important to create sustainable and interesting places for living, flexible traffic solutions and solutions improving daily life for both staff members and inhabitants by developing and implementing e.g. digital solutions. Finally, the aim to be a frontrunner in the regional cooperation is

also important when thinking about the results. One important result is to contribute in a positive way to the regional innovation eco system and to support activities that have a win-win character for all involved partners.

Regarding measuring impact by setting targets for expected results from innovation initiatives, the pilots carried out have been measured and followed up. They also included set targets for the pilot. One important aspect, which should be taken into account in future, is to measure the time that the staff members are spending on different tasks and how much time can be saved via digitalization. This is one important measure from the city's perspective, if we think out smaller changes improving how tasks can be carried out. In the larger picture, all kind of positive environmental effects are important, and these are been moved forward in projects like IRIS and the target "Carbon neutral Vaasa 202x".

Vaasa hopes that IRIS can help the city to streamline certain aspects and functions, and that Vaasa can find good and functioning solutions and models to implement for improving life. In addition, the experience of being a partner in a Horizon2020 project and the experience from project management in IRIS is very important. The follow-ups have not been planned yet.

Summary

Vaasa is rating itself as an organisation with respect to the dimensions in The IMProve Method in terms of how well the city planning is going and how far it has come with implementation. 1=only started and 5=almost finished.

Table 10 Vaasa rating, based on The IMProve method.

	Planning Execution 1-5	Implementation execution 1-5
Innovation Strategy	1	0
Innovation Organisation and Culture	3	2
Innovation Life Cycle Processes	3	2
Factors Enabling Innovation	3	2
Results from Innovation	3	2

Example of best practice

Vaasa here gives an example in terms of the city's strategic innovation work, that IRIS can use as a best practice case.

The case with Wärtsilä's Smart Technology Hub, which was mentioned earlier, was one good example of the city's strategic work including a new way of working. The city was able to act very fast and get the planning of the area ready in a short time, which makes a 200 million Euro investment in Vaasa possible. Another similar example was the Giga factory project a few years back. In that case, the city of Vaasa planned and prepared a large area in the city for coming investments in a battery factory.

One good example of strategic innovation work has been carried out in some of the schools in Vaasa. By implementing digital tools, it has been possible to change the way of working. The changes have enabled to involve the parents better in school matters and the pupils are more engaged in the schoolwork. This was one case where it was possible to see what can be achieved, when there are dedicated people very motivated to push things forward and to do things in a new way.

3.3 Assessment of performance of IRIS Transition Tracks

In this section, and in following three sections, we have chosen to assess the project status from a transition track perspective. In each subsection is reports from all three lighthouses assessed and discussed. By using the transition track perspective, the context and market differences or similarities for each integrated solution becomes more visible. The transition track perspective is also similar to the Business model fact sheet methodology presented in milestone MS4.

The assessment of the launch reports is also used in the next chapter presenting road maps for IRIS cities. In that chapter we present the assessment of launch reports from a city perspective. By using the city perspective, the city authority's innovation management for each transition track becomes more visible.

3.3.1 Transition Track 1: Smart renewables and closed-loop positive energy districts

The objective for this transition track is to integrate:

a) a high share of locally produced and consumed renewable energy at district scale,
b) energy savings at building level reducing the citizens' energy bill and
c) energy savings at district level.

Demonstrated solutions integrate high renewables penetration like district scale PV and biomass for district heating, near zero energy housing retrofit, energy efficient low temperature district heating and smart public lighting that is energy efficient, powered by renewables and connected to the district energy system.

Comments and suggestions below are based on the following reports:

- D5.3 Launch of T.T.1 activity on Smart renewables and near zero energy district -Utrecht
- D6.3 Launch of T.T.1 activity on Smart renewables and near zero energy district - Nice
- D7.3 Launch of T.T.1 activity on Smart renewables and near zero energy district – Gothenburg

3.3.1.1 Comments and suggestions in Transition Track 1 – going from launch to city roadmap

The main market stimulation for the demonstrated solutions is contractual agreements between City authority and property developers. It is important to specify either solutions or restrictions in pollutions when the agreements are made. The specifications will drive business model enhancement and establish new partnerships and value chains.

A contractual agreement with the city authority forces the property developer to enhance its business model to include supplier partnerships to establish the required solutions. The property developer also needs to increase organizational competence and, in some cases, also include new services.

The City authority should pay the solution providers extra attention and make sure they can grow with rapidly increasing demand on the city market. This will support the bankability of their business model.

Market communications from the City Authority is also important to make sure the citizens understand that the new solutions are valuable for the citizens. This could be form different perspectives. Either to support the retrofitting the of properties and communicate directly with the tenants (citizens) or to present the city's long-term strategies for reducing climate impact to make them understand any risk in investing in a privately-owned apartment in one of the properties.

The business models presented does not relate to a future transformed market situation with the city where the solution has a large market share. Future market relations are important to include in the presentation as this presents possibilities for new actors and new investors. Large business potential with low risk supports bankable investments.

The business models present specific benefits with the technology solution. But, business model enhancement for the solution provider on the city market context is missing. The solution provider (e.g. property developer) should elaborate on how their established business model could be developed and enhanced by including the new IRIS solution.

3.3.2 Transition Track #2: Smart Energy Management and Storage for Grid Flexibility

The objectives for this transition track are to integrate smart energy management and renewable energy storage for

a) maximum profits of renewable power/heat/gas,
b) maximum self- consumption reducing grid stress and curtailment, and
c) unlocking the financial value of grid flexibility.

Demonstrated technical solutions include smart ICT to interconnect energy management systems at home, building and district level, and to integrate maximal renewables production (track 2), V2G storage in e-cars operated in car sharing systems (in Transition track 3) with additional stationary energy storage.

Comments and suggestions below are based on the following reports:

- D5.4 Launch of T.T.2 activities on Smart energy management and storage for flexibility Utrecht
- D6.4 Launch of T.T.2 activities on Smart energy management and storage for flexibility Nice
- D7.4 Launch of T.T.2 activities on Smart energy management and storage for flexibility Gothenburg

3.3.2.1 Comments and suggestions in Transition Track 2 – going from launch to city roadmap

There are different strategic opportunities on how the city could design the roadmap for this transition track. It is recommended that the city makes it clear in communication what the end goals are and how the roadmap include different phases to reach that target. For example, in phase 1 are all new built districts constructed with a new set of energy specification which includes a joint energy management system and a joint energy storage system. When there is a competitive business ecosystem in place older districts will be mandatory upgraded with new services.

Property developers engaged in the demonstration of solutions in this transition track have not yet identified how batteries for storage of solar produced electricity can enhance their business model. Electricity utilities see the benefit with batteries and local storage for providing power at peak load in the district. However, they have not commented this possible enhancement of their business model.

Electricity utilities core business is to deliver electricity (power and energy). In general, they have hard expanded their offering to energy management systems and services for energy efficiency. This as such a service are in conflict with their core business. For a successful implementation of energy management systems there probably needs to be an intermediary operator offering their services to property owners in a district. Offering to serve the district as an Positive energy District.

The City authority should support the establishment of energy distribution networks in the districts. It could either be a municipality owned network for Heating, cooling and electricity or it could be a private solution depending on the political governance. The city authority should also support the establishment of business platforms for energy transactions between supply and demand within the districts.

City impact goal ambitions and time plans is lacking in all three launch reports. It is not possible to understand about supporting activities in the city along the transition track. How is the impact goal and transition track communicated to citizens? What does the up-scaling plan look like, i.e. how will the market develop the coming years? How are decision makers working on policy's for investments in infrastructure or development of city policy's and regulations?

There are no comments or discussion on the launch activities in the other two cities in any of the launch reports. It would be beneficial for the knowledge sharing between the cities about develop innovative Business Models to demonstrate that both technical and financial risks are low enough for large scale investments in other EU cities with similar characteristics.

3.3.2.2 Business model facts for stationary batteries in buildings

One of the demonstrated IRIS solutions in transition track 1 is stationary batteries in buildings. An especial focus has been put on 2nd life with a hypothesis that these are economically most efficient.

The value proposition to the end-users is a positive energy building based on short term storage of solar electricity and the possibility of peak power shaving from electricity in the property.

The enabling IRIS solution as demonstrated in Gothenburg consists of a > 200 kWh electricity storage in 2nd life automotive (bus) batteries powered by 140kW local PV and an energy management system.

The enabling solutions is established by a number of actors along a value chain (or ecosystem) all having their business model. Each actor defines in their business model who are their customer and their

supplier. All actors must however also understand that they together deliver the value proposition to the end-user and share the revenues along the value chain.

The property owner should over time have a better electricity service and lower electricity costs from the solution. The property owner can choose to operate the solution themselves or outsource to a property manager. Which way they choose will in this case decide whom of the wo needs to recruit energy expertise to operate the solution.

In the same way should the battery leasing (or selling) company enhance their business model to make it work for leasing batteries to property owners or to property management companies. The grid operator needs to enhance their business model to work with property-based energy management systems. An so it continues along the value chain and in the ecosystem related to the enabling solution.

The transition track report would benefit of presentations of business model enhancements along the value chain. This and a joint strategy from actors in the value chain on how they together plan expand this business opportunity. Preferably also identifying whom of them who plans to take the lead in the expansion, e.g. the battery leasing company or the property management company?

The transition track reports would also benefit of presentation from the city authorities describing how they through policy and regulation supports (or plan to support) the scale-up of the enabling solution in city. And how the city imagines the future market situation with a substantial up-scaling of the integrated solution. Especially city with municipality owned energy utilities needs to be clear about if new solutions is part of the energy utilities future services or seen as an “competing” service.

3.3.3 Transition Track #3: Smart e-Mobility Sector

Integrating electric vehicles and e-car sharing systems in the urban mobility system offering

a) local zero-emission mobility,
b) lower household mobility costs, and
c) smart energy storage in V2G car batteries.

Demonstrated solutions include extensive deployment of (V2G) e-cars, exploitation of (V2G) e-cars in local car sharing systems, and district-wide smart (V2G) charging stations powered mainly by renewables.

Comments and suggestions below are based on the following reports:

- D5.5 Launch of T.T.3 activities on Smart e-mobility Utrecht
- D6.5 Launch of TT3 activities on Smart e-mobility Nice
- D7.5 Launch of T.T3 Activities on Smart e-mobility Gothenburg

3.3.3.1 Comments and suggestions in Transition Track 3 - going from launch to city roadmap

There are different strategic opportunities on how the city could design the roadmap for this transition track. It is recommended that the city makes it clear in communication what the end goals are and how the roadmap include different phases to reach that target. E.g. in phase 1 will all new built property

development have reduced number of parking place of which most of them are reserved for electrical solar charged and V2G vehicles in car sharing fleets. When a critical mass of vehicles in the city region is reached next phase is started and parking place throughout the city is equipped with electrical solar charged and V2G systems. In the final non-equipped parking space will be rebuilt into other purpose areas.

Utrecht is a frontrunner in e-mobility. Building upon this experience, a district wide V2G e-car sharing system has begun realization, offering zero emission mobility, decreasing household mobility costs, mostly powered by the sun. The rate of implementation is demand dependent, which enables learning experience about actual demand and business models to be used. The car sharing system is integrated with smart solar charging, using V2G charging systems that can load and unload the solar power stored in V2G batteries. As a result, the e-cars are mostly solar powered, grid stress is reduced thanks to the V2G storage, local air quality is improved, and children get more room to play since less parking space is needed.

The city of Utrecht incentivizes the use of car sharing systems. The municipality e.g. provides incentives to apply for a double-parking license in districts with paid parking for one car for households sharing the car in adjacent districts (so that the shared car may be parked in both parking districts of the shared owners). New construction districts in Utrecht have a high density. In these districts the municipality applies lower parking norm (parking-space that needs to be reserved per dwelling) and actively stimulated the development of MaaS concepts**.** The municipality of Utrecht plays an important role with its current project to place 150 smart charging stations throughout the city, based on local demand and the expected steep growth of the number of electric vehicles in the city.

Seen from the Nice city authority’s point of view, the expansion of EV adoption with the consequent integration of EVCI in the context of new real estate projects, is leading to a dramatic increase of the number of parking places equipped with charging points. This is possibly causing a significant impact on the electric power grid in terms of local peak power demand. To avoid the cost of oversizing the public distribution grid as an answer to the multiplication of urbanization projects coupled to this increase of the EVCI network density, flexibility management of EVCI seems to provide a part of the answer.

Gothenburg’s ambition for the selected demonstration and replication is to develop and demonstrate new solutions for integration of different solutions of mobility.

The district has adopted a “Green Travel Plan”, according to which a prerequisite for the densification of the campus area is that the total travel by car to the area will not increase compared to today's level. The Green Travel Plan contains references to city policy objectives for the city to grow and densify while reducing car traffic, to the city parking policy and to the region's goals for increased public transport. Shared mobility solutions will therefore be crucial for the expansion of residential housing and offices.

A Mobility as a solution to property developer as a long-term service may substantially increase revenues for property development. With this arrangement the property developer can apply for reduced amount of regulated parking space on the property. In Gothenburg, the regulated parking space on the property is 1,2 parking spaces per apartment. With a MaaS provider contracted the property developer can have this regulation reduced to up to 70%. This means that development of many more apartments could be an additional sellable area.

Partners in WP3 and WP8 are working together to support transition track development both in Lighthouse cities and Follower cities. Together with CERTH (Panos) in March 2020 IMCG agreed upon working together with them regarding the business model fact sheets. The first fact sheet produced was for Mobility as a Service, MaaS in Gothenburg with Trivector and EC2B at the housing cooperation Viva at the real estate company Riksbyggen. What IMCG is doing is to look at the business model value chain and this information will be added to the fact sheets that WP8 is doing. The fact sheets that were then produced regard battery storage, which is to be found in all three light house cities.

3.3.3.2 Business model fact sheets for innovative mobility services

One of the demonstrated IRIS solutions in transition track 3 is innovative mobility services. Here the main value proposition to the end-user is access to mobility solutions (cars or bikes) without owning a vehicle.

The enabling solution is a vehicle-sharing platform with different vehicles included (e.g. cars or bikes or public transport) and a digital booking system.

The enabling solutions are established by a number of actors along a value chain (or ecosystem) all having their business model. Each actor defines in their business model who are their customer and their supplier. All actors must however also understand that they together deliver the value proposition to the end-user and share the revenues along the value chain.

In the three lighthouse cities the driving business in the value chain differ a lot. In Utrecht the driving force is to use the battery in the electric car as additional short-term storage for from solar panel produced electricity. In Nice the driving force is to offer an alternative mobility service to owning your own car. In Gothenburg it is a business opportunity for property developers to produce leasable area instead of parking spaces, thus increasing revenues substantially.

The value chain and ecosystems differ between the three lighthouse cities due to the difference in driving force. In Utrecht the value chain is short and most of the value creation is created by one actor. In Nice and Gothenburg, the value chain is longer and mixed up with the ecosystem where potential suppliers just the same can be a competitor offering their services directly to the end-user.

The transition track report from Nice and Gothenburg would benefit of presentations of business model enhancements along the value chain. This and a joint strategy from actors in the value chain on how they together plan expand this business opportunity. Preferably also identifying whom of them who plans to take the lead in the expansion, e.g. the battery leasing company or the property management company?

The transition track reports would also benefit of presentation from the city authorities describing how they through policy and regulation supports (or plan to support) the up-scaling of the enabling solution in city. And how the city imagines the future market situation with a substantial up-scaling of the integrated solution.

3.3.4 Transition Track #4: City Innovation Platform (CIP)

Cutting edge information technology and data framework enabling solutions in Transition Track 1-3, maximising cost-effectiveness of the integrated infrastructure.

Next, the City Innovation Platform with open, standard based application program interfaces (APIs) provides meaningful data and information services for households, municipality and other stakeholders, allowing for a Data Market with new business models.

A common architecture, harmonized data models and a sustainable data governance plan ensure the interoperability and replicability of the solutions, transferring them from city to city.

There are open data portals, data warehouses, brokers, sensor networks, BI-tools and storage facilities to facilitate the collection, processing and visualisation of data and the provisioning of services. These systems support solutions like waste management, traffic flows and public lighting. The City Innovation Platform builds on these results and connects the dots between the different solutions by creating a common architecture and usage of standards, data models and governance practices.

The City Data Market and the service marketplace manage access to all data and services, with appropriate licenses and flexible pricing models in and across cities, and allowing real time KPI monitoring and benchmarking of smart energy and mobility performance

Comments and suggestions below are based on the following reports:

- D5.6 Launch of T.T.4 activities on City Innovation Platform and information services Utrecht
- D6.6 Launch of TT4 activities on City Innovation Platform and information services Nice
- D7.6 Launch of TT4 activities on City Innovation Platform and information services Gothenburg

3.3.4.1 Comments and suggestions in Transition Track 4 – going from launch to city roadmap

City impact goal ambitions and time plans is lacking in all three launch reports. It is not possible to understand about supporting activities in the city along the transition track. How is the impact goal and transition track communicated to citizens? What does the up-scaling plan look like, i.e. how will the market develop the coming years? How are decision makers working on policy's for investments in infrastructure or development of city policy's and regulations?

There are no comments or discussions on the launch activities in the other two cities in any of the launch reports. It would be beneficial for the knowledge sharing between the cities about develop innovative Business Models to demonstrate that both technical and financial risks are low enough for large scale investments in other EU cities with similar characteristics.

The CIP will serve as an essential infrastructure for the growing data-economy. How the infrastructure will be designed for access and governance is important as it will define the data-economy market. A comparison is the difference for business development using roads or railways for transport. Roads are accessible for all following regulations while railways are accessible through contract.

It is recommended to strengthen cooperation between the transition tracks and between cities.

3.3.5 General comments on business model adaptation

The reports presenting launch of transition track activities describes the different demonstrated solutions very well. The descriptions are usually written by the solution supplier (technology supplier) or the solution provider (the Property or utility provider). A recommendation is that the City representatives should contribute with a section to describes the city roadmap to reach the. impact goals with the transition track within the city. This section would also be important for the business model development as it would describe future demand within the city. It is recommended that all three perspectives are included in the launch reports.

The business model descriptions presented in the reports are mainly benefits for the service or product presented by the solution supplier. A recommendation is that the solution provider describes how the service or product enhance their business model and competitiveness and profit on the market. For example, how does the service or product make sure property developers win biding for land? How does the service or product reduce increase profit from property development or management?

The IRIS project supports the Lighthouse cities and their Follower cities to address their urgent need to deliver energy and mobility services in their cities that are cheaper, better accessible, reliable, and that contribute to a better and more sustainable urban quality of life. To achieve these impact goals the transition track activities could not only consist of technology demonstration but also activities related to policies, regulation and governance processes. It is recommended that the cities to appoint people and resources to validate and exploit business models. And also appoint people and resources for up-scale of transition district by district in the city region.

The Business Model and Finance (BMF) Task group today includes experts from 19 projects in the SCC program. The group share knowledge and methods for supporting more than 100 European cities with impact management in the projects. The BMF group recommends the projects to cooperate along thematic areas similar to the transitions track. This cooperation will increase knowledge sharing and building in city authorities. It will also produce a better communication to relevant industries and give them insights on how they could address the business opportunities along the different transition tracks.

4 Output to other work packages

4.1 Relevant output of WP3

WP3 is a horizontal work package and differs a lot from vertical work packages. For example, the objectives of WP3 are the objectives that the IRIS cities wish to accomplish. The purpose of WP3 is to support the city of Gothenburg, Nice, Utrecht, Alexandroupolis, Vaasa, Focsani and Santa Cruz de Tenerife to achieve;

The specific objectives of WP3 to *enable* bankable/investment grade solutions in practice, during and beyond project are:

1) Develop and exploit 30+ new business models for IRIS Smart City solutions, whereof 5+ bankable solutions put into practice and 20+ novel ideas incubated;
2) Enhancing all existing business models;
3) Increase replication potential;
4) Increase innovation management performance of LHs and FCs to greatly enhance replication capabilities of cross-sector innovative solution;
5) Efficiently support exploitation of European services, solutions and knowledge, developed in IRIS, to a strong growth market estimated globally at €1.3 trillion in 2020 leading to 20+ official IRIS deployment agreements signed;
6) Adapting, for IRIS already established financial instruments and financing solutions for the cities and service providers;
7) Secure continuum of deployment of IRIS solutions, knowledge transfer beyond project termination, efficiently handle Intellectual Assets.

This very deliverable supports the work of bullet 2 and especially bullet 3 and 4. Here WP3 supports WP5, WP6, WP7 and WP8.

WP3 is a horizontal work package meaning that the tasks and objectives are joint efforts for the Lighthouse cities. The cities will present their achievements on these joint tasks and objectives in their two upcoming deliverables: *Preliminary report on lighthouse demonstration activities (M48)* and *Final report on lighthouse demonstration results and lessons learnt (M60).*

We recommend the Lighthouse cities to start developing plans on how to initiate this work and how to initiate WP3 experts in these processes.

4.2 Relevant output of Task 3 Business model advancement and Smart Cities Innovation Management "Task Forces"

This task will facilitate city change efficiently in practice by:

- Developing approaches to systematically investigate business models (D3.6)

- Identifying successes and Achilles heels (D3.6)
- Drawing lessons that can drive business model exploration elsewhere
- Addressing and increase the cities present innovation management performance (D3.6)
- Adaptation of business model assessment frameworks to IRIS conditions;
- Extending the conceptual frameworks to reach a higher level of detail in business model mapping; Apply the frameworks to develop fine-grained descriptions of current business models;
- A tool for mapping actual business models and possible variations therein (D3.6)
- assess, support and provide tools for selected IRIS cities to continuously increase innovation management performance using the IMProve method
- Developing rational and effective Impact roadmaps for each IRIS Smart City. (D3.6)

Not only does this benefit the LH cities and the FCs, but the outcome also feeds into WP8, giving a more efficient and successful implementation and replication of IRIS solutions.

4.3 Relevant output of D3.6 IRIS City innovation management performance and roadmaps

This deliverable contains several tools that supports impact and innovation management as well as replication and exploitation of project results. The content will be of most value for WP5/6/7 and 8; Utrecht, Nice, Gothenburg and Replication (Vaasa with all FCs).

Tools to be found in this deliverable or in other WP3 deliverables:

- BUSINESS MODELLING & INNOVATION ECOSYSTEM - Business model dashboard-tool (D3.2)
- BUSINESS MODELLING – Business model canvas, the KER-method, Business model fact sheets, the Value Chain Design
- FINANCING – see D3.7 for overview of possible funding to apply for
- WORKING IN PARALLEL PROCESSES – the technical development go hand in hand with applying for funding to reach market impact – use IMCG Innovation Arrow to make sure many processes are ongoing at the same time
- IMPACT MANAGEMENT – tool developed together by the Business Model and Finance Task Group

As this deliverable is within in a task that is ongoing throughout the project, WP3 will use the remains of the time in the task to support the IRIS cities in their aim at becoming better at impact and innovation management.

4.4 Hands on activities where WP3 can support

As mentioned earlier, WP3 is a horizontal work package supporting the city managers of IRIS Smart cities. WP3 also supports solution providers that are the “born global” IRIS solution providers and want to scale-up their activities outside of Europe. To get WP3 support, both city managers and solution providers need to be wanting the support.

4.4.1 WP3 Support activities for the IRIS Lighthouse Cities and the solution providers

WP3 offers support to IRIS City managers in their impact management and their aim at making the results from the demo sites replicable and scalable. Here WP3 can support with:

The LH cities of IRIS Smart Cities have upcoming deliverables:

- D5.8 Preliminary report on Utrecht lighthouse demonstration activities (M48)
- D6.8 Preliminary report on Nice lighthouse demonstration activities (M48)
- D7.8 Preliminary report on Gothenburg lighthouse demonstration activities (M48)

These reports should contain a chapter on business models and how cities should best handle their innovation management in order to adopt the solutions demonstrated. WP3 supports the city managers of WP5, WP6 and WP7 with input to this chapter. A starting meeting on this will take place in January 2021.

A very strong recommendation is to look into the strategies and practices to investigate to what extent they are designed to ensure that results from demonstrators can and will be scaled and replicated. For example, is there a process in places ensuring that intellectual properties are handled in a proper way? Are other aspects than technical tested, to make sure that replication projects get enough funding? Are actors and individuals that will take the next step involved from the beginning? This will help to ensure they objective of putting into practice bankable business models over proposed integrated solutions, tested to reduce technical and financial risks for investors guaranteeing replicability at EU scale.

4.4.2 WP3 Support activities to for the IRIS Follower Cities

The follower cities are at this stage (late autumn 2020) ready with their replication plans. This means that they have stated what they would like to replicate and it's time to plan for how to finance possible replication. WP3 will discuss with WP8, lead of replication, regarding what FCs are most interested in and adopt the information accordingly.

4.5 Peer-to-peer sessions on: Support from other IRIS WPs

Actions on behalf of WP5/6/7 to support the innovation management process to ease the possibility to implement solutions from the IRIS project;

- INNOVATION STRATEGY & IMPLEMENTATION: The cities to learn from one another as suggested above.
- INNOVATION CULTURE: This is not something that you just can decide to have, you earn it. However, a good thing is to study the other cities and learn from how they work. An allowing

environment, where you are allowed to test things in order to develop new processes and improve work.

- TECHNICAL KNOWLEDGE TRANSFER: The FCs need a deeper understanding regarding the technologies behind the solutions. Each FC can identify one solution they need to dig deeper into in order to implement. The LC cities can provide sessions on these topics. Preferably by spring 2021. The demo sites play a crucial role here. Due to Covid-19/Corona it is not likely there will be study visits for a long time. Therefore, the LH cities are strongly recommended to make short movies showing the parts of the demo site that is a must to see for an engineer. This type of film differs from movie clips just showing the site as place to visit to get inspiration on how to develop a smart city. Both types of films are needed. The technical one could most likely be done by another engineer, using her or his smart phone.

4.6 Learnings from other projects

Learnings and takeaways from other projects are essential.

- CITIZEN ENGAGEMENT: Since innovations implemented by a city almost always have to do with problems that need to be solved in order to provide citizens with better and more sustainable services, it is crucial that the citizens feel part of the process. The City Exchange project provides a playbook regarding citizen engagement in smart cities: https://cityxchange.eu/knowledge-base/delivery-of-the-citizen-participation-playbook/

5 Conclusion & Recommendation: Roadmaps for cities and transition tracks

5.1 IRIS cities' Achilles heels and best practices regarding innovation management

Interviews with the cities provided totally different types of information from each city. This of course, makes it hard to compare the results. However, this report aims to highlight good cases and also point out Achilles heels to overcome in order to handle innovation management better. Even though the IMProve method is originally designed for companies, to discuss its content with the cities has proved very useful. For some cities, innovation management, is not a regular topic, but to highlight it and by engaging the Innovation management Task Force to interview the cities, innovation management and the link to replication was initiated.

Several of the IRIS cities don't have an innovation strategy. That is an Achilles heel that can be approached by aligning with, for instance Gothenburg, that can be a good role model in this case.

All IRIS cities understand the need to be able to provide excellent service to the citizens. This is the cities' driving force to implement new solutions, to replicate IRIS solutions within mobility, energy etc. In order to efficiently do so, not only do you have to have an innovation strategy in place, but also implement it. It will be a tool used in the cities' efforts to provide efficient, sustainable and effective services to the citizens. It will make both the cities' (the staff) and the citizens' lives easier.

Gothenburg has an innovation strategy where a lot of work has been put into. However, Gothenburg is not claiming to be best in class when it comes to actually do what the strategy implies. For implementation of a way to work with innovation, Utrecht might be the city to look at. Furthermore, when it comes to smart and innovative cities, a good thing to do is to position oneself as such. Here, Nice is a strong forth runner, that can inspire the other IRIS cities.

For the FCs there are barriers to overcome such as market conditions and regulatory contexts that limits replication, lack of funding and the lack of consumers' involvement. The LH cities need to better at describing their business models – an effort that will facilitate replication in the FCs. To enhance the ability in the IRIS cities regarding innovation management, there are some actions that WP3 has identified, where we can support. Furthermore, we have identified actions to be performed by some of the other work packages.

Table 11 The Achilles heels and best practices regarding innovation management in IRIS cities.

IRIS City	Achilles Heels	Best Practices
Gothenburg	*Has not had the ability to implement the innovation strategy *Had an innovation manager, but not anymore. It is not clear who will handle this task now * Has not developed an innovation management of transition tracks for the city. Therefore, there are no smart city market stimulation plan developed either.	*Has an Innovation programme (strategy) * The tech innovations demonstrated here, has great replication possibility * The science parks play an important role being collaboration platforms where the city participates and invest money * Has a district-by-district development strategy which have been deployed since the 1990-ies.
Nice	*Not clear who handles innovation management processes in the city * Has not developed an innovation management of transition tracks for the city. Therefore, there are no smart city market stimulation plan developed either.	*Has digital innovation document where smart city concept is addressed, describing how different dimensions should be handled by the city *Has clear focus areas: Energy management / Resilience and risk management/ the environment / new forms of mobility *Excellence in initiating major experimental projects testing new services; has become a large-scale innovation lab; living lab, building upon collaboration *Established itself as a pioneering innovation metropolitan area *Excellent in positioning the city on smart city rankings *IMREDD – a perfect example of a collaborative work for a smarter city

		* The tech innovations demonstrated here, has great replication possibility
Utrecht	*Does not have a separate Innovation strategy – it is integrated in the general business strategy for the city *Not clear who handles innovation management processes in the city *CIOs often are good at ideas regarding innovation and start the innovation process, but doesn't always have the capacity to work it through the next steps * Has not developed an innovation management of transition tracks for the city. Therefore, there are no smart city market stimulation plan developed either.	* The tech innovations demonstrated here, has great replication possibility *Has experience in market formation that seems replicable, because they put a lot of effort in scaling district by district, already, in Utrecht *Excellent at actually work with innovation *Lots of efforts put into capacity building and culture development *The mayor has made the decision to focus on data -driven solutions *Event though there are 40 business units in the city, there a management system to secure knowledge transfer for supporting innovation *Clear focus on energy and mobility transition
Applicable for all FCs	*Market and regulation contexts don't seem sufficiently mature to replicate from Nice – further efforts are needed for scaling *Market characteristics seem to be not far from what is required to the deployment of solutions developed in Utrecht	*The value of the technology developed in Gothenburg entails replication potential and the associated regulatory context observed in Gothenburg – presumably more "soft regulation" i.e. ways to involve citizens, than "hard regulation" which again is highly country specific – are likely to be immediately replicable
Alexandroupolis	*New technology – a challenge for local engineers/operators *Hard to find financing the implementing the technology *Lack of legislation for novel technologies	*A business incubator as well as activities for the promotion of entrepreneurship and innovation has been successfully implemented *Has clear focus on energy transition

	*Hard to find citizen acceptance and engagement to innovative solutions *Need strengthen IT support and project management *Barriers to successful innovation management are the relatively large bureaucracy, the lack of funding and the lack of know-how to raise funds through European mechanisms supporting the energy transition (EIB)	*Has an innovation strategy (2015-2019) *Has started its innovation journey by joining 2020-projects and implementing actions that facilitate its sustainable development. *Good at human resources management
Focsani	*Has no innovation strategy *Barriers for innovation management is the Legal framework, the creation of Population awareness, Financial issues regarding implementation and Energy poverty	*Has proved to be able to implement a large project regarding the creation of an ICT system, involving over 40 public institutions. *Has an open mindset towards innovation *Engaged in the Replication Plan *Has good IT structure *Strong local support of the local council and the mayor
Santa Cruz de Teneriffe	*No innovation strategy *Lack decision making criteria regarding choice of the best energy efficiency system etc *Knowledge transfer needed regarding business models, running of operations etc *The need to teach the citizens about energy savings and about new ways of travelling * Need to improve IT-support as well as the general innovation culture of the organization	*Strong on project management

	* The complexity of the administrative structure and the difficulties to create a useful need definition sheet.	
Vaasa	* No innovation strategy *Barriers for implanting innovations are; Lack of decision-making criteria for selecting energy solutions, Financing of investment and Clear business models.	*Excellence in providing pilot sites *Has a digital vision for the city *The citizens' perspective is taken into account

From the interviews it is clear that the cities approach innovation in different ways, probably as a consequence of differences in organisational and political set up, cultural aspects and individual efforts. It is hard to claim that a particular approach is better than the other, since they all have their merits. The purpose of this benchmark is instead to provide an opportunity for reflection and provide ideas for improvements.

One aspect is to what extend there is a need for a more general innovation strategy, as exemplified by Gothenburg, or one very much focusing on the Smart City concept, as exemplified by Nice. Another dimension is to what extent the strategy should take departure in opportunities and technology advances, or in societal needs as exemplified by Utrecht. Gothenburg and Nice have both used a somewhat top-down model, whereas Utrecht is more focusing on capacity-building and providing principles thereby enabling bottom-up action. The cities also vary in terms of how much they focus on the importance of establishing an innovation-oriented culture.

The cities also demonstrate many similarities. They all put emphasis on collaborating with all kinds of actors, provide support for SMEs, and include digitalisation. They also put the city into a regional and national perspective.

The purpose of this benchmarking activity is to enhance the dissemination and exploitation of the innovations developed within the projects, by increasing the fit of the strategies between the participants. Hopefully, this preliminary report has provided all three cities with ideas on how to develop their innovation strategy work even further and perhaps raised some common issues to be explored within the IRIS project.

A very strong recommendation to the local city coordinators is to look into the strategies and practices to investigate to what extent they are designed to ensure that results from demonstrators can and will be scaled and replicated. For example, is there a process in places ensuring that intellectual properties are handled in a proper way? Are other aspects than technical tested, to make sure that replication projects get enough funding? Are actors and individuals that will take the next step involved from the beginning? This will help to ensure they objective of putting into practice bankable business models over proposed integrated solutions, tested to reduce technical and financial risks for investors guaranteeing replicability at EU scale.

5.2 General road map – applicable to all IRIS Cities

The roadmap is focusing on inspiration of what's working and improvement of what's not working. Learning from others. For instance, Gothenburg is good at forming an innovation strategy, Utrecht proves to be good at getting something done and Nice is good at positioning themselves on top smart city rankings. The reason why cities would benefit from handling innovations is because it will give them better means to replicate and to scale-up new innovations that provides a solution to an identified problem. Replication from country to country is obviously constrained by different (national) regulatory contexts that limit the opportunities of replication.

Many cities work with innovation, but are not in a very structured way. For instance, not all work is measured, and therefore it's hard to prove that the results from innovation initiatives has provided an improvement. To choose among different types of innovations to implement in the city is hard. Decision-making criteria is crucial, but not always something that the cities have.

Some of the FCs of the project expect the results of IRIS to lead to that the city gets an increased capacity of municipality staff and stakeholders involved to design and implement novel integrated solutions towards energy transition and energy sustainability. Furthermore, one hopes for identifying funding sources to realize the integrated solutions supported by sustainable business model in order to foster the roll out. The expectations are high. As stated below some of the work packages of IRIS, including WP3, can help to a certain degree. But the cities also have to be dedicated and have a clear mindset on who, what function, in the city, that will handle it from the city perspective.

The FCs clearly shows that it is of utter importance to focus on the problems so that the city can offer the citizens better, more efficient, sustainable and effective services. Often, there is a complexity of the administrative structure and the difficulties to create useful descriptions of the problems and what is needed in order to solve it.

During the interviews with the IRIS cities there were a number of things said about what is needed for the city to be able to implement an innovation, thus replicate. The most relevant topics for the IRIS Smart Cities are (parenthesis states how many cities have suggested a certain topic being relevant):

- Decision-making – Example of comments on this topic: Create clear and simplified technical description of the solutions tested/implemented in LCs (for presentation to non-technical audience) / related to selected solution and possible options / Decision making process, especially in the identification of the stakeholders involved / Help to prioritize / Follow up solutions / interested in learning more about different kinds of models for how to prioritise among initiatives and manage them, where one strategy is to have a portfolio. (IIIIII)
- Investment - List investment costs, operation & maintenance costs, Technical solutions and calculations, capacity, power, investments, running costs, etc. / Technical solutions, especially in getting more efficient in calculations, capacity, power, investments, running costs / Running of operations, costs, maintenance (IIII)
- Financing - funding, incentives, financial issues (III)

- Business models - Give a detailed information regarding business models applied, Business models, especially Background of business solutions, subsidies and incentives, operator, profitability calculations, funding, etc. (III)
- Description of well-working decision-making process (II)
- Legal framework - Implementation of legal framework –buildings, district heating, public transportation (II)
- Citizens - Population awareness, Energy poverty, Examples of population awareness campaigns / Knowledge transfer regarding citizen's engagement activities, stakeholders' involvement, listen to their description of the problem (IIIIII)

WP3 can see that these factors constitute a typical roadmap for all IRIS cities – in order for the cities to be better prepared to implement new innovations:

First of all – create and implement an Innovation strategy. Communication skills is very important throughout the whole process. This strategy and the implementation of it should contain information about the following:

THE GENERAL ROAD MAP FOR IMPROVING INNOVATION MANAGEMENT IN ORDER TO BE ABLE TO REPLICATE ARE:

1. **Establish impact goals** clearly related to the transition track and packaged solutions with a story of Why the decision makers aim for this, How the targets will be reached and What the future city will consist of. The impact goal should also clearly describe the future business ecosystem in the city region.
2. **Decide upon a decision-making process** so that it is clear how the city will select among innovations to replicate and in what field and to manage the innovation initiatives. Identify what city function that will be the *innovation or Impact manager* and have the mandate to make decisions. In order to implement all this, an *innovative culture* should be nurtured – the base for all this is the *Innovation Strategy*
3. **Establish a time-line** for the roadmap and preferably also a district by district sequence to orient the local businesses about upcoming new quality criteria's.
4. **Gather information on costs of the investment** – should be discussed with LH cities
5. **Investigate what financing is suitable** – for instance, check D3.7 Financial solutions
6. **Understand the business model** – for instance, check available business model fact sheets, discuss with solution providers and LH cities to secure knowledge transfer, use relevant tools listed
7. **Plan for overcoming the national regulatory and legal framework barriers** – sometimes what is written can be re-interpreted
8. **Involve citizens** – learn from the LH cities and listen to the citizens *description of the problem* – which is key for being able to deliver better, smarter, more sustainable and *attractive services to the citizens – use relevant tool listed*

In order to make all the above happen, it is of essence to add a 9th step, namely;

9. **Monitor and Evaluate**– identify how the city would like to measure its' innovation management process.

Later in this chapter there are special sections that applies to each individual IRIS city. The "next steps" there relate to what came out of each interview with the cities regarding their innovation management capacities. The next step is a way to point at what is needed to move forward. By the end of the IRIS project WP3 will do a short round of interviews with the cities again, in order to see what has been improved. The seven bullets above are the main areas on which is city should dwell upon.

5.3 Recommendations to roadmaps for IRIS cities (M31-M60)

The Roadmaps for the different cities don't differ from each other that much. Below you will find that they many times are the same. The exchange information, cases demonstrations and knowhow transference. The interaction between all the experienced actors of IRIS is key.

A general recommendation is also that the City representatives responsible for the city's innovation management should contribute with a section in each transition track report which describes the city roadmap to reach city impact goals with the transition track. A transition track roadmap for the city is important for the business model development as it would describe future demand within the city. A recommendation is that to achieve these impact goals the transition track activities could not only consist of technology demonstration but also activities related to policies, regulation and governance processes. It is recommended that the cities to appoint people and resources to validate and exploit business models. And also appoint people and resources for up-scale of transition district by district in the city region.

WP3 is a horizontal work package meaning that the tasks and objectives are joint efforts for the Lighthouse cities. The cities will present their achievements on these joint tasks and objectives in their two upcoming deliverables: *Preliminary report on lighthouse demonstration activities (M48)* and *Final report on lighthouse demonstration results and lessons learnt (M60*). It is a general recommendation that the cities presents their roadmaps in these deliverables.

5.3.1 Recommendations to roadmap per IRIS Transition Track

The IRIS project supports the Lighthouse cities of Utrecht (NL), Göteborg (SE) and Nice Côte d'Azur (FR) and their Follower cities Vaasa (FI), Alexandroupolis (GR), Santa Cruz de Tenerife (ES), and Focsani (RO) to address their urgent need to deliver energy and mobility services in their cities that are cheaper, better accessible, reliable, and that contribute to a better and more sustainable urban quality of life.

To achieve this, IRIS works along Transition Tracks based on common challenges, encompassing 16 integrated solutions that cities can mix and match according to their characteristics and district specific needs. Track 1, 2 and 3 enhance energy efficiency and utilize grid flexibility by balancing supply and demand dynamically and by 2nd life battery and V2G storage, to allow increase of renewable energy production and roll-out of e-cars and e- buses. Track 4 supports this by data sharing, a common

architecture, use of standards, and governance practices accelerating innovation, standardisation and implementation of affordable smart applications.

The transition track approach will enhance collaboration between cities rapidly take advantage of joint scale together with other cities in the SCC-program. This will include requested benefits such as: aggregating demand, shared learning in critical domains, ecosystem orchestration, citizen-focused and accelerated implementation. It will support delivery of better value, and lasting impact.

Each lighthouse city should develop innovative business models to demonstrate that both technical and financial risks are low enough for large scale investments in other EU cities with similar characteristics. In the following chapters we comment on the Smart City Market stimulation plans in the three lighthouse cities presented in their launch reports and how cities vision of ecosystems and business models create value to end-users, the citizens.

Smart City market stimulation package is the sum of all action's city authorities take to support market development of prioritised quality criteria (or impact goal) e.g. fossil free mobility. Including promotion of solutions, policies, regulations, financial support to entrepreneurs, investments in infrastructure, data donation platforms. The impact goals benefits from being clearly related to the transition track and demonstrated solutions with a story of Why the decision makers aim for this, How the targets will be reached and What the future city will consist of. The impact goal should also clearly describe the future business ecosystem in the city region.

Established actors should work on how to enhance their existing business model based in line with the city impact goals and on innovative solutions demonstrated each transition track.

It is important to understand the market stimulation plan as this will set the scene for how the city plan to support the creation of value for the end-users, the citizens. The Lighthouse cities have urgent need to deliver energy and mobility services in their cities that are cheaper, better accessible, reliable, and that contribute to a better and more sustainable urban quality of life. The Market stimulation plan describes how the city imagine a future ecosystem in the city which deliver solution within the transition track. Without a vision of the future market it will be too risky for the stakeholders to engage in business model development.

In this chapter the authors have evaluated 12 transition track launch reports covering transition track launch activities from transition track 1- 4 in Utrecht, Nice and Gothenburg. Using the assessment tools presented in the methodology chapter comments on existing work and recommendation for future work is presented.

Integrated solution activities are well described in the transition launch reports. There are detailed presentations which gives a good understanding of potential and challenges for the demonstrated new solutions. The descriptions are usually written by the solution supplier (technology supplier) or the solution provider (the property manager or utility provider).

5.3.2 Recommendations to roadmap for Gothenburg

Road map Gothenburg includes the following steps and recommendations:

Innovation strategy

After having evaluated the innovation programme, as was planned, there should be a stronger implementation plan for the innovation strategy throughout the organisation. As part of the change management process, more than 2000 managers in the city administration have received a presentation regarding the importance of creating a culture supporting innovation.

Much effort has been put into relating the innovation programme to the established work on quality improvement. The core message is that both quality assurance and innovation is needed in order to create double loop learning. Still, much of the innovation work is done by a few enthusiasts.

In general, Gothenburg regards itself as much better at planning than on execution since the Innovation Programme is rather new.

Next step:

- The city needs to make sure that there are no silos – for instance; make sure open data is open so that all departments can use it. The toolbox for generating ideas with the purpose to move forward good ideas all the way to distribution is a good tool, but it will work better if the silos between departments are broken down. The departments "Intraservice" and "Consumer & Citizen support" are not close to all other departments and they don't have a natural way of getting close to them. So even though there are good tools, they have not yet reached their potential of getting used. Learn from Utrecht, that is a city with no innovation strategy, but very good at implementing innovation, but avoid ending up with a few enthusiasts doing all the work related to innovation.
- Increase the managers ability to support innovation by making it easier for ideas to flow through the organisation.
- Identify the core innovation management team. Everyone in the city should know where to go with questions regarding innovation.
- Even though the strategy might be to handle all kinds of innovations, learn from Nice and position the city so it will be easier to top rankings. For instance, Vaasa has a strong position within energy, Gothenburg, with the strong automotive cluster, might want to highlight the mobility sector, which is very close to the energy sector. Learn from Utrecht on how to make things happen.

Innovation culture

Work on success stories as they are considered as important success factors for the innovation programme work.

Next step:

- Identify how these stories should be communicated and to whom. Also consider how to measure the impact of this work. The communication work needs to be improved regarding this.

A city is not always an employer that encourages personnel to make mistakes. If a new innovation is to be implemented, there is not a guarantee that it will work, but if you believe in it, you will never know if it works if you don't try it.

Next step:

- In order to create an innovative environment and understanding the nature of the innovations that a city might want to implement, there must be a space where employees are allowed to test a bit

More communication is needed by the "innovation management team" – and they need to be identified and easy to find.

Next step:

- In order to move from baseline regarding innovation management, this culture must be clearly seen by all, not merely by some really driven people, like ones at the Intraservice department.

Innovation ecosystem

It is clearly stated in the programme, that collaboration between the public sector, academia, the business sector and the civil society is needed in order to create innovation. Gothenburg strongly believes in triple helix and the science parks are the arenas where this is shown most. Also, the academia runs incubators for new ideas. However, all this work effort is not related to actual problems the city is facing.

Next step:

- To improve the innovation management process the subjects addressed by the academia, science parks and incubators should be more linked to what the city has put up as targets for innovation, meaning that they need to focus on areas where the city need solutions in order for problems to be solved.

Overcome barriers for implementing innovations

Many people within the city want to work with innovation, but doesn't have the means to do it

Next step:

- Gothenburg is to increase the managers ability to support innovation by making it easier for ideas to flow through the organisation and bring down the silos.

Overcoming barriers for letting other cities implement the innovations from Gothenburg

Next step:

- Identify the key exploitable results from each innovative project, such as IRIS, and always work on business model fact sheets as well as create a value chain design, so that it is clear what type of actors that are needed in the city specific context in order to make this solution work
- Give good examples on how to finance the implementation of the innovations

- Put down to words your decision-making strategy when it comes to choosing among different types of innovations within a certain area.

Identifying KPIs for innovation management

Gothenburg has an innovation strategy but has not implemented it fully.

Next step:

- Set KPIs for level of implementation of the innovation strategy.

5.3.3 Recommendations to roadmap for Nice

Innovation strategy

The innovation strategy of Nice is described in the document called SMDEII. Some parts of the strategy work fine, some need improvement. Nice focus the strategy on energy management, resilience and risk management, the environment and new forms of mobility.

Nice is very good at positioning – through communication, marketing, ranking; has established itself as a pioneering innovation metropolitan area. In 2015, it joined the ranks of the top five smart cities in the world, competing with London, Barcelona, New York and Singapore

For Nice, innovation has become a governance model in terms of a solution for creating and managing the urban experience, and the driving force behind the city's economic development strategy. The innovation capacity is important and IMREDD has an important role here.

Next step:

- It is time for a re-examination of the different levers in order to consolidate strengths and weaknesses. Furthermore, there is a need to point out who is responsible for executing the strategy.
- Further enhance innovation as a governance model and prepare tomorrow's smart city expert and not only train the engineers for smart cities but hire them and include them in the city structure.

Innovation culture

It seems like Nice is a very innovation-friendly city, but it's hard to identify exactly where the innovations are handled and by whom. The city is preparing for the future's smart city by the "engineers for smart cities" course delivered by IMREDD. This is done in partnership and the city offers a multidisciplinary curriculum focusing on innovation and the entrepreneurial culture in the smart city.

Next step:

- Make it a bit clearer who handles innovation management and also break the silos between different departments.
- Create a plan for how these innovation students are going to be "integrated" in the city. Innovation studies preparing tomorrow's smart city is an excellent way to go about for capacity building. IMREDD's role could be enhanced.

Innovation Ecosystem

Nice is working as a large-scale innovation laboratory building a smart city through collaboration with companies, academia, SMEs, industry etc – IMREDD is a great example of this. The next step to move from baseline of innovation management is to take steps towards making a full scale or real-life innovation demonstrator out of Nice.

Next step:

- Make it clearer for start-ups and SMEs to get access to open data and to understand the problems the city is facing. In that way it will be easier for the start-ups and SMEs to offer the right types of solutions.

There are some major urban structural projects, that make it possible to provide an appropriate real estate offer and focus investments in order to reach a critical mass in key sectors. Flagship sites act as catalysts for the economic excellence ecosystems while also contributing to their visibility.

Next step:

- Use this visibility even more, so that citizens can follow what is happening in the city and feel more engaged.
-

Overcome barriers for implementing innovations

Not clear who handles innovation management processes in the city.

Next step:

- More clearly describe the procedure the city will take in order to implement innovations, and replicate. This will be helpful not only in this project but in others.

Overcoming barriers for letting other cities implement the innovations from Nice

Next step:

- Identify the key exploitable results from each innovative project, such as IRIS, and always work on business model fact sheets as well as create a value chain design, so that it is clear what type of actors that are needed in the city specific context in order to make this solution work
- Give good examples on how to finance the implementation of the innovations
- Put down to words your decision-making strategy when it comes to choosing among different types of innovations within a certain area.

Identifying KPIs for innovation management

Ranking: The implementation of innovative solutions is prerequisite for their duplication and deployment at regional level, making it possible to validate the city's role as a regional economic driving force, increase the national and European visibility of its smart metropolis strategy. Nice was highly ranked 2015.

Next step:

- The city needs to continue working on this.

5.3.4 Recommendations to roadmap for Utrecht

Innovation strategy

There is no innovation strategy. The CIO office tries to support innovation agents in the different departments and help them with approaches regarding on how to go about innovating your process, with a focus on agile principles. Emphasis is put on becoming smarter at defining and describing the problem they are facing. The Office teaches them how to do design sprints focusing on the problem and help them with structuring the process and the disciplines they need involved.

Utrecht does not have such an explicit plan for technology adoption, since they believe one size does not fit all. The development often depends on to what extent the city owns the infrastructure and can be innovative, and the work is often dependent on the drivers of the other players in the ecosystem.

Next step:

- Create an innovation strategy. Learn from Gothenburg and study the one that they have done. A toolbox for generating ideas, develop and test, implement and scale-up and distribute has been created in Gothenburg. Also see how Utrecht's natural way of implementing innovation can be done following a strategic plan for it.
- Make sure that you have a decision-making strategy when it comes to choosing among different types of innovations within a certain area.
- Since the Utrecht City Mayor decided to focus on IT and data-driven solutions, Utrecht has a much larger capacity to develop this and are able to combine data from different sources and since Utrecht is a front runner in creating solutions – these topics could be the ones that Utrecht could position itself within.

Innovation culture

The city has created a culture where managers see the ability to innovate their processes, which often involve digitalisation. The city has created a culture where the managers see the ability to innovate their processes, which often involve digitalisation. It is an emergent strategy that comes from the challenges.

In Utrecht, top management had several mandatory master classes on innovation. They also have a program for four years for data-driven solutions where managers had to do two pilots regarding data-driven solutions, working with smaller companies.

Next step:

- In order to move from baseline regarding innovation management, this culture must be clearly seen by all, not merely by some really driven people, like ones at the CIO office.

The city uses a design thinking process for innovation, which is a solution-based approach to solving problems. Focus are on the human needs involved and the process includes how to fund your solution and creating a business model of the service being developed.

Next step:

- Re-organise by involving the innovation agents. New projects are started as a consequence of initiatives in the cities, and these are realised with different European partners. They consider projects to create a good infrastructure to spread ideas and experiences.

Innovation ecosystem

The innovation ecosystem seems very well developed.

Next step:

- Utrecht is good at implementing innovation but could helped by forming a strategy for it so it becomes more structured.

Overcome barriers for implementing innovations

Next step:

- The city might benefit from really dedicate a function/person as innovation manager, so that all barriers can be identified and worked on.

Overcoming barriers for letting other cities implement the innovations from Utrecht

The city uses a design thinking process for innovation, which is a solution-based approach to solving problems. Focus are on the human needs involved.

Next step:

- Knowledge transfer regarding this design thinking process – both with the citizen focus and business model creation in mind

- Work on success stories as they are considered as important success factors for the innovation programme work. Identify how these stories should be communicated and to whom. Also consider how t measure the impact of this work.

5.3.5 Recommendations to roadmap for Alexandroupolis

Innovation strategy

There is document similar to an innovation strategy (2015-2019). The city ranks itself 3 (1 being only started, 5 being almost finished) regarding planning execution and 2 on implementation execution.

Next step:

- Update the existing document and create an innovation strategy. The city would benefit from positioning itself within a certain field., most likely energy. For creating the strategy, Gothenburg can be a good role model. For actually implement a way of work, Utrecht might be the city to look at. And to position oneself within a certain field – here Nice is a strong forth runner. The innovation strategy could very well include a description upon how the decision-making process should go about.

Innovation culture

Being part of H2020-projects and starting up an incubator are the first steps the city has taken in order to enable an innovation culture. Furthermore, the city states communication being an important part of enabling an innovation culture. The city ranks itself exactly the way here as it does on innovation strategy; 3 on planning execution and 2 on implementation execution.

Next step:

- Make sure that the city is allowed to test things and make mistakes. Also see to that the communication with the citizen is not a one-way communication, but a dialogue.

Innovation ecosystem

The city often partners with both private and public organisations, academia and institutes and subcontracts innovation processes when required. Cooperation with other organisations is performed through memorandums of cooperation or subcontracting. Any company, regardless size, can participate in the calls for tenders published by the city.

Next step:

- Citizen engagement is a crucial part that needs to be included in the teams working with innovation. Communication should be prioritized, and the citizens need to feel engaged.
- Alexandroupolis will continue to develop smart low temperature district heating. It's already on-going in the Traianoupolis area for 22 public buildings. By now it is probably getting clear what actors are involved in order to make this happen. This is important work to note. Furthermore,

the city is to state what other smart solutions and related business models they are interested in. By now it's time to be more specific and engage with the LH city/cities that demonstrates these.

Overcome barriers for implementing innovations

The city states that IT-support, project management and IPR management are barriers for good innovation management. Also, the relatively large bureaucracy, the lack of funding and the lack of knowhow to raise funds through EIB. Further, there might be a technical barrier for the local engineers.

Next step:

- Identify funding sources to realize the integrated solutions supported by sustainable business models. Regarding funding, Alexandroupolis could read D3.7 regarding Financial instruments, to get an overview on what there is on the market, and to see if what is listed there provides more information than what Alexandroupolis already has found through their own searches. Further, the city needs clear business models for the energy solutions that will be implemented. This calls for the city to engage in discussions with the lighthouse cities.
- The city will increase its capacity of municipality staff and stakeholders involved to design and implement novel integrated solutions towards energy transition.
- See to that there is a knowledge transfer on a technical level during the project duration. Alexandroupolis is keen to learn from other smart solutions and related business models.
- See if lobbying towards change of legislation supporting innovations is possible.
- Largely dive into citizen engagement, as they are key to the energy transition. Study the cases of the LH cities and learn from them. What are their best practices? Can you adopt simple citizen engagement activities?
- Decide upon a decision-making process – this could very well be part of the innovation strategy.

5.3.6 Recommendations to roadmap for Santa Cruz de Teneriffe

Innovation strategy

There is no formal innovation strategy. There are innovation actions that are carried but there is work to be done in order to go further on this. There many coordinated initiatives in different areas but there is not a plan. The city ranks itself 2 (1 being only started, 5 being almost finished) regarding planning execution and 2 on implementation execution.

Next step:

- Create an innovation strategy and include how to make decisions regarding what specific solutions to implement. Since all city actions, including innovation, are developed considering the goals of the Covenant of Mayors as well as the Sustainable Development Objectives today, it would be suitable to write that in the innovation strategy. The innovation strategy would benefit from stating that the city demands of all private contractors that they must comply with certain innovation criteria.

Innovation culture

The city encourages the sharing of ideas, clearly communicates the objectives pursued, and achieve employee involvement, promotes collaboration and meetings and encourage that motivation is improved by positive feedback to employees. The city ranks itself 1 (1 being only started, 5 being almost finished) regarding planning execution and 1 on implementation execution.

Next step:

- Through IRIS further develop skills knowledge transfer to the City Council to generate new services of value for the citizens as well as to improve and make the city's internal processes more efficient. Provide the means for an improvement of the innovation culture in the organization.

Innovation ecosystem

Santa Cruz municipality has several collaboration agreements with public universities and local NGOs. On the hand of the companies, the public procurement does pursue competitiveness for a better efficiency and democracy, so there is not further cooperation with companies except from public procurement process.

Next step:

- Further investigate public-private partnerships in order to help local innovation ecosystem accordingly with the regulations.
- Implement the solutions:
    - Sun houses and Krokslätt office building
    - Near-zero energy retrofit in social houses
    - ElectriCity
    - Bus and tram priority

Overcome barriers for implementing innovations

The IRIS project represents an opportunity to learn from the LCs and facilitate Santa Cruz's local replication processes.

Next step:

- Bring innovation processes from LC to the Santa Cruz administration This helps to reflect on internal processes in order to improve. Furthermore, there is an interesting knowhow exchange in technological level. A decision-making process must be put in place, especially in the choice of the best energy efficiency systems and amortization periods, and in combing household energy management measures with global measures.
- The complexity of the administrative structure and the difficulties to create a useful need definition sheet need to be overcome. Through the innovative activities of IRIS the expected

results are for the city be able to provide an efficient, sustainable and effective service to citizenship.
- An improvement on public-private partnership initiatives and policies. Enabling success in the IRIS project are; the exchange information, cases demonstrations and knowhow transference. The interaction with experienced actors is key.
- Learn more about how to communicate efficiently with households/residents, in the field of energy saving, and make them accustomed to using their own vehicle and not public transportation, which demands to do educational activities as well as improving public transport.

5.3.7 Recommendations to roadmap for Focsani

Innovation strategy

Focsani doesn't have an innovation strategy, but a city strategy and an urban mobility plan. The city rates itself 1 (only started) on both planning execution and implementation execution of such a strategy.

Next step:

- Develop the existing plans so that they also contain a part focusing on how the city will handle innovation, to better show how replication is intended. A good thing will be to study both the innovation strategy of Gothenburg and WP8 Replication Vaasa's deliverable regarding replication tool-box. A good thing would also be to decide upon a certain area – mobility or energy – in which Focsani would like to position itself.

Innovation culture

Has a positive mindset towards innovation and a strong IT-structure, but rates itself 1 (only started) regarding planning and implantation of innovation culture.

Next step:

- Innovation is not part of any department, but could be made a natural part of it since the departments within mobility, energy etc regards the future within in this fields. An innovative culture will grow better if it is allowed to make mistakes and the personnel is allowed to test different things. To further work on increasing local support within the own organisation is crucial and something that could be highlighted at the occasion of the consortium meeting to be held in Focsani during the IRIS project.

Innovation ecosystem

Focsani has stated what the city wants to replicate in terms of solutions.

The city has in the past proven that it is good at large-scale collaboration; together with companies the city developed and implanted an ICT system with great success.

Next step:

- Needs to take the learnings from the success story mentioned above and needs to identify what actors in the innovation ecosystem that are needed in order to implement;
  - Near-zero buildings for administrative buildings
  - Increasing energy efficiency in the district heating system
  - E-buses and bicycles
  - CIP and management for city traffic, district heating system and public lightning system

Overcome barriers for implementing innovations

Focsani has listed barriers for implanting innovations,

- Legal framework
- Population awareness
- Financial issues
- Energy poverty

Next step:

- Study the legal framework and see if there are policy regulations that could be altered through lobbying. Gothenburg works on soft replication meaning that working with citizen engagement is major. Inspiration could be taken from there. D3.7 Financial instruments is one way to start looking into how to finance implantation of solutions.

5.3.8 Recommendations to roadmap for Vaasa

Innovation strategy

The City of Vaasa does not have any innovation strategy – different pieces of the innovation work are divided between many different departments and teams.

Next step:

- Develop the innovation strategy together with the digitalisation manager. It should be developed in close cooperation with for instance the regional development company VASEK or similar partners in order to create synergies and link it very strongly to the interest of companies in the region. It should cover the actions going on in the region, not just that what the city is doing Vaasa has not got any innovation strategy, therefore the question is not relevant. The national Sustainable Development Goals should be in the strategy.The city brand and how Vaasa wants to position itself will be part of the innovation strategy.

Innovation culture

The city has a culture of working on pilots and the city has the IT support needed and skilled staff members within project management. Vaasa is very much aware of the city as a brand. It's hard to convince people that an organization is very innovative if computers and phones are from the 90s.

Next step:

- Convince people that there is a need to do something and if possible, show that a new way of doing things will lead to lower costs, changing things will not be a problem.
  Even though Vaasa one day decides to work in a new way, it can take years to change the behaviour of 5 000 staff members. This is the hard work and for this, Vaasa needs an innovation strategy and a plan for implementing it in the everyday working life. In addition, there is a strong need to start pushing an innovative culture even more and to create better platforms for internal communication and knowledge exchange.
- Vaasa will continue to work with the city branding, a way to attract the "right" people. An innovative culture is very important also in this respect. In the larger picture, the city services including schools and kindergartens will affect which people Vaasa can attract as new inhabitants and taxpayers. The city should be even better to promote Vaasa as the place to live and work. The first step is to get people to consider moving to Vaasa.

Innovation ecosystem

The City of Vaasa has long tradition in triple helix cooperation, and cooperation between companies, academia, public sector and NGO are a natural part of daily work as well as acknowledged in the city strategy. Vaasa aims at being a front-runner when it comes to regional cooperation and is aiming for support in both directions, that the organisations the city is supporting are supporting the city in some way, for instance by improving Vaasa's image or increasing the number of working places in the region.

Vaasa intends to replicate the low temperature district heating.

Next step:

- Vaasa need to identify the actors in the ecosystem that needs to be involved in the implementation in Ravilaaksо. Vaasa needs to learn about business models and also other solutions.

Overcome barriers for implementing innovations

Vaasa is keen to know more about available basic funding. Further, the city has identified communication being an important part of the innovation management work.

Next step:

- Needs to form a system that enables at least some funding for innovative initiatives. Also, there is a need to work on decision criteria for selecting energy solutions and also engage in knowledge transfer regarding business models.
- Create more efficient internal communication channels.