



Pop-Machina

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D5.1 Pilot profile report

Profiles and cross-case analysis
of seven pilot cities

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25/03/2020

<http://www.pop-machina.eu>

Abstract

The Pop-Machina project is an EU-funded research project that aims to explore how the maker movement can contribute to cities' transition to the circular economy. The project will use seven cities as case studies, called 'pilot cities': Leuven, Venlo, Istanbul, Thessaloniki, Piraeus, Kaunas, and Santander. Working with the local municipalities, the project will engage with and scale up existing bottom-up initiatives in the maker movement and the circular economy to create a 'circular maker community'. This deliverable, D5.1 Pilot profiles report, provides a first glimpse of the existing resources, needs, goals, and barriers in terms of creating a 'circular maker community'. The seven cities have each organised a pre-designed workshop with local stakeholders and recorded their responses. The results of these workshops have been collected and summarised in this deliverable as seven 'pilot profiles'. The seven pilot profiles are then compared with each other, resulting in a cross-case analysis that identifies major themes that have appeared repeatedly across multiple cities. The findings of this deliverable will be used as a guide for the next steps of the Pop-Machina project.

This report constitutes Deliverable 5.1, for Work Package 5 of the Pop-Machina project.

February 2020

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1. Summary

The Pop-Machina project is an EU-funded research project that aims to explore how the maker movement can contribute to cities' transition to the circular economy. The project will use seven cities as case studies, called 'pilot cities': Leuven, Venlo, Istanbul, Thessaloniki, Piraeus, Kaunas, and Santander. Working with the local municipalities, the project will engage with and scale up existing bottom-up initiatives in the maker movement and the circular economy to create a 'circular maker community'.

This deliverable, D5.1 Pilot profiles, provides a first glimpse of the existing resources, needs, goals, and barriers in terms of creating a 'circular maker community'. The seven cities have each organised a pre-designed workshop with local stakeholders and recorded their responses. The results of these workshops have been collected and summarised in this deliverable, into seven pilot profiles. The seven pilot profiles are then compared with each other, resulting in a cross-case analysis that identifies major themes that have appeared repeatedly across multiple cities. The finding of this deliverable will be used as a guide for the next steps of the Pop-Machina project.

2. Terms/definitions/abbreviations

CE	Circular economy
D5.1	Deliverable 5.1
EU	European Union
KPIs	Key performance indicators
NGO	Non-governmental organisation
SME	Small-medium enterprise
T5.1	Task 5.1
TUD	Delft University of Technology
ULL	Urban Living Lab
WP5	Work package 5

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4. Introduction

4.1 The Pop-Machina project

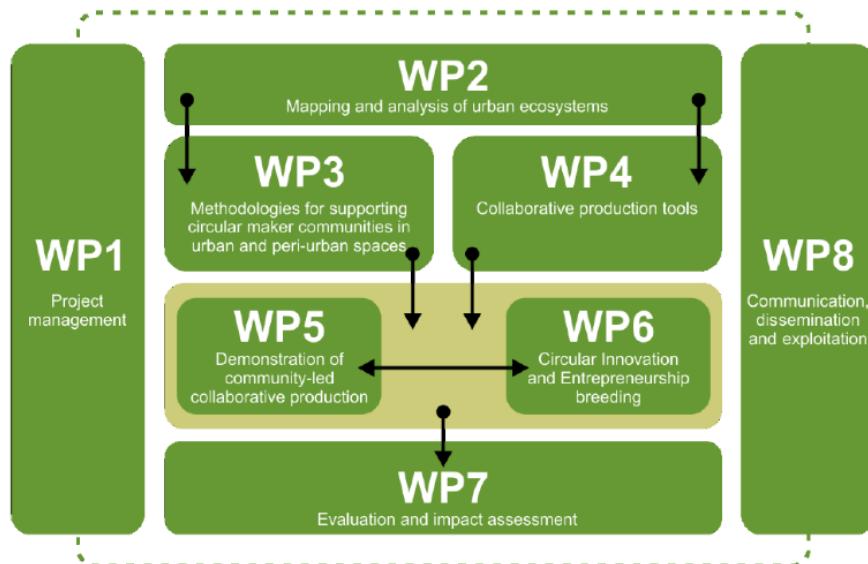
Pop-Machina is a Horizon 2020 project that seeks to highlight and reinforce the links between the maker movement and circular economy in order to promote environmental sustainability and generate socio-economic benefits in European cities.¹ The project will use seven cities as case studies, called ‘pilot cities’: Leuven, Venlo, Istanbul, Thessaloniki, Piraeus, Kaunas, and Santander. Working with the local municipalities, the project will engage with and scale up existing bottom-up initiatives in the maker movement and the circular economy to create a ‘circular maker community’. By the end of the project, each pilot city will have:

- a ‘circular makerspace’;
- a digital platform connecting makers;
- a training programme on fabrication skills in the circular economy;
- a training programme on entrepreneurship for local makers.

4.2 Work Package 5 (WP5)

WP5 is one of eight work packages in the Pop-Machina project. The purpose of WP5, ‘Demonstration of community-led collaborative production’, is to take methodologies and tools developed in WP3 and WP4 and apply them to the seven pilot cities. The diagram below shows this process. Throughout the work package, the WP5 leader (TUD) will work with local municipalities to set up and operate a makerspace, along with its supporting services.

Figure 1. Work packages and knowledge transfer of the Pop-Machina project



¹ For more information, please visit the project website, <https://pop-machina.eu/>, and EU Grant Agreement, <https://cordis.europa.eu/project/id/821479>

WP5 will produce four deliverables: D5.1 Pilot profiles (this deliverable), D5.2 Pilot setup and deployment plan, and D5.3 & D5.4 two reports on the operation of the pilots. D5.1. Pilot profiles will create a first overview of the seven case studies, which will inform the next deliverable. D5.2 Pilot setup and deployment plan will then provide a detailed plan of the operation of the city's makerspace and its associated activities. This plan will be co-created by WP5 partners, local municipalities, and local stakeholders. Once the makerspaces and associated activities have been set up, D5.3 & D5.4 will report on the operation of the pilot projects.

4.3 This deliverable: D5.1 Pilot profiles

The purpose of this deliverable is to gain a first understanding of the seven pilot cities in terms of their strengths, weakness, goals, barriers, and stakeholders, as well as their initial plans for their local circular maker community. In order to do this, the seven municipalities were asked to discuss these topics with local stakeholders using a workshop format. The results of these discussions were collected and analysed in this deliverable. For more details on the methodology of this deliverable, please refer to the next section, Paragraph 5 - Methodology.

This deliverable contains the methodology, pilot profiles, cross-case analysis, conclusion, and caveats. The methodology section explains the process of creating this deliverable. This covers how the workshops were designed, how the workshops were run, how the data was collected, and how it was analysed. The pilot profiles section provides a profile of each of the seven cities - it is a summary of the workshop results for each city. The cross-case analysis section compares the results of the seven cities to each other and identifies important themes and trends that emerged from the analysis of the seven workshop results. The conclusion summarises this deliverable's findings and proposes the logical next steps of WP5. Finally, the caveats section explains the weaknesses of this deliverables' methodology that could be improved upon in the next steps of WP5.

4.4 Key performance indicators (KPIs)

In order to evaluate the success of the Pop-Machina project, KPIs have been established for all work packages of the projects. Below is a brief summary of KPIs associated to this deliverable. The KPIs covered by this deliverable (D5.1) are:

- KPI-10. Socio-economic contexts analysed and optimised based on project outcomes: 7;
- KPI-11. Spatial urban structures (city and/or neighbourhood level) analysed and optimised based on project outcomes: >7.

4.4.1 KPI-10. Socio-economic contexts analysed and optimised based on project outcomes: 7

This KPI also concerns D2.1; D2.2; D2.4; D2.5; D5.2; D5.3; D5.4; D6.1; D6.2; D6.3; D6.4.

This KPI will be partially addressed by T5.1, through the integration of socio-economic and socio-cultural aspects into the pilot profile workshops. For each pilot city, the potential for maker communities and circular economy models is identified by workshop participants, following perceptions and expertise regarding the local social context.

NB: In the Grant Agreement, KPI-10 was not attributed to D5.1. However, in developing the pilot profile workshops, it was found that KPI-10 is indeed - partially - relevant for D5.1.

4.4.2 KPI-11. Spatial urban structures (city and/or neighbourhood level) analysed and optimised based on project outcomes: at least 7

This KPI also concerns D2.1; D2.3; D3.1; D5.2; D5.3; D5.4; D6.1; D6.2; D6.3; D6.4.

This KPI will be partially addressed by T5.1, integrating aspects of urban layout and development within the pilot profile workshops. In each pilot city, the potential for maker communities in urban layout and development is addressed through perceptions and expertise of the workshop participants concerning allocation of land, infrastructure, and resources.

4.4.3 KPIs mentioned in the Grant Agreement but not included in D5.1

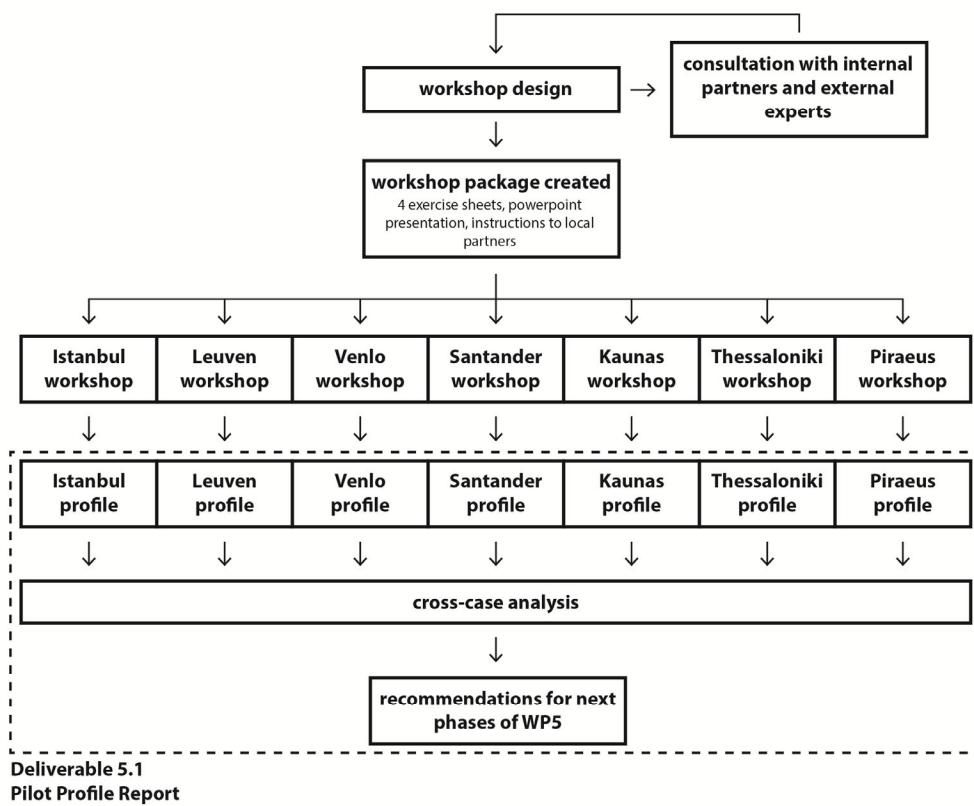
KPI-21. Remodelled buildings and/or open spaces: >7.

This KPI is not relevant for D5.1, but part of other deliverables, notably: D2.1; D2.3; D3.1.

5. Methodology

5.1 Overall methodology

Figure 2. Diagram of overall methodology



It was decided in the early stages of the Pop-Machina project that the first deliverable of WP5 will be created based on running seven ‘pilot profile workshops’ in the seven pilot cities. The municipalities would run the workshops in their city, in the local language, without the presence of the WP5 leader, TUD. This idea was presented to and agreed by the consortium in the project’s kick-off meeting in Leuven in June 2019.

TUD then developed the workshop by considering what information is needed later on in the pilot operation of the Pop-Machina project. Experts from a similar research project, ‘Cities of Making’² were consulted during the process of designing the workshop. The Cities of Making project chosen

² <https://citiesofmaking.com/>

as a reference because it was the only project found that covered both the topics of circular economy and making in the city; whereas other considered projects focused only on one of the two topics.

As a result, a workshop presentation, schedule, and corresponding exercise sheets were created to facilitate and concentrate discussions during the workshop. More details of the exercise sheets are in Paragraph 5.2 - Exercise sheets.

The first draft of these workshops was tested individually with the municipality of Venlo in their office in September 2019. After some small improvements, the workshops were tested again, this time with the seven municipalities during the project's second consortium meeting in Venlo, in November 2019. The municipalities provided a lot of feedback, most of it focusing on simplifying the workshop so that it was easier to understand for local citizens.

After the two tests of the workshop, a final version was produced. A toolkit was produced to help municipalities and local academic partners run the workshop without supervision from WP5 leader, TUD. The toolkit included an instruction sheet on how to run the workshop, a PowerPoint presentation used to guide the workshop, four corresponding exercise sheets to guide discussions, and a template for municipalities to submit the results of their workshop. These materials were then translated to the local language of each city by the municipalities or local academic partners.

Using the provided toolkit and instructions, each municipality ran a workshop in their city, during the period of November 2019 to January 2020. For each city, local stakeholders were invited by the municipality to a half-day workshop. On the day of the workshop, participants used the exercise sheets to discuss pre-defined topics, and these discussions were recorded by the municipality. The exercise sheets filled-in by participants were then translated back into English by the municipalities or local academic partners, and sent to TUD to be analysed. Some cities also deeply analysed their workshop results themselves can come up with clear conclusions for next steps of the project in their city.

Once TUD collected all the results, they were combined into an excel sheet, which can be found in the annex and online.³ The results were categorised according to the exercise sheets and topics of discussion during the workshops: past, resources, needs, goals, barriers, stakeholders, values, outputs, and actions. Each category was then further separated into four themes: industry, society, sustainability, and urban development. These were chosen after discussion with the consortium, especially with WP2 partners.

The categorised results were then used to create a pilot profile for each city, which can be found in Section 6 of this document. Each profile follows the same structure, listing out each city's past, recourse, needs, goals, barriers, stakeholders, next steps, and urban strategy.

The results were then used to conduct a cross-case analysis across the seven cities, which can be found in Section 7. The structure of the analysis is similar to the pilot profiles - past, resources, needs, goals, and stakeholders. Because of the different interpretations of the cities, fewer topics were compared across the seven cities. Within the cross-case analysis, common topics discussed by many cities were extracted and highlighted. Important common topics are listed out in 8.1, Summary of findings.

5.2 Exercise sheets

In order to ensure that the workshop discussions are focused on specific topics relevant to the Pop-Machina project, exercise sheets were created to guide the discussion amongst participants. Four exercises were created: the city timeline, the project ecosystem canvas, the stakeholder canvas, and the city mapping.

³ https://docs.google.com/spreadsheets/d/1PO4xfXRyPuqaylh_FRJ6JoKFXOQAFGX7XdrIshOfQLU/edit?usp=sharing

5.2.1 City timeline

Figure 3. City timeline exercise sheet

Past Industrialisation - Now	Present Now	Future Now - 2050
Industry and making in the past  How did industry and manufacturing affect the citizens of your city historically? How did industry affect trade or politics?  What kind of industries did you have in the past? How did these industries appear and disappear?  Were there sustainable ways the city manufactured things in the past? Who participated in these sustainable ways of making?  How did industry affect the growth or shrinkage of your city in the past?	Resources (strengths)  What are the stakeholders, policies, and societal trends that are improving things right now?  What are the industries that have in the city? What knowledge and skills in production do citizens have right now?  What are some sustainable ways of making we are using right now? What stakeholders are working with sustainability?  Are there areas in the city that are awaiting urban development? Or areas in the city that are in decay?  Are there upcoming events in the city that the Pop Machina project could participate in? (Festivals, biennales, conferences?)	Goals for the future (opportunities)  Which stakeholders should the city focus on in the future, in terms of sustainable production?  How should industry develop in the future in this city? What kinds of industries have the potential to develop?  Does the city have any goals for sustainable production? What are your opinions and suggestions for these goals?  Which areas of the city would be suitable for sustainable production in the future? Which area of the city would benefit the most?
Needs (weaknesses)  What are the social problems in your city? Which citizens are vulnerable and in need of help?  What are the industries that have left the city? What knowledge and skills in making are citizens lacking right now?  What are some un-sustainable ways of manufacturing we are using right now? What stakeholders are working unsustainably?  Are there areas in the city that are in decay? Are there problem neighbourhoods? Why are they problem neighbourhoods?	Barriers for the future (threats)  Which stakeholders could be against sustainable production in the future? What are the societal barriers?  How might industry develop badly in the future in this city? What kinds of industries might be unsustainable / create social problems in the future?  What are some of the city's strategies that could negatively affect the sustainability of the city?  Which areas of the city could deteriorate in the future? Why?	

The purpose of the city timeline is to make a general overview of the past, present, and future of the city, according to four themes: sustainability, social cohesion, production, and urban development. In this report, the names were changed to sustainability, society, industry, and urban development, because they reflected the topics of discussion better.

These themes were decided upon in collaboration with HIVA-KU Leuven and were given concrete definitions to ensure that the whole consortium would have a similar understanding of these terms. The discussions and definitions of these themes can be seen in an online document.⁴ The definitions of the themes are as follows:

- **sustainability**: actions which aim to improve the environmental quality and/or avoid depleting natural resources. Sustainable actions are aimed at maintaining long-term ecological balance;
- **society (was previously ‘social cohesio’)**: actions which aim to enhance social connection between and within communities. Inclusion, creation and education are part of the main values. Education as it brings equal learning opportunities and creativity to gather people around a common project and thus enhance community beliefs;
- **industry (was previously ‘production’)**: towards improvement and change of more circular, inclusive, distributed production systems. Change in production may be created through distributed production, localised, small and/or open-source way of producing. It includes concepts such as industry 4.0, distributed production, prosumerism;
- **urban development**: improving the liveability and prosperity of neighbourhoods and cities through the effective allocation of land, infrastructure, and resources.

⁴ https://docs.google.com/document/d/14h2ZMXAj_EMD5hmQeNRH7_Q5h41yalxmA7xiVtBlmJ8/edit?usp=sharing

This exercise was created based on a tool developed by Osmos,⁵ a Brussels-based empowerment service for communities that want to engage in the place-based economy. The tool's original name is the 'chart of emotions'.⁶ Osmos granted the permission for using this tool.

After the creation of this exercise, it was found that the resources, needs, goals, and barriers in the exercise corresponded to a SWOT analysis, which helps to identify the city's strengths, weaknesses, opportunities, and threats.

5.2.2 Project ecosystem canvas

Figure 4. Project ecosystem canvas

Pop-Machina Project (pre-filled in by municipality)			
Values	Stakeholders	Actions	Outputs
<ul style="list-style-type: none"> Sustainability Social inclusion Urban regeneration Local Production municipality can add extra values of the Pop-Machina project 	TO BE FILLED IN BY MUNICIPALITY BEFORE THE WORKSHOP E.g. for VENLO: <ul style="list-style-type: none"> Nao Dordt Municipality of Venlo TU Delft 	<ul style="list-style-type: none"> Engaging with local circular maker communities Creating a digital platform for the circular maker community Selecting and creating a makerspace Running a training programme + entrepreneur breeding programme Creating circular products in the makerspace Municipality can change wording to suit local needs and understanding Municipality can fill in other actions that are planned 	<ul style="list-style-type: none"> Engagement activities to make decisions together with local stakeholders Digital platform for the circular maker community Pop Machina training programme Entrepreneurship programme Circular maker community + makerspace Evaluation and impact assessment Municipality can change wording to suit local needs and understanding Municipality to fill in other outputs that are planned
Your city (filled in by participants during workshop)			
Needs	Stakeholders	Resources	Goals
<ul style="list-style-type: none"> What are the needs of your city? (look at the city timeline) Do these needs relate to the values above? How could they be related? 	Who are the other stakeholders in the city who could get involved? Name specific organizations <ul style="list-style-type: none"> Societal groups, NGOs Governmental organizations Knowledge and research organizations Business organizations, entrepreneurs Funding sources, investors, banks 	<ul style="list-style-type: none"> What are the resources available in your city? (see what you filled in the city timeline) What are your suggestions on how these resources can help the actions above? 	<ul style="list-style-type: none"> What are the goals of the city? (see city timeline) What are your suggestions on how the outputs above can contribute to the goals of the city?

Similar to the business model canvas, the project ecosystem canvas is a simple discussion tool used to facilitate constructive discussions within expert groups. This tool⁷ was developed by consulting service Osmos for the 'Cities of Making' project, and permission was given by the author to use this tool in the Pop-Machina project. The Cities of Making project chosen as a reference because it was the only project found that covered both the topics of circular economy and making in the city.

For the workshops, this tool was used to establish a connection between the broader context of the city to the specific activities and outputs of the Pop-Machina project. As seen above, the first row is the canvas contains the values, (internal) stakeholders, actions, and outputs of the project. This row is pre-filled in by the municipality. It is about the Pop-Machina project itself. The second row, on the other hand, is about the wider context - the general needs, stakeholders, resources, and goals of the city, which could relate to the Pop-Machina project.

The first column is about needs and values. It establishes which needs of the city match with the values of the Pop-Machina project. The second column is on stakeholders. It establishes which stakeholders in the city could potentially help with or benefit from the Pop-Machina project. The third column is about actions and resources. It establishes which resources of the city could fulfil the actions of the project. The fourth column is about outputs and goals, and how the outputs of the Pop-Machina project could contribute to the broader goals of the city. During the workshop, participants were asked to take the needs, resources, and goals from the previous city timeline exercise, and match them in this canvas.

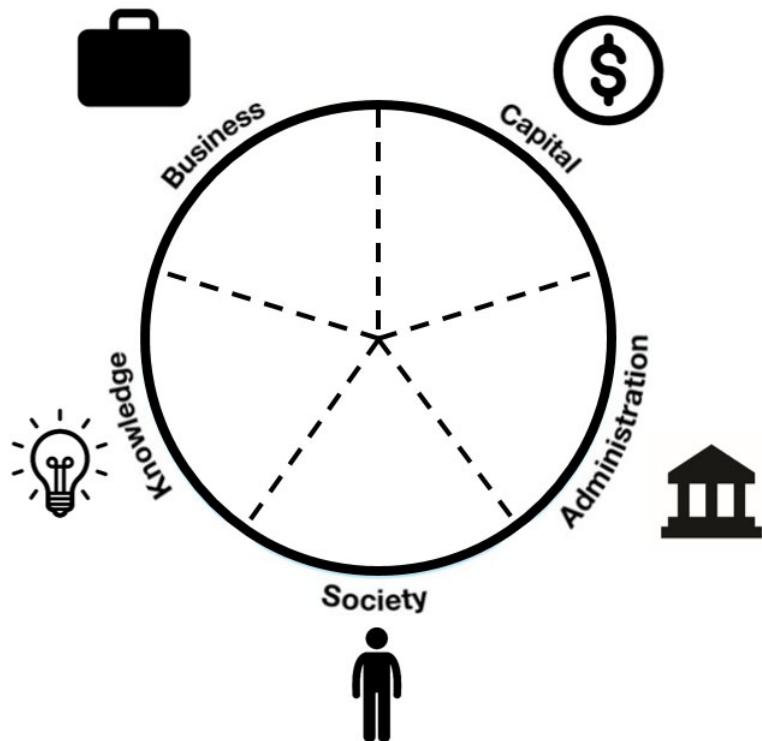
5 <http://osmosnetwork.com/hello/>

6 <http://osmosnetwork.com/chart-of-emotions/>

7 <http://osmosnetwork.com/project-environment-canvas/>

5.2.3 Stakeholder canvas

Figure 5. Stakeholder canvas



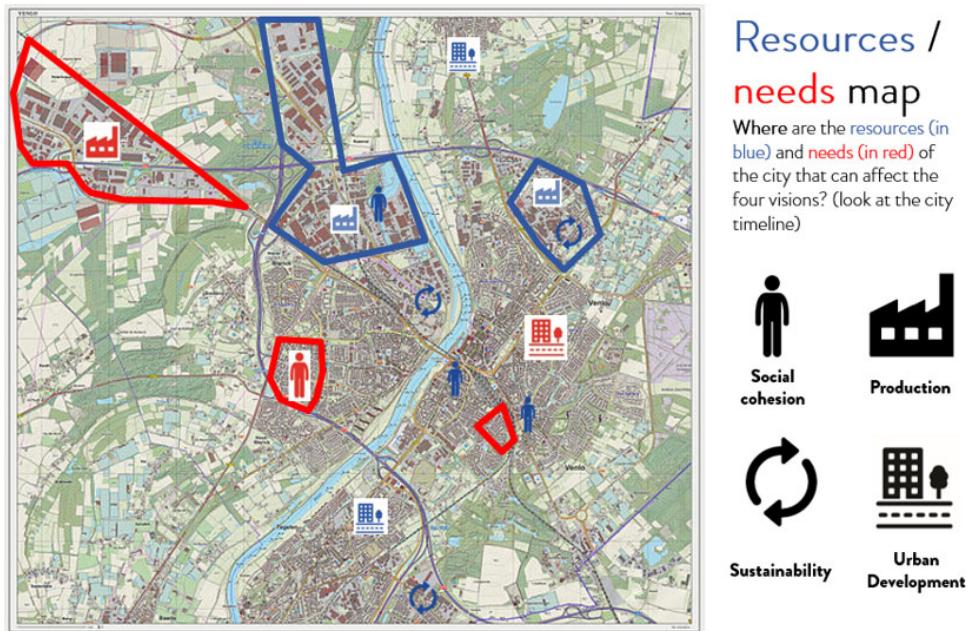
In the stakeholder canvas, participants were asked to list out all the local stakeholders they could think of into five categories: business, capital, knowledge, society, and government. The definition of the five categories are as follows:

- **business**: all parties which are profit-seeking and registered as company/enterprises - they provide goods or services (but not financial ones);
- **capital**: parties whose main role is to provide financial support - can be either public or private entities;
- **knowledge**: public or private entities whose primary role is to contribute to the enhancement and dissemination of knowledge;
- **citizen**: citizen-led entities whose primary goal is to support citizen right (social, environmental, educational, etc.);
- **government**: public institutions providing administrative and infrastructure support.

5.2.4 City mapping

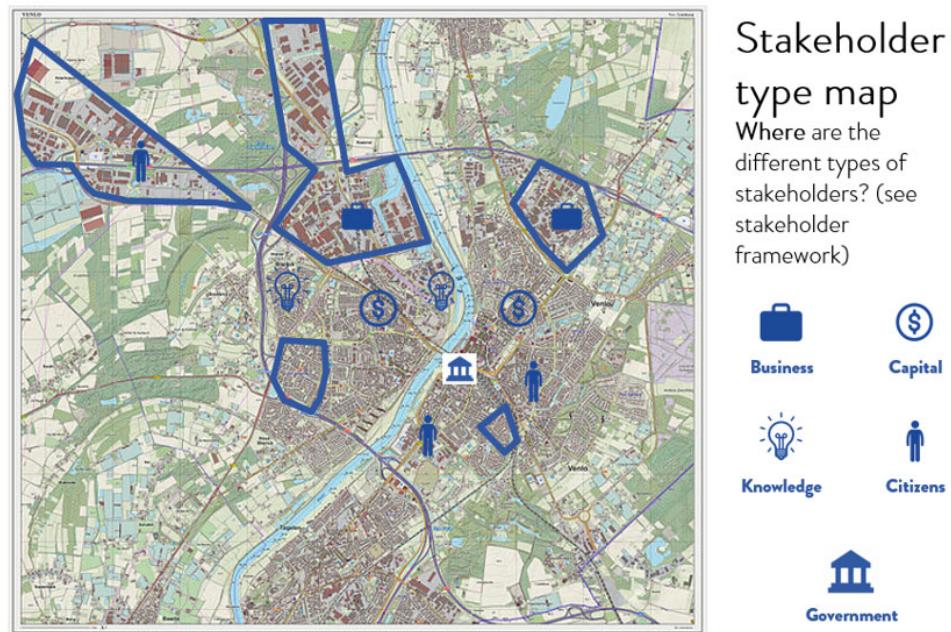
In the final exercise, participants were asked to connect their discussions during the workshop onto a map of the city. Two maps were created for each city: the ‘resources and needs map’, and the ‘stakeholder map’. The map aims to show how the participants perceive their city instead of reporting the actual reality of the city.

Figure 6. Resources and needs map



The resources and needs map (above) aims to provide a general understanding of the city, and whether certain neighbourhoods have more potential or problems. Participants were asked to take the resources and needs mentioned in the previous exercises, and if possible, to place them onto a map of the city. The resources and needs were classified according to the four themes - society, industry, sustainability, and urban development.

Figure 7. Stakeholder type map



The stakeholder map (above) aims to understand if there are areas in the city where certain types of stakeholders gather. Participants were asked to take the stakeholders identified in the previous exercise and to place them onto the map. The stakeholders were categorised in the same five types as the previous exercise: business, capital, knowledge, society, and administration.

5.3 Urban Living Labs and co-creation

Although it was not explicitly mentioned in the Grant Agreement, the idea of ‘urban living labs’ (ULLs) is strongly linked to the Pop-Machina project, especially to the activities of WP5. According to a systematic literature review of ULLs (Voytenko, McCormick, Evans & Schliwa, 2016), ULLs constitute ‘a form of experimental governance, whereby urban stakeholders develop and test new technologies, products, services and ways of living to produce innovative solutions to the challenges of climate change’.

The study on ULLs is important because it is ‘increasingly recognised that achieving urban sustainability is not a matter of gathering more data, creating technical fixes, and establishing the right institutions. Changes are required in how systems of provision and services are designed, organised, and delivered in diverse urban contexts.’ (Voytenko et al., 2016). ULLs can be seen as the connection between knowledge institutions and society, shifting markets, practices, policy, and culture in order to match citizens to new technologies and ideas.

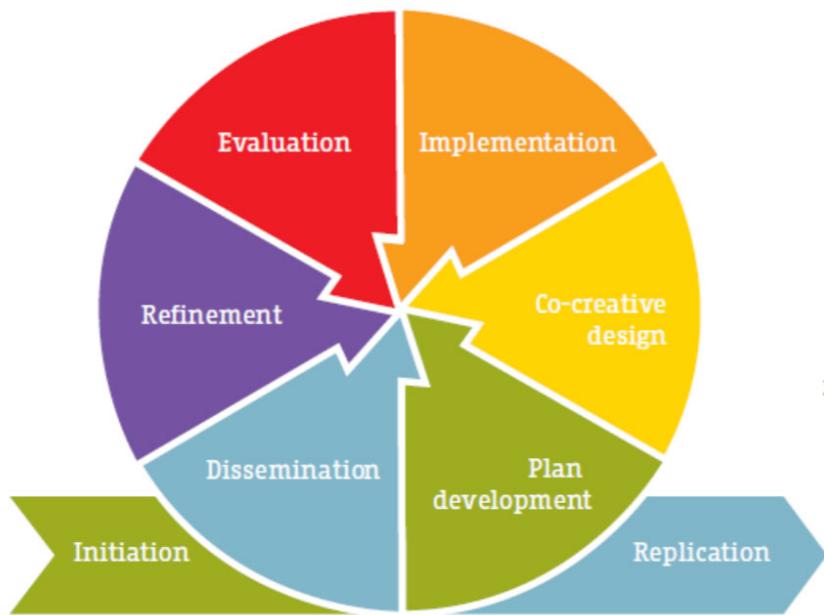
The research of Voytenko et al. resulted in five ‘key characteristics’, which match very closely with the activities of the Pop-Machina project.

Table 1. Similarities between Urban Living Labs and the Pop-Machina project

5 key characteristics of (Voytenko et al., 2016)	the Pop-Machina project
ULLs are placed in a geographical area	the project is situated in 7 pilot cities, each with a specific geographical, cultural, and political context
ULLs represent a specific form of experimentation	the project aims to experiment on how a circular maker ecosystem and corresponding makerspace would function in each city
ULLs require participation and user involvement in the co-production of knowledge	the project, especially WP5, requires local stakeholders to participate in the design and planning process, ensuring that knowledge of local stakeholders is taken into account
ULLs have a clear leader and owner	each municipality is the leader of the Pop-Machina project in their city
ULLs include an evaluation phase	the project will be evaluated throughout the operation of the makerspace, this corresponds to T7.1

In ‘Urban Living Lab - a living lab way of working’, by Ellen van Bueren and Kris Steen with the Amsterdam Institute of Advanced Metropolitan Solutions, different phases of ULLs were identified, as shown in the figure below. These phases correspond closely to the tasks of WP5.

Figure 8. Phases of Urban Living Labs (van Bueren & Steen, 2017)



The Pop-Machina project has strong links to the concept of Urban Living Labs. Connecting Pop-Machina with ULLs is beneficial to both the project and the academic community that study ULLs. Pop-Machina can utilise existing research on best practices of ULLs to improve its activities, and results of the Pop-Machina project can enhance the emerging academic research on the topic.

6. Pilot profiles

This section provides an overview of the results of the pilot profile workshop for the seven municipalities in the Pop-Machina project. The workshop results of each municipality are structured as follows:

Past – positive memories and negative trauma

During the ‘city vision’ exercise, participants identified the historical development of the city in terms of four main themes: industry, sustainability, society, and urban development. This gives a general overview of how making is intertwined in each city’s history.

Present – resources and needs

During the ‘city vision’ and ‘project ecosystem canvas’ exercises, participants identified the resources and needs of their city, again along with the four main themes: society, industry, sustainability, and urban development. This allows us to identify the challenges that each city has, which the Pop-Machina project could focus on, as well as the existing human and material resources in each city that the Pop-Machina project can capitalise.

Future – goals and barriers

During the ‘city vision’ and ‘project ecosystem canvas’ exercises, participants identified the future goals and barriers for their city, based on their discussion on the resources and needs. The future goals again allow pinpointing key aspects that the Pop-Machina project should focus on in each city.

Project – plans and ideas for next steps of the Pop-Machina project

During the ‘project ecosystem canvas exercise’, participants discussed concrete suggestions for how the Pop-Machina project can be implemented according to the unique challenges of each city. Suggestions have been made for how the different deliverables of the Pop-Machina project, such as the digital platform and physical makerspace, can be implemented.

Stakeholders

During the ‘stakeholder mapping’ exercise, participants identified the stakeholders of the circular maker community in their city, according to the five categories: capital, knowledge, society, business, and governance. This provides a better idea of the existing ecosystem of the city that could further support activities of the Pop-Machina project.

City mapping

During the ‘city mapping’ exercise, participants aim to identify issues they have discussed on a city map. This resulted in areas within the city that could be interesting for the Pop-Machina project.

A table summarising results of all seven workshops can be found in the annex.

6.1 Istanbul

Population	15,214,177
Area	2,576.85 km ²
Density	5,904 people/km ²

Figure 9. Satellite image of Istanbul

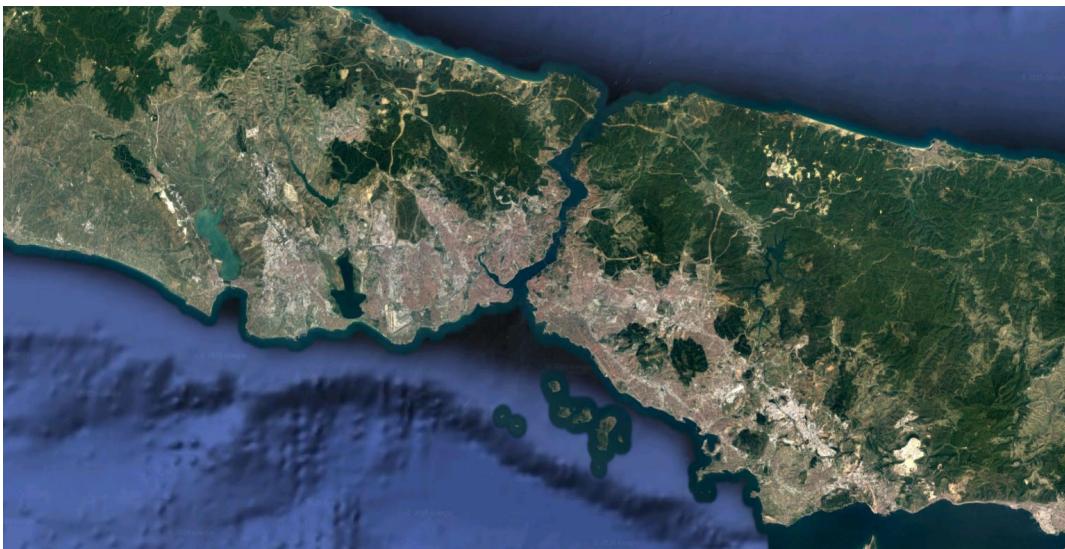


Figure 10. Photos from the Istanbul workshop



6.1.1 Introduction

The pilot profile workshop in Istanbul was held on 29th November 2019, in Zemin Istanbul, a centre which aims to attract entrepreneurs interested in subjects such as environment, energy, transport and social innovation within the framework of the city/urban science. There were 29 participants at the workshop with diverse backgrounds:

- 2 from the scientific community;
- 11 from industry;

- 10 from civil society organisations;
- 6 policy makers.

During the workshop, it was discovered that some maker communities in Istanbul have similar activities, but they are not aware of each other. There were comments around the possibility of the Pop-Machina platform providing communication between different maker communities in order to prevent overlaps (e.g. developing a sustainable packaging for local agricultural products). Through this workshop, participants had a chance to raise questions about the project, making the project clearer for them, as well as make suggestions for future steps. For example, adding new features to the Pop-Machina platform, such as having marketplaces of the products they develop, the development of a green brand around makerspaces, and allowing them to share waste.

The workshop was an opportunity for different actors of the maker movement to meet and exchange ideas regarding their work. It was observed that some of them exchanged business cards by the end of the event. Furthermore, new partners were added to the city's preliminary stakeholders list: İstanbul Sehir University, Alya, Fazla Gıda, Tumsis, Axolotlbio, Mikro-p, Scode, GE Garage, Kentsel Vizyon, Yeşilist, Yaratıcı Fikirler Enstitüsü, Onaranlar Kulübü, Ekolojik Marketler Topluluğu, Esnaf Sanatkarlar Odası, Çorbada Tuzun Olsun, and Aşhane.

6.1.2 Past: positive memories and negative trauma

In terms of industry, Istanbul has a rich history of making and local artisanal crafts. According to the participants, 80-90 industries (Ceramics, glass blowing, shoe making, leather, wood works, wool, etc.) were represented in Istanbul, until globalisation and mass production decreased local production and craftsmanship. Mass urban migration affected the food production of the city – agricultural land was sacrificed for residential or industrial areas.

In terms of sustainability, Istanbul historically had 'Bostans', which are local community gardens that allowed fresh vegetables and fruits to be produced locally. Until 1983, there were 103 Bostans in Istanbul, some of which date back to 1,600 years ago. These gardens were managed by the municipalities where gardeners worked. This expertise was transferred from one generation to the next. Starting from 1983, these gardens were turned into residential areas. Only two of them (Yedikule & Kuzguncuk) survived. NGOs such as 'Protecting Yedikule Bostanları Initiative' have been actively focusing on preserving these facilities.

There were more craftsmen in the city producing artisanal crafts (such as tinsmith, jewellery, printing, ...), but they are now more prevalent in rural areas. There were more repair shops around the city, but today many people living in urban residential areas don't have local access to repairing facilities - they either buy new products or go to specific districts (such as Karaköy, Kadıköy, Beşiktaş) to get their items repaired.

In terms of urban development, industry was sometimes a driving force for neighbourhood development. For example, textile industry developed in Laleli, which improved the neighbourhood from an economic and touristic perspective. Laleli turned into a trade centre, starting from mid 90s.

From the results of the discussion, it was clear to see that rapid, uncontrolled urban expansion was a major concern for the participants, as well as the root cause of both positive and negative developments for Istanbul. While the other pilot cities of the Pop-Machina project are suffering from urban shrinkage and decreasing population, Istanbul is experiencing the opposite problem: unprecedented urban growth and congestion. Internal migration from rural to urban areas expanded the city at an unprecedented rate, creating problems of congestion and lack of space.

Table 2. Summary of Istanbul's past in making

	INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
positive memories	chemical industry in Yenibosna, textile industry in Laleli, 80 or 90 industries of the country represented in Istanbul	Bostans (local gardens) for local and circular production, craftsmen were in the city (now in rural areas), more repair work	less congested	Laleli neighbourhood improved thanks to textile industry
negative trauma	mass production - craftsmanship lost, lost agriculture to urban development, competition made local production decrease, illegal industries	increased plastic use, linear economy		unplanned urbanisation, internal migration to urban areas

6.1.3 Present: resources and needs of the city

6.1.3.1 Resources

In terms of industry, Istanbul still has some existing local industry, such as the production of glass and ceramics around Beykoz; production of local vegetables and fruits in existing Bostans of Yedikule and Kuzguncuk; and jewellery around Karaköy and Sirkeci. Some industrial activities that are geared towards the circular economy, such as recycling companies like Atik Nakit and Basaksehir. It was suggested that shops selling consumer goods such as cell phones and furniture could turn into centres of repair as well. Istanbul has existing makerspaces and fablabs, and some were participants of the workshop. However, they are currently mostly working independently and not aware of each other's work.

'Halletme', a Turkish concept that describes the culture and practice of quick and practical making to solve problems, was mentioned during the discussion. An example of 'halletmek' would be a broken chair repaired with duct tape, or using old packaging boxes and a wooden board as a product display case. Turkish designer Nur Horsanali published a book online⁸ named halletmek, which gives a good impression of the concept.

In terms of sustainability, Istanbul has recycling companies, a good existing recycling system, as well as a 'zero waste programme' from the city. The government's Zero Waste Programme is mainly shaped around collecting separated waste (such as plastic, paper, metal, glass, and wood). In addition to that, there are innovation hubs and NGOs that focus on sustainable production, such as Atik Nakit.

In terms of society, Istanbul has existing social networks that could contribute to the circular maker community. Bottom up or informal stakeholders were identified – informal waste collectors collect and sort waste that can be recycled or reused; repair shops extend product life by giving consumers an alternative to throwing away their broken products; and many buildings have 'door keepers' or building managers, who take care of everything related to the building, such as waste separation, water, and electricity. These stakeholders can be seen as the 'gate keepers' of recyclable or reusable waste, and could be engaged throughout the Pop-Machina project as the connectors of different material flows.

In terms of education and training, Istanbul has incubation centres, innovation centres, training centres and vocational high schools (such as ISMEK, KOSGEB, Zemin, BTM, and Is-Kur). More-

⁸ <https://issuu.com/nurhorsanali/docs/halletmek.pdf>

over, SKD, Turkey's Business Council for Sustainable Development, is developing a 'Turkish Materials Marketplace'⁹ which is a cloud-based platform designed to facilitate cross-industry materials reuse among Turkish companies and communities.

In terms of urban development, Istanbul already has neighbourhoods that are a base for maker communities, in Kadıköy, Kurtuluş, Beyoğlu, and Beşiktaş. Areas around the old airport and Levent Alt Çarşı are awaiting urban expansion.

Table 3. Summary of Istanbul's resources

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
existing industry: glass in Beykoz, packaging waste, recycling companies (atik nakit, Basakşehir), cell-phone repair places	recycling companies	population: growing awareness of sustainability, young generation, more experts	base for maker communities in Kadıköy, Kurtuluş, Beyoğlu, Beşiktaş; techno parks
<u>existing makers: traditional making skills (halletmek), fablabs</u>	policy/governance: zero waste programme, good recycling system	support ecosystem/network: bottom up waste collectors and repair shops, incubation centres, and SKD working on 'Turkish materials marketplace'	urban expansion: Old airport, Levent Alt Çarşı
	civic: innovation hubs and NGOs on sustainable production, such as Atik Nakit	knowledge: Vocational high schools such as ISMEK, KOSGEB, Zemin, BTM, Is-Kur; digital design skills	

6.1.3.2 Needs

In the discussion about the needs of Istanbul's circular maker community, it was found that communication and awareness of the existing ecosystem of makers is lacking. Although there are already makers in the city, they are not aware of each other and not collaborating enough. Many participants were enthusiastic about creating a platform for makers, which could allow makers to exchange materials and skills; publicise the work of makers to each other; as well as serve as a sales platform for makers' products.

In terms of education, participants identified the need to raise awareness for different sectors of society. More understanding is needed on co-production and design in the maker movement, and existing makers can be taught entrepreneurship skills in order to scale-up their production activities. More reuse and repair skills could be taught to both makers and citizens in order to promote a longer life for products.

In terms of sustainability, participants observed that makers have limited access to recyclable materials and waste streams, as well as the knowledge of how these waste streams can be utilised. The Pop-Machina Istanbul team observed that participants of the workshop had a limited understanding of the circular economy and were mostly focused on 'end-of-life' processes, especially recycling or production using recycled materials. There needs to be more holistic understanding amongst makers about the circular economy, and how it can be integrated in the design process of products.

Issues and potential solutions related to organic and food waste were mentioned multiple times in the exercises. Participants identified that there is a need for more local solutions to food and organic waste, such as urban farming. This relates to Istanbul's 'bostans', or community gardens, as well as the city's congestion and need for more public green space.

⁹ <http://turkey.materialsmarketplace.org/>

Table 4. Summary of Istanbul's needs

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
urban farming, local solutions for food, shelter, and health	knowledge: access to recyclable materials, organic and food waste, grey water	immigration, lack of skilled technical workers, disabled, refugees, elderly, children	lack of venues to sell products
		education in: co-production, design, entrepreneurship, reuse, repair skills, recycling culture and applications; for makers, start-ups, decision makers, doormen and collectors	Fikirtepe, Kuştepe, Gültepe, Tarlabası, more urban green needed
		ecosystem: network for makerspaces, collaborating with big companies (entertainment and beverage), waste material exchange, individual garbage collectors, sales platform for makers	

6.1.4 Future goals

For the future, participants envisioned self-sufficiency in the city, more access to expertise, and decentralisation in production and consumption which can be promoted by the maker movement. Goals fell into three main themes: sustainable industry, society, and urban development.

In terms of sustainable industry, participants identified the following materials or products of interest: food (and urban farming), glass, packaging, and electronic waste. Participants were not explicitly asked to name products or materials of interest, so this aspect should be further discussed in the next phase of the Pop-Machina project.

In order to make a transition towards the circular economy, participants recognised that more understanding of material flows throughout the city is needed and suggested that there could be a map of different material streams as well as sources of waste material throughout the city. This could be achieved through the (to be developed) Pop-Machina platform. There was a desire to create a stronger ‘circular economy’ culture by establishing urban recycling festivals, common compost areas, and a goods exchange system.

Industrial symbiosis was suggested as a goal, where the waste streams of one industry can be the resource of another. Generally, industrial symbiosis projects are implemented in large-scale industrial districts, where the district is planned beforehand and industrial companies with the right resources and waste streams are invited to set up in the area. However, there are some examples of industrial symbiosis at a smaller scale, as explored by Yale University researchers (Mulrow, Derrible, Ashton & Chopra, 2017).

In terms of society, there was a strong desire for better communication channels between makers and knowledge stakeholders such as universities, NGOs, and vocational high schools. It was suggested that more partnerships could be established between local makers and larger companies, and directing products produced by makers to a larger market. Moreover, local governments could play a role in supporting local makers and SMEs, as well as incubation centres that support scaling up activities of local making. There could be a platform for makers that provide a ‘match-making’ service for skills and material resources, as well as for selling products. There was a suggestion that the entrepreneurship council could play a role in connecting local government problems to local makers and entrepreneurs.

Better education is needed for decision makers within the city, as well as ‘gate keepers’ of material flows such as door keepers and waste collectors (such as paper collectors). Education is needed on both circular economy and digital fabrication. However, it was emphasised by the makers that they did not need additional education on ‘making’ but rather on sustainability and circular economy. Education can be done through vocational high schools like ISMEK, or through local libraries.

In terms of urban development, specific areas are already rich with makerspaces, such as Kadıköy, Yeldeğirmeni, Kurtuluş, Karaköy; these areas could be further enhanced and developed. Local solutions should be tailored to each district in terms of different ages, practices, and professions.

Table 5. Summary of goals

SUSTAINABLE INDUSTRY	SOCIETY	URBAN DEVELOPMENT
increasing circular production in industrial areas	expert suggestions for makers, universities, NGOs, vocational high schools; partnerships with big companies; local SME support; incubation centres collaborate with local government; directing makerspace products to the market	local solutions tailored to each district, green areas, accessible open spaces
food, glass + packaging + electronic waste + urban farming	match-making for skills, resource sharing, connecting makers, selling goods	specific areas rich for makerspaces: Kadıköy, Yeldeğirmeni, Kurtuluş, Karaköy
mapping material streams, especially on materials of interest - glass, packaging, electronic waste, city agriculture	education for decision makers, door keepers, waste collectors, trainers; on making; with ISMEK, libraries	
urban recycling festivals, common compost areas, goods exchange system, sharing	tax reduction, local governments should play more prominent role, entrepreneurship council to solve local government problems	
industrial symbiosis, organisation of recyclable outputs and resources		

6.1.5 Project – plans and ideas for next steps of the Pop-Machina project

During the ‘project ecosystem canvas exercise’, there were many suggestions on how to implement the Pop-Machina project. This is related to different areas:

1. makerspaces can be motivated and given a purpose through the Pop-Machina project;
2. communication needs to develop between different actors of the ecosystem;
3. the education and training programme should take into consideration the already existing skills of the maker ecosystem in Istanbul;
4. promotion of the project is needed, as well as access to information for the public;
5. existing facilities and initiatives should be used;
6. the circular economy should be promoted by the creative economies and their competition.

According to the participants the expected outputs of the Pop-Machina project should be:

Pop-Machina Academy

The Pop-Machina Academy should involve different stakeholders from NGOs to industry organisations, to take suggestions from experts. Also, there should be co-creation activities and training pro-

grammes that develop the skills of makers by ‘training the trainers’. Suggested topics for these programmes were glass, packaging, electronic waste, city agriculture, software development, and waste management to develop a circular economy. Also, these programmes should train mid-level technical staff and be developed in collaboration with education and industry fields.

Upgrading Pop-Machina projects and start-ups

The Pop-Machina projects and start-ups need support in terms of funding and legal advice. It is suggested to propose legislation for social entrepreneurship that creates tax incentives for these organisations. Other areas of support can be in terms of marketing and helping them in order to put new products on the market, developing partnerships with big companies and incubation centres and promoting the most abundant wastes as a resource to production.

Pop-Machina platform

The Pop-Machina platform should support the makers to sell their circular maker products, and the platform should be able to sustain itself in the future. This platform should allow participants to share resources, wastes, machines, workforce and renting spaces. The platform should be supportive of establishing a transparent process of waste management.

Pop-Machina circular development

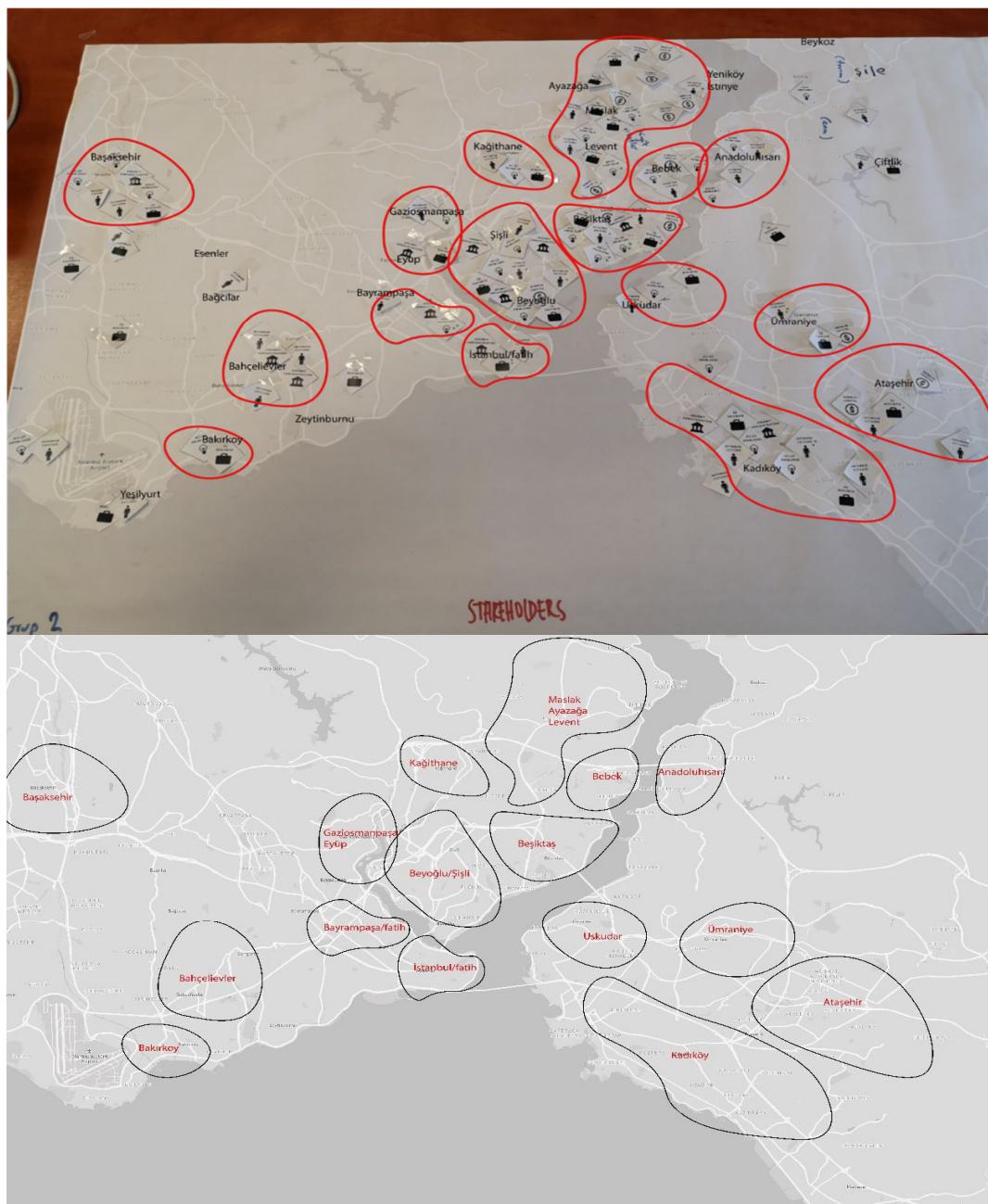
Recycling systems should be developed inside the makerspaces, and there should be criteria for ‘circular’ classification. Along with the latter, in the case of Istanbul, these makerspaces can be supported by the ISMEK centres to promote trainings about maker and circular topics. Finally, it is observed that activities are needed to promote the circular aspect of the makerspaces with urban recycling fairs and collaborations with big companies.

6.1.6 Stakeholder ecosystem

Because the list of stakeholders in Istanbul is too long, it is not suitable to place the full list into this document. Instead, the full list of stakeholders can be found in the annex (Section 12.6).

6.1.7 City stakeholder map

Figure 11. Istanbul stakeholder map



In relation to the stakeholders map, it can be observed that in Istanbul there is a distribution of stakeholders mainly along districts that are closer to the seaside either the Bosphorus or the Marmara Sea. Examples of the latter are Besiktas, Kadikoy and İstanbul/Fatih. This can be related to how the city has been developed in history starting from the 'old city' expanding from the Bosphorus and upwards.

There are clusters of stakeholders in different sides of the city:

- administration is more related to Istanbul/Fatih, Beyoglu, and Kadikoy;
- capital seems to be mostly clustered in Levent and maslak areas;
- knowledge, even though in Istanbul there are many universities and research centres, it is very concentrated in Besiktas, Sisli, bebek, Bayrampaşa, Levent, and Kadikoy;
- businesses are located in many different sides of the city, but they seem to be more prominent in Istanbul/Fatih, Besiktas, Levent, Kadikoy and atasehir;
- citizen's participation is very prominent in Kadikoy, Besiktas, Basakschir, and Bahcelievler.

Finally, it is observed that the present of all the relevant stakeholder in the areas of Beyoglu and Beşiktaş and areas where there is a big quantity of different types of stakeholders (but at least one category missing) in the areas of Maslak, Levent, ayazaga and Kadıköy. There is a lack of stakeholders in the areas of Yesilyurt, Zeytinburnu, Beykoz and Ciftlik.

6.2 Leuven

Population	101,396
Area	56.63 km ²
Density	1,800 people/km ²

Figure 12. Satellite image of Leuven



Figure 13. Photo of Leuven workshop



6.2.1 Introduction

The pilot profile workshop was held on 9th December 2019, in OPEK (openbaar entrepot voor de kunsten) Leuven, the public warehouse for the arts in Leuven. 40 participants attended the workshop, with:

- 4 from the scientific community;
- 1 from industry;
- 35 from civic society organisations.

In addition to the aims set by WP5 leaders, the purpose of the Leuven workshop was to introduce the Pop-Machina project to the circular ecosystem in Leuven, and to answer the following questions together through discussions in the workshop:

- what are the needs, resources, and goals of local makers and the circular ecosystem in Leuven?
- how should the Pop-Machina project address these needs, resources, and goals?
- who are the people and organisations in Leuven that need to be involved and become partners in the Pop-Machina project?

The municipality of Leuven used this workshop to inform local organisations and stakeholders about the new context in Leuven: that circular economy is a priority in the policy agreement. The municipality aims to develop a citywide urban strategy, in collaboration with Platform Leuven Circular, another initiative that aims to connect circular stakeholders in the city. The municipality aims to update the platform about projects and plans to find opportunities to collaborate and create a larger impact.

6.2.2 Past – positive memories and negative trauma

During the workshop, participants discussed that historically, industry played a role in the development of the city. The city was home to large companies such as Philips (electronics), Stella Artois (beer brewery), Marie Thumas (canned vegetables), Vanderelst (tobacco), and BBG and Scordeur (metallurgy). The presence of industries allowed for local employment, highly educated technical staff, and created a knowledge hub in Leuven. Blue collar neighbourhoods housed workers in the various industries. The presence of the university, founded in 1425, had a very positive effect on the city.

With globalisation, automation, and industrial zoning, heavy industries moved out of Leuven. This can be seen in Vaartkom (or the Vaart), Leuven's industrial area in the north of the city. Neighbourhoods that provided housing for blue collar workers in Vaartkom have now been dispersed throughout the city. The disappearance of large industries like Remy (one of the world's largest producers of rice starches) decreased employment and the quality of life of the neighbourhoods around it.

Table 6. Summary of Leuven's past

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
positive			
Philips site, Stella Artois, Marie Thumas, Vanderelst (tabacco), Metallurgy (BBG, Scordeur), handicrafts and trade with market places to support that		university had positive effect	
		local employment, knowledge hub, high education technical staff, blue collar neighbourhoods	Vaartkom urban development
negative			
globalisation, automation, Vaartkom (no heavy industry in Leuven), industries such as Remy moved out, blue collar workers dispersed through Leuven		Vaartkom (no heavy industry in Leuven)	

6.2.3 Present – resources and needs

6.2.3.1 Resources

From the results of the workshop, it can be seen that the main strengths of Leuven are its strong knowledge community, its highly-educated citizens, and the municipality's focus and strategy on the circular economy. Arguably, the strong presence of knowledge, in the form of the KU Leuven, with 53,000 students in 2020, provides a strong base for the resources mentioned in the workshop.

In terms of societal resources, Leuven has an existing ecosystem of citizen initiatives, many of which work with issues concerning the circular economy. Leuven has had a strongly developed social economy for many years. The work of SPIT (ViTeS), the existing circular shops (Kringwinkels), Velo, and Living and Working has been pioneering in many respects and now forms a real economic circuit that puts the circular principles into practice. The citizens' initiative Maakbaar, created by the umbrella association of Leuven maker's organisations Maakbaar Leuven (Makeable Leuven) created a strong dynamic by offering a place where citizens can repair things together. Additionally, they provide a toolbox and through various workshops and courses, the circular economy is being built from the

bottom up. FabLab Leuven offers a wide range of machines in a workshop where students and other people from Leuven can share knowledge.

Maakbaar Leuven has created a platform which actively supports the existing network of citizen initiatives. Through this platform, organisations can work together to create an urban network of possibilities to repair things and to further build and strengthen the repair economy.

In terms of sustainability, Leuven has a strong knowledge base, with expertise in life cycle engineering. In recent years, Leuven researchers have played an important role in the knowledge network of Circular Flanders, the Flemish circular economy network organisation consisting of government, industry and civil society. Existing stakeholders also have a great deal of expertise on sustainable product design, such as Flanders DC (Flanders District of Creativity, a non-profit organisation founded by the Flemish government), the university (KU Leuven, UCLL) and companies (such as Comate, engineering and design company based in Leuven).

The municipality of Leuven has a strong commitment to sustainability and the transition to a circular economy. Leuven 2030, an initiative from the municipality which aims to create a sustainable roadmap for the city, has worked very hard in recent years on the project to make Leuven a climate-neutral city. A particularly important result of this work is the Roadmap 2025-2035-2050. This scientifically substantiated roadmap is supported by all stakeholders.

The municipality is also involved in other circular projects. Within the framework of the project C-builders, Leuven has committed itself to a circular building project; and in recent years, work has been carried out on a Leuven food strategy aimed at shortening cycles. Ecoverf, an inter-municipal company which serves Leuven and 27 municipalities in the province of east Brabant, has been working hard on the transition from a waste processor to a materials player, and plays a role in innovative projects.

The city has an existing network of sustainability-focused initiatives. In recent years, at the initiative of active citizens, a network of repair cafés has been created, where citizens themselves put the circular economy into practice. Initiatives such as Sociaal Atelier Leuven and REused are exploring new traces of reuse of existing materials.

In terms of urban development, innovative urban projects are being prepared, such as the ‘Maak-Leerplek’, or ‘Make-learn space’, and they are looking for innovative concepts for the makers’ movement. The Circular project of Interleuven aims to develop circular principles for business parks. Circular principles are anchored in urban policy documents such as the municipal Spatial Structure Plan. Leuven North and specifically the Vaart area, an old industrial area, will focus on circularity and creating space for make industry and circular initiatives.

Table 7. Summary of Leuven's resources

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
med tech bio tech, food, 3d printing, software	maker community are highly educated on circular economy	highly educated migrants with technical education and awareness of sustainability	Vaartkom, Leuven Noord
fablab, maker community		strong local bottom up initiatives in CE, and strong local network between municipality, knowledge, and citizens. Leuven 2030 could be the communication platform	
		social economy organisations in textile, rubber, plastics	
		KU Leuven, UCLL, secondary schools	

6.2.3.2 Needs

Since Leuven has a strong existing community of (highly educated) citizen initiatives, what is needed by the city is a way to connect these initiatives, allowing them to collaborate further. There is a need to scale-up and increase the impact of these initiatives, allowing them to become 'mainstream'.

In terms of society, the ecosystem or network of initiatives need to be improved. In order to achieve impact, Leuven should identify the needs of current actors, both organisations, individual makers and companies. To get a good view of the drivers to circular economy, businesses and industry need to be engaged as well in this network. There needs to be more clarity on the role of the municipality in the city: should it provide a central information point for information on licenses? What kind of competence is required for each level of government? There could be a better link between existing initiatives and employment, especially social employment.

In terms of sustainability, the main needs are related to promotion of existing sustainable initiatives to the general public. There is a need for a full-blown marketing campaign to market the maker movement, circular products, and the circular economy. Efforts should additionally be made to mainstream local, sustainably produced products. Currently, these products are too expensive for consumers, sometimes also for makers, as sustainable raw materials are more expensive.

There is a need to connect with consumers. A participant remarked that, for example, the UK plans and spending 8.5 billion pounds on Christmas gifts, which are usually made abroad. The maker movement could offer a more sustainable alternative. It was remarked that citizens should get something out of the circular economy.

In terms of urban development, participants pointed out that there is a lack of affordable space in the city for the making and storage of materials.

Table 8. Summary of Leuven's needs

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
waste streams not 'pristine'	circular economy needs to be mainstream and affordable	language barrier, unseen poverty	
lack of affordable space for making and storage of materials		restricted employment opportunities for makers, unattractive working conditions, urban mining could have potential	
		lack of digital skills, not enough 'makers' training	
		support for local circular entrepreneurship	

6.2.4 Future – goals and barriers

6.2.4.1 Goals

In terms of industry, the areas of interest mentioned in the workshop are food, fair fashion, construction, and 3D printing. These areas of interest should be clarified in the next phases of the Pop-Machina project, as participants were not explicitly asked to list out products or materials of interest. Participants wanted more interaction with big producers and world players, such as IMEC (the Interuniversity Microelectronics Centre, an international research & development and innovation hub, active in the fields of Nano electronics and digital technologies), and Materialise, a private company based in Leuven specialising in 3D printing in aerospace, architecture, consumer goods, and healthcare.

In terms of sustainability, participants mentioned different strategies that could aid a transition to a circular economy. Product service systems could be a possible strategy.¹⁰ The municipality could play a role through circular procurement, and mapping waste material streams throughout the city, allowing for more understanding of what materials are available in the city, and where.

Existing industries and initiatives can be further enhanced as well. More reuse could be promoted in the construction sector. The repair movement in Leuven could be professionalised, turning the city into a 'repair hub'.

In terms of society, there could be more collaboration between business, the social economy, the maker movement, and knowledge actors in the city. There was some interest in creating a sharing platform, for sharing materials as well as knowledge.

¹⁰ Product service systems are business models that provide for cohesive delivery of products and services and are emerging as a means to enable collaborative consumption of both products and services, with the aim of pro-environmental outcomes.

Table 9. Summary of Leuven's goals

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
corporate social/sustainable responsibility of big producers	product service systems, circular procurement of municipality; mapping material streams	interaction with world players like imec, materialise; business/social economy/maker movement/knowledge actors; upscaling small initiatives	reuse in construction sector, repair hub
food, fair fashion, construction, 3D printing	reuse in construction sector, professionalising repair movement, repair hub	sharing platform	

6.2.4.2 Barriers

The barriers to achieving these goals were discussed during the workshop. In terms of industry, it was noted that citizens are not involved in industry, or in the process of making the product. Citizens could be transformed from consumers to 'prosumers'.

In terms of sustainability, it is difficult to obtain 'pristine' waste streams, meaning that waste streams available in Leuven (and most other cities) are a mixture of different materials, which makes it difficult to reuse.

In terms of society, there is a lock-in on the current linear production system, which makes it difficult for companies to choose between profit and sustainability. There is a lack of a strong European vision, or at least this vision is not well broadcasted to its member states.

In terms of urban development, there is a lack of space for makers, as mentioned in the 'needs' section.

Table 10. Summary of Leuven's barriers

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
citizens not involved with making	no pristine waste streams, large scale agriculture	lock-in of current production system, profit and sustainability, lack of strong EU vision	not enough space for makers

6.2.5 Project – plans and ideas for next steps of the Pop-Machina project*Platform Leuven Circular – Leuven's strategic policy plan for a circular city*

The municipality of Leuven aims to integrate efforts of the Pop-Machina project with a larger municipality initiative – Platform Leuven Circular. In implementation of the municipality policy agreement, the Platform Leuven Circular has developed an urban strategy that should lead to a co-ordinated policy to turn Leuven into a circular city. By doing so, Leuven wants to show itself to be a pioneer in the circular economy. Circular strategies are a crucial part of the project to make Leuven a climate-neutral city. After all, more than half of the greenhouse gas emissions are related to materials.¹¹

¹¹ https://omgeving.vlaanderen.be/sites/default/files/atoms/files/2019-12-09_VEKP.pdf (fig 7.1).

Leuven's urban strategy is based on five strategic objectives: (1) circular entrepreneurship in Leuven, (2) circular construction, (3) repair, sharing and reuse, (4) sustainable and circular consumption, (5) knowledge building and embedding circular principles in the policy of key stakeholders of the city.

Integration with the Pop-Machina project

For each objective, actions have been identified which will be developed step by step in the next few years, together with the urban actors. The Pop-Machina project gives Leuven possibilities and oxygen to accelerate the circular transition by focusing on Leuven to become a maker city via a circular maker's space, a circular concept store and a building material platform. Pop-Machina gives the opportunity to strengthen and connect local bottom-up initiatives and organisations in a shared vision and story.

There is already an enormous presence of initiatives in Leuven. The challenge now is to strengthen the urban circular ecosystem. In doing so, the city wants to respond as much as possible to what is already there and what can be further developed.

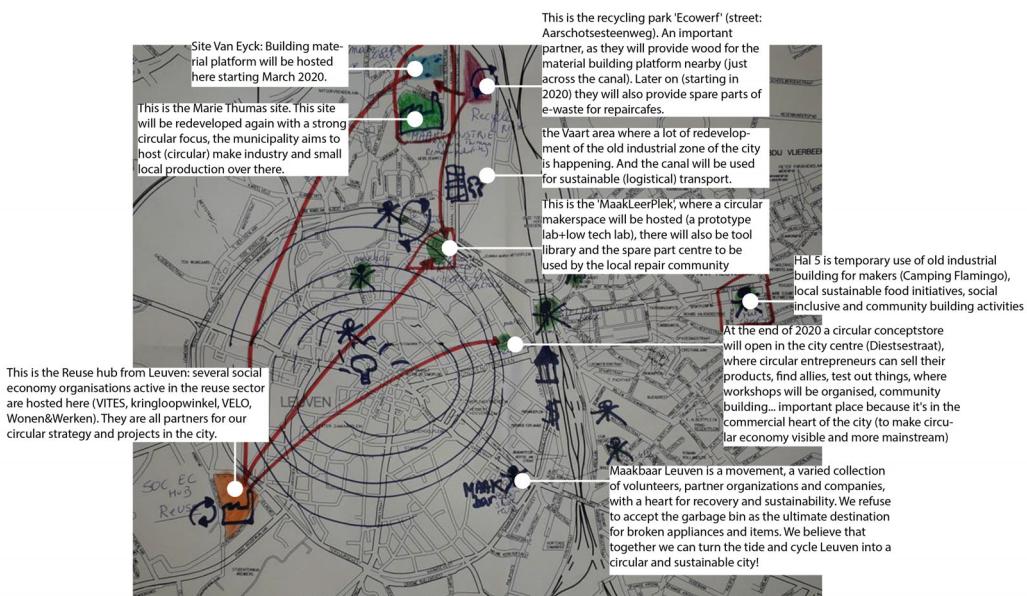
During the workshop it was confirmed that the circular makerspace (MaakLeerPlek) will be hosted in the iconic building of the Molens van Orshoven, which will be renovated in a circular way and circularity will be integrated in the business model

6.2.6 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.2.7 City stakeholder map

Figure 14. Stakeholder map of Leuven



6.3 Venlo

Population	101,603
Area	128.99 km ²
Density	813 people/km ²

Figure 15. Satellite image of Venlo



Figure 16. Photo of the Venlo workshop



6.3.1 Introduction

The pilot profile workshop of Venlo was held on the 21st of January 2020, at the municipality office of Venlo. There were 12 participants in total:

- 3 in higher education and research;
- 3 entrepreneurs;
- 3 members of civil society organisations;
- 1 policy maker;
- 1 member of the media;
- 1 designer.

In addition to objectives set by WP5 leaders, the objectives of the Venlo workshop were:

1. to inform the stakeholders, inside and outside the organisation of the municipality of Venlo, about Pop-Machina and the relation to KanDoen. KanDoen is the municipality's societal organisation that provide work for citizens with a distance to the labour market. KanDoen will be the leader of the Pop-Machina project in Venlo;
2. to inform local organisations and stakeholders about the impact of Pop-Machina to a more circular and sustainable economy;
3. to promote circularity and sustainability as a priority in the policy agreement;
4. to introduce the Pop-Machina project to the circular ecosystem in Venlo.

6.3.2 Past – positive memories and negative trauma

Venlo's urban growth and economic development was strongly driven by industry in the past. The municipality of Venlo shares a border with Germany, and is a trade hub between the Netherlands and the Ruhr area of Germany. The city has an inland port, seacon, and has developed into a logistic hotspot over the years.

The city has a connection with agriculture in the surrounding area, and the 'Venlokas', a very commonly used greenhouse in the Netherlands, was invented and manufactured here. The ink company, Oce, started in Venlo producing yellow dye for colouring butter, and has now transformed into a multinational ink company – Oce Canon. The city was also home to many smaller industrial businesses, producing wooden pallets (for transportation and logistics), beer, wool, ceramics, and lamps and cables. A participant noted that, at one point, Venlo was home to over 50 butchers.

In terms of sustainability, Venlo claims to be the first in the world to embrace Cradle to Cradle principles as a region. Cradle to Cradle is a sustainability concept advocated by German chemist Michael Braungart and US architect William McDonough. It focuses on turning waste streams from both technical and bio-cycles into resources, and can be seen as a precursor of the circular economy. Venlo's adoption of cradle to cradle principles led to the establishment of cradle to cradle certified companies, circular building projects such as the new Municipal offices, and supporting organisations like the C2C expo lab.

In terms of urban development, the Floriade, an international exhibition and garden festival, was held in Venlo in 2012. This led to the further development of for instance The Brightland Campus, a business and industrial campus focused on innovation and sustainability.

In terms of negative historical memories, globalisation in the late 90s affected the local industrial companies as industry moved overseas. The society in Venlo was strongly supported by the Catholic Church, and the secularisation of society has had, in some ways, a negative impact on social bonds between communities.

Table 11. Summary of Venlo's past

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
positive			
agriculture, green houses, butchers, wooden pallets, breweries, wool, ceramics, oce (ink), lamp and cable factory, C2C companies	greenest city in EU in 2003, C2C development, circular building, C2C expo lab, C2C certified companies	Floriade 2012 and campus development, rebuilding after WWII, transport academy - later Fontys Venlo	Floriade 2012 and campus development
trade between Venlo and Germany (ruhr area), inland port (seacon), developed into logistic hotspot			
negative			
		financial crisis 2008, globalisation in late 90s, secularisation	

6.3.3 Present – resources and needs

During the discussion about resources and needs, it became clear that the city's strengths lies in its existing entrepreneurial ecosystem, with both large and small companies. However, there is still a lack of interest from citizen initiatives such as repair cafes, and the city is experiencing some population shrinkage. There are repair cafés in Venlo (at least 5) but they are not aware of the impact they have on sustainability.

6.3.3.1 Resources

In terms of industry, Venlo is still home to large global industrial companies such as Canon (printer ink and printers), AMI (aluminium products for industry and buildings), AGMI (traffic and lighting signs), Blue engineering (sustainability consultancy on the blue economy), ECOR (composite fibre boards made from waste materials for furniture and interiors), Jalema (office supplies). Many of these companies are cradle-to-cradle certified, and are supported by cradle-to-cradle networks such as the C2C Expo lab. Venlo is a logistics hub in the EU, because of its strategic position between the Netherlands, Germany, and Belgium.

In terms of sustainability, the municipality of Venlo is working on other sustainable initiatives that Pop-Machina could collaborate with. For example, the municipality plans to establish a ‘sustainability desk’, or ‘duurzaamheids-locket’, which aims to connect sustainability actions with social initiatives in neighbourhoods. Venlo approved the implementation programme ‘Venlo Circular and Sustainable Capital’, which will be further explained in Section 7.3.5: Project – plans and ideas for next steps of the Pop-Machina project.

There is a particular interest in improving the food system in Venlo. Venlo is a city with a wide range of restaurants. At the same time, the city has a long tradition in horticulture. The challenge is to connect these components. This creates opportunities to use food as a linking element. There is potential to expand urban horticulture and establish sustainable relationships between urban agriculture, involved citizens and market parties.

In terms of society, Venlo has a lot of small and medium sized companies. With their position and scale, they are often part of a larger chain, and will need to take into account in the developments concerning sustainability and social inclusion. The Pop-Machina project could engage with interested SMEs. The education representative from local colleges and vocational high schools indicated that they see Pop-Machina and KanDoen as a good opportunity to collaborate, especially for students.

KanDoen, an organisation within the Municipality of Venlo, is another resource for the city. The aim of KanDoen is to provide work for citizens with a distance to the labour market. It has three centres in Venlo, where volunteers and employees work on production tasks such as bicycle repair, artisan crafts, and tasks sub-contracted from nearby manufacturing companies. KanDoen is the organisation in Venlo that will be implementing the Pop-Machina project. The aim is, by implementing the Pop-Machina project, the activities of KanDoen can be move towards the circular economy.

In terms of urban development, Venlo still has some industrial areas, such as the inland port for container shipment (Seacon), and Greenport Venlo, a business and innovation park for sustainable businesses. Venlo has an attractive surrounding landscape, and surrounding villages like Arcen and Steijl host events and festivals, as well as tourists from the surrounding area.

In terms of events, Venlo is home to many annual festivals. This is because Venlo, like other municipalities in the South of the Netherlands, celebrate carnival, a Western Christian festive season that occurs before the liturgical season of Lent. Carnival involves large festivals and parties with an emphasis on role-reversal and the suspension of social norms.

Through the participation of a board member of the annual Zomerparkfeesten (Summer Park Parties) in the workshop, it is possible for KanDoen/Pop-Machina activities to connect easily to the event. The board member is responsible for making the festival more sustainable.

Table 12. Summary of Venlo's resources

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT	EVENTS
Canon, AMI, AGMI, Blue engineering, ECOR, Jalema; C2C certified companies, logistics hub of EU	projects in Randstad, C2C expo lab, sustainability desk (duurzaamheids-loket)	practical skills, cross border workers from EU	inland port/container transhipment (Seacon), Greenport Venlo	summer festivals, carnival
		cradle to cradle network, a lot of SMEs	villages like Arcen en Steijl and a lot of events/festivals, attractive landscape	
		KanDoen		
		vocational high schools		

6.3.3.2 Needs

Despite the development of cradle to cradle networks, participants observed that there is a need for awareness of sustainability in wider society. The Pop-Machina project gives Venlo the opportunity to raise the circular economy to a higher level and accelerate the circular transition. A lot is happening in Venlo in this area, but it can be done much better and quicker. For example, developments in the recycling industry, especially in the field of textiles, need a boost. Another example is the challenge to reduce the use of plastic and to be able to reuse plastic waste.

The lack of awareness or interest can be seen in the repair cafes of Venlo. The repair cafes were invited for the workshop, but they were not interested to join, because they are not a formal organisation, and find the Pop-Machina approach too scientific. They are unaware of their contribution to the circular economy. The municipality will try to organise a separate meeting with the repair cafes.

Participants noted that more education is needed for SMEs on entrepreneurship and market developments, so that local businesses could stay competitive. There could be more information available for sustainable transitions, such as how neighbourhoods can become more circular. A potential solution could be creating a 'library' for financially viable circular solutions for Venlo's neighbourhoods.

More general weaknesses include population decline as citizens move from Venlo to larger cities in the Netherlands, resulting in a lowered working population and an aging society. A participant suggested that Venlo could therefore focus on the ‘silver economy’, producing products and services aimed at the elderly population.

Participants have noted that Venlo is slow in responding to market developments and have missed opportunities for economic growth in the past. An example of this is when developers wanted to build a new designer outlet store in the city centre in Venlo. Local shop owners were strongly opposed to this development, and the outlet store was built instead in Roermond, a smaller neighbouring city. As a result, Roermond experienced economic growth, and Venlo was left behind.

Table 13. Summary of Venlo’s needs

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
healthier and more circular food	not enough circular awareness	population decline, brain drain, aging society	vacant stores in city centre, problem neighbourhoods
		education needed on entrepreneurship and market developments, citizens on sustainable neighbourhoods, ‘library’ for financially viable circular solutions	
		C2C network, knowledge events and platforms	

6.3.4 Future – goals and barriers

6.3.4.1 Goals

Venlo aims to have a stronger regional position economically and in terms of sustainability. Existing industrial activity could be maintained, and the hospitality sector can be developed to cater to tourists from neighbouring Germany.

In terms of society, more collaboration should be encouraged between citizens, companies, and knowledge institutions. The existing network of SMEs should be upheld and further supported.

In terms of urban development, the municipality aims to develop the ‘Kazernekwartier’, the old army barracks, into a tourist area in the future. The Brightlands Campus in Greenport Venlo, an innovation hub in Venlo which focuses on healthy food & nutrition, future farming and bio circular economy, is also a potential area to work with.

Table 14. Summary of Venlo’s goals

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
strong regional position economically	strong regional position economically and in sustainability	citizens, companies, knowledge institutions; upholding SMEs	development of the ‘Kazernekwartier’ (old army barracks, future tourist area)
industry and hospitality (German tourists)	reuse	ownership in district agreement	make use of Brightland campus and Greenport; make use of being a shrinking region
	awareness about sustainability		

6.3.4.2 Barriers

The main barrier for Venlo is a weak definition of sustainability, which causes confusion between partners and stakeholders. The aging and shrinking population weaken the city's labour force and economic development. In terms of urban development, there is too much focus on the city centre of Venlo, and not on the surrounding neighbourhoods.

Table 15. Summary of Venlo's barriers

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
	robotisations, weak definition of sustainability	aging population	too much focus on Venlo centre, and not on surrounding neighbourhoods

6.3.5 Project – plans and ideas for next steps of the Pop-Machina project

6.3.5.1 KanDoen

The Pop-Machina project in Venlo will be implemented by KanDoen, which is a municipality organisation that provides a low-stimulus work environment for citizens with a distance to the labour market. It already has three established centres with workshops for wood, bicycle repair, art, and other production activities. KanDoen is interested in the following projects that could connect to Pop Machina:

1. Bird houses

Wasted wood will be reused for the production of birdhouses. These birdhouses help in the combat of the processionary caterpillars and the owners of the birdhouses will have a role in the combat ...

2. Upcycling of materials into new products

KanDoen upcycles discarded banners, flags, cloths, clothing and such. For example, shopping bags, laptop bags, pencil cases, toiletry bags, cuddly toys or even bags for a mobility scooter, are made. The materials are supplied by various organisations, such as events, companies, foundations, and clubs and so on. Anyone can donate materials, so that a new life can be given to these materials. By upcycling the products, procurement of new materials will not be needed to create a new product and therefore CO2 emissions and the use of other chemicals can be reduced.

3. KanDoen is going to connect with the ‘sustainability desk’, or ‘duurzaamheids-locket’, which aims to connect sustainability actions with social initiatives in neighbourhoods. This collaboration leads to various initiatives in the neighbourhoods.

4. Orphan bicycles

In Venlo are a lot of ‘lost’ bicycles. KanDoen collects them, repairs them or will reuse the materials for new bicycles. These bicycles will be sold to people with a small budget or will be used for immigrants for cycling lessons.

5. Improving the sustainability of the KanDoen centres. KanDoen is settled in old buildings which are not very sustainable by improving the buildings with help of the KanDoen participants it increases the awareness of sustainability and the buildings become more future proof.

6. Creating awareness concerning circularity (finding your own raw materials to upcycle)

Venlo is a city where a lot of events are organised. KanDoen is an organisation that can provide the necessary people to make, at least a part of, the necessary production process possible. The people that participate will be able to collect the used materials, such as banners, and make new circular products in KanDoen facilities. In order to help the KanDoen employees in this process certain capacity will be needed with sub-contractors (depending on willingness of volunteers).

6.3.5.2 Wider strategy of the municipality

The Pop-Machina project has the potential to collaborate with other initiatives of the municipality, under a wider strategy for Venlo to become a ‘Circular and Sustainable Capital’. This implementation programme is based on the ambition document ‘Venlo Circular 2018-2030’, and focuses on a translation of the three major tasks for the coming years:

- energy transition;
- climate adaptation;
- circularity.

Wherever possible the Municipality of Venlo will work on these three tasks together. For example in the project ‘The green street’. The aim of this project is to involve environmental aspects into the design of the public space. Measures will be taken in the public space for climate adaption, energy transition and circularity.

The Municipality of Venlo hopes to inspire inhabitants and businesses to get started too on the sustainable transition too. The Municipality will start a pilot in 2020, in which the municipality will explore, together with education partners, whether such a project can contribute to employment in the neighbourhood.

Another new project being carried out in 2020 is the Sustainability desk in the neighbourhoods. In this project, connecting physical developments to social developments is a requirement.

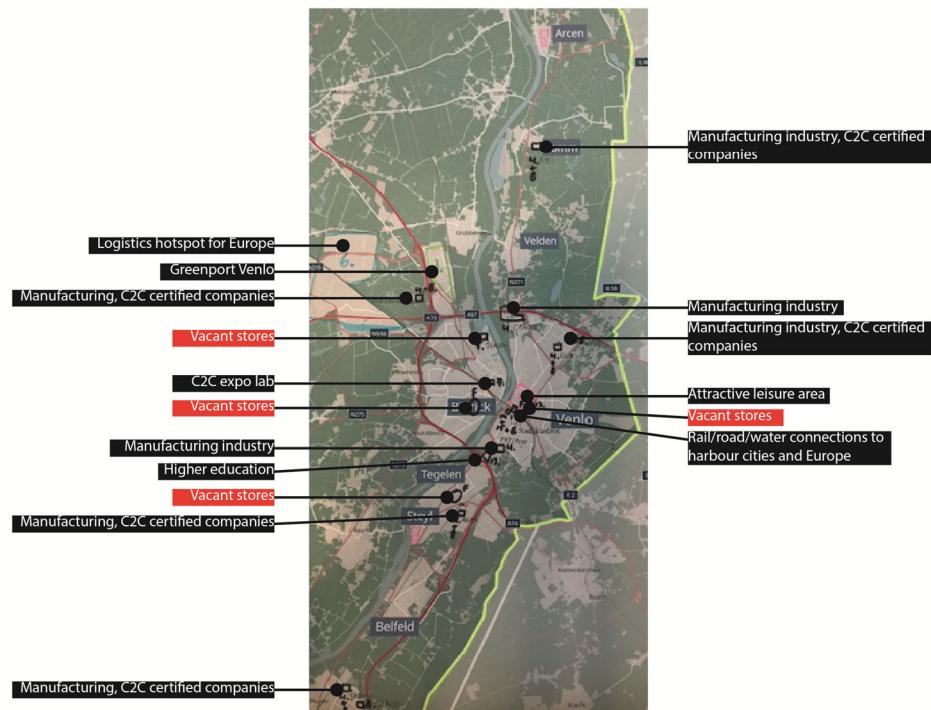
6.3.6 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.3.7 City maps

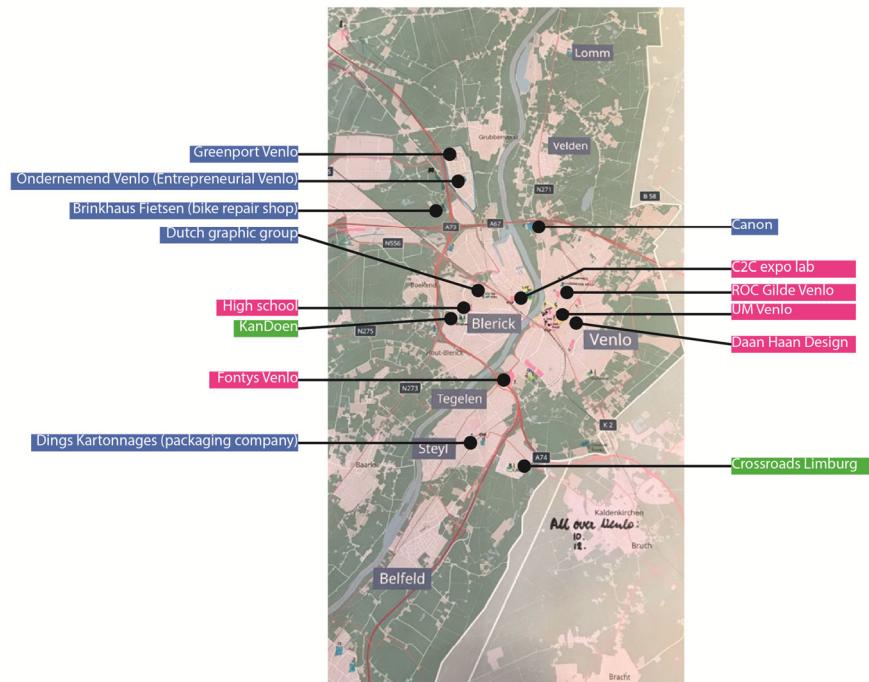
6.3.7.1 Resources and needs

Figure 17. Map of Venlo's resources (black) and needs (red)



6.3.7.2 Stakeholders

Figure 18. Map of stakeholders in Venlo; businesses = blue, higher education = pink, government = green



6.4 Santander

Population	172,044
Area	35 km ²
Density	4,900 people/km ²

Figure 19. Satellite image of Santander



Figure 20. Photo of the Santander workshop



6.4.1 Past – positive memories and negative trauma

The city of Santander had a rich history of industry in the past. Because the city is next to the sea, there was fishing-related manufacturing as well of shipyards. There were various other factories in household goods, such as household appliances (Cork, Teka), faience (tin-glazed pottery), and wood (la marga); consumer goods such as breweries and tobacco (tabacalera); as well as large-scale industries such as metallurgy (Global steel wire, Saint Gobain, Ferrolantica), the surrounding cattle industry, and chemical industry (Solvay). The establishment of the port of Santander allowed for trade with colonies in the Americas.

During the 80s, Santander started converting industry activity to services, focusing on tourism and health tourism. As a consequence, most industry left the city, causing population decline. Participants saw Santander's community as a conservative society, with a lack of attitude for entrepreneurship and innovation. In the next sections, participants see population decline as a major weakness for the city.

Table 16. Summary of Santander's past

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
positive			
fishing-related manufacturing, shipyards, breweries, household appliances (Cork, Teka), faience factory (tin-glazed pottery), Wood factory (la marga), Tobacco (tabacalera), Metallurgy (global steel wire, saint gobain, Ferrolantica), cattle industry, chemical industry (Solvay)		summer holidays of royal family, health tourism, industry moved to surroundings	
maritime trade relationship with America			
negative			
80s - conversion of industrial activity to services, most industry left the city causing population decline		conservative society with little entrepreneurship/innovation attitude	

6.4.2 Present – resources and needs

6.4.2.1 Resources

Although most of Santander's industry has left the city, some industrial activity still remains. The city continues to have sea-borne trade via the mid-size port in the city, specialised in car trading. The city continues to produce house appliances in two factories, as well as steel wire. Because of the increase in tourism, there are artisan craftworks made locally that are sold to tourists.

In terms of sustainability, Santander is near CEDREAC, the Documentation and Resources Centre for Environmental Education in Cantabria. The centre serves as a meeting and training space for all environmental educators in the region, as well as for entities and people linked to Environmental Education or interested in knowing and transmitting environmental values.

In terms of society, the city is home to a local fablab, which provides workshops on digital fabrication techniques such as 3D printing, electronics and programming with Arduino, and drawing with CAD (computer aided design). The city council has started 'young space', an initiative that involves youngsters.

Santander is home to a network of ICT firms, which are represented in the city by ASCENTIC association, the ICT companies association. Santander is beginning to put itself on the map with smart city initiatives funded by the EU, such as Smart Santander, which uses sensors deployed throughout the city to monitor various pieces of city infrastructure, such as lighting, parking, and

even when trash cans are filled up. These initiatives are often started by Santander's small but prestigious university, University of Cantabria. There is potential for the Pop-Machina project to collaborate with existing smart city initiatives.

In terms of urban development, Santander has a mid-size by specialised car trading port, as well as a technology park PCTCAN. As for tourist attractions, the city has its docks, city centre, and the sardinero beach.

The city hosts various events, such as music festival Fair of Nations, 'Festival de la Naciones'; and Smart weekend, which hosts workshops, talks, round tables and exhibitions related to the latest technologies.

Table 17. Summary of Santander's resources

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT	EVENTS
sea-borne trade, automotive port, home appliances, steel wire	CEDREAC resources and documentation for environmental education in Cantabria	environmental awareness of youth	mid-size but specialised (mainly car trading) port; technology park PCTCAN	fair of nations, smart weekend, 'the night is young' workshops, networking in climate change
local craftworks for tourism	2030 agenda for sustainable development	local fablab, initiatives with youngsters (young space, initiative of city council), corporate social responsibility network	docks,	
waste recycling business (AMICA)		smart city initiatives, ICT firms	city centre, sardinero,	
		small but prestigious university	southern slope of General Dávila street	

6.4.2.2 Needs

Santander is experiencing population decline, as young people move to bigger cities with more opportunities. This is leading to a 'brain drain', a lack of talented employees in the city, as well as an aging society. There is a lack of work for youth in the city.

During the workshop, participants stated that there needs to be a better entrepreneurship ecosystem that supports small businesses, as well as spaces for them to grow, leveraging innovative projects into self-sustainable ones. This can be done through creating an open space for innovation and making, providing resources and coaching for kick-starting innovative ventures, and more cooperation among different companies in the area. The ICT industry in the city could have more involvement with local issues and share their knowledge with other initiatives in the city.

In terms of sustainability, there is a lack of awareness of the value of waste materials, as well as a lack of space for innovative sustainable projects. There is a lack of initiatives for sharing knowledge and tools, such as repair cafes.

In terms of urban development, the city's neighbourhoods Cabildo, Calle Alta, Cueto, Monte, as well as the city entrances are in decline. Commerce in the city centre is dying because there are larger shopping centres in the surrounding area.

Table 18. Summary of Santander's needs

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
decline of industry	understanding of value of waste materials	population decline, brain drain, aging society	Cabildo, Calle Alta, Cueto, Monte, city entrances; dying commerce in city centre because of surrounding shopping centres
	lack of space for innovative sustainable projects	lack of work for young people	
		awareness of sustainability	
		entrepreneurship ecosystem, spaces, ICT industry involvement, knowledge sharing initiatives	

6.4.3 Future – goals and barriers

6.4.3.1 Goals

For Santander, the goals for sustainability relating to the Pop-Machina project is to promote more local production and consumption, as well as creating a registry of potential secondary raw materials. There is a need to clarify the regulation framework for the circular economy, and to promote the changes to enable it. There could be a repository of solutions for the circular economy that the local community to choose and learn from, as well as more understanding of repair and prototyping. A marketplace for secondary materials could be established to encourage better use of waste.

In terms of social aspects, participants remarked that there is the potential to join efforts with existing smart city initiatives, instead of creating yet another ‘new’ thing. This is an interesting idea, since the fablab of Santander has projects on electronics and coding, such as making products using Arduino, which is an open-source electronics platform based on easy-to-use hardware and software. The Pop-Machina project can take advantage of the city’s festivals to do workshops with citizens, to co-create practical sustainable actions that are specific to Santander. There is a need for the municipality to clarify sustainability transition directives.

The existing maker community could be promoted and upskilled into businesses, and engage with private companies, creating a habitat in the city to retain and attract talent.

Table 19. Summary of Santander's goals

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
	local production and consumption	existing smart city initiatives, private companies; tourism, recycling; retain talent; maker community into entrepreneurs; more interaction between youth and elderly	
	registry of secondary raw materials	workshops in festivals for citizens; for practical actions for Santander;	
	repository of circular ideas; on repair and prototyping	clarify sustainability transition directives	
	marketplace for secondary materials		

Table 20. Summary of Santander's barriers

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT
	lack of support for CE, not enough lobbying, strong competition with neighbouring regions, too focused on hospitality	global economic crisis, not enough funding, aging population, brain drain	transport infrastructures are bad

6.4.4 Project – plans and ideas for next steps of the Pop-Machina project

Santander will setup a centre in which it will combine a makerspace with complementary facilities that reinforce the centre to become an innovation pole of attraction to entrepreneurs and innovative companies of the city. The makerspace will be equipped with state-of-the-art machines such as 3D printers, laser cutter, CNC and other general tools and workshop material. There will also be specific machines focused on plastic reuse and recycling, they will be defined further during the development of the project.

The complementary facilities will be a small meeting room, several breakout spaces for design and work in small groups and a medium presentations room with higher capacity. The layout of the makerspace including the breakout space will have an open concept in order to foster collaboration and synergy among ideas and people. One of the aims of the City Council is to revive the economic fabric and to foster the creation of new business based on innovative technologies.

Currently, several municipality buildings have been identified. Two of them are very suitable for becoming the centre, the first one located in the premises of the Local Development Agency and the other one located in city zone in which the City Council is performing an intervention under programme of strategies sustainable and integrated urban development. The adaptation of the space to become a makerspace with the additional facilities described in the preceding paragraphs raises the need of subcontracting external services and works. There will be a need for simple works including electrical and IT facilities, and the associated internal architecture project.

Regarding the equipment, apart from its purchase that will be done directly by the purchase department, the need for a small service subcontracting for defining the purchase has been identified. The nature of the equipment has to be aligned with the objectives of the project and the current state-of-the-art of maker movement and it is reasonable to think that there is not enough knowledge in the municipality and external support will be necessary. The infrastructure and equipment defined in this

proposal will be dedicated specifically and exclusively to the activities of this project. Also, during the project activities there is a set of activities of a very specific nature related to the maker movement that will make it necessary to subcontract specialists in the area. The city council has dedicated staff especially for events and activities, but this will need to be complemented with these specialists through subcontracting.

6.4.5 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.4.6 City strategy map

Figure 21. Map of Santander's stakeholders

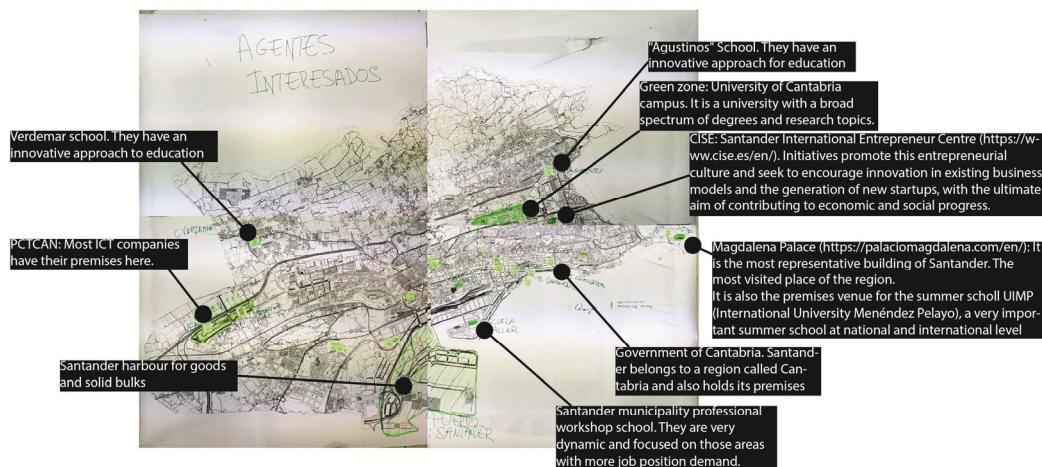
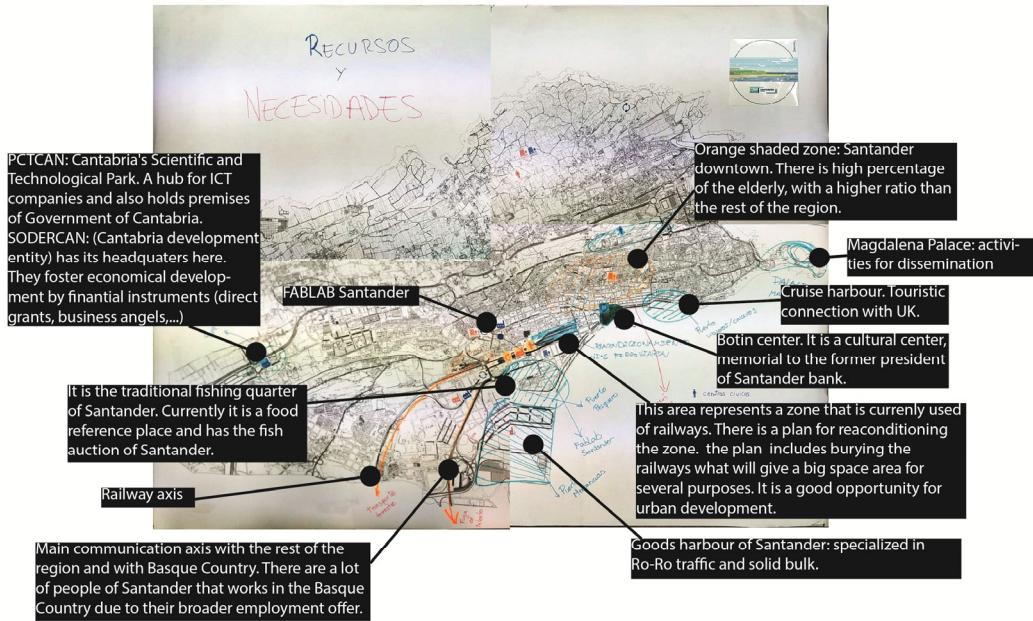


Figure 22. Map of Santander's resources and needs



6.5 Kaunas

Population	328,763
Area	157 km ²
Density	1,935 people/km ²

Figure 23. Satellite image of Kaunas

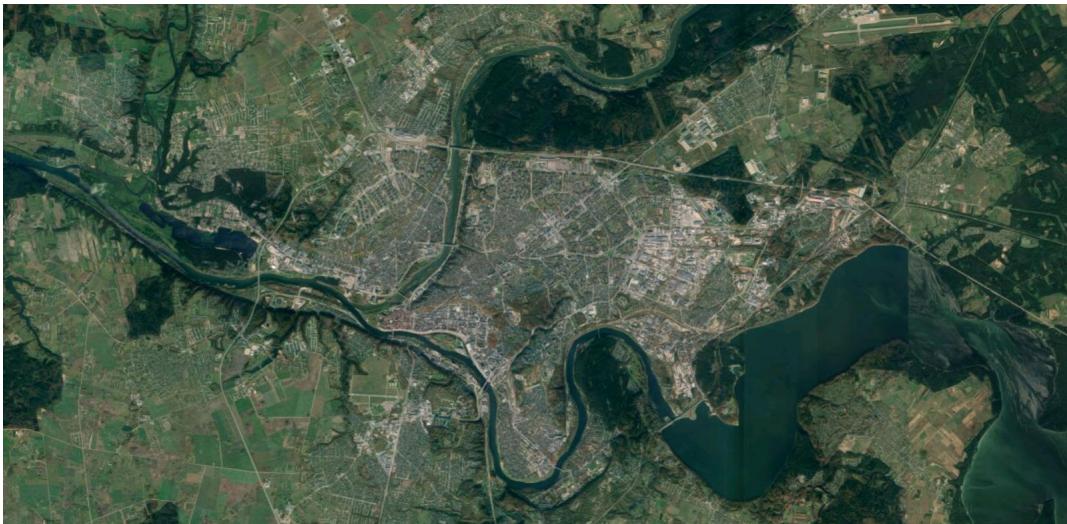


Figure 24. Photo of the Kaunas Workshop



6.5.1 Introduction

The pilot profile workshop of Kaunas was held on 22 January 2020. There were 42 participants, from the following sectors:

- scientific community (higher education, research): 12;
- industry: 10;
- civil society: 12;
- policy makers: 8.

The objective of the pilot workshop was to gather information regarding maker community stakeholders in the city, identify the current situation towards circular economy, and find out the needs, resources and goals towards Kaunas vision on the circular economy. In this context, it was found that makers are not aware of each other as well as other stakeholders of the ecosystem in the city, there is a lack of applied knowledge on how to promote circular initiatives. High demand is needed for raising the awareness and educating the society towards circular economy principles, culture of making, reuse, recycling, consumption, and waste management. Better dialogue between local government and communities is missed. Improvement of legal framework and regulations are necessary in order to stimulate a smoother transition of Kaunas into a greener consumption. City could aim to facilitate for their citizens, so that they more easily make choices for better/smarter/circular goods and services to reduce waste and promote more sustainable consumption patterns.

During the workshop different stakeholders of maker movement had a chance to meet, know each other, discuss and exchange ideas regarding future cooperation, work and goals. Some participants exchanged business cards by the end of the event. Furthermore, new stakeholders were added to the preliminary stakeholders list, in between, could be mentioned Kaunas University of Technology, Kaunas Maker space.

6.5.2 Past – positive memories and negative trauma

In the past, Kaunas was home to various industrial activities. This includes already collapsed industries of aviation on motor vehicle production, as well as consumer goods such as porcelain, electronics, furniture, and printing. The city had a ship building industry and served as a logistics point for Nemunas, the biggest river in Lithuania, which flows through Kaunas.

During Soviet times, the presence of industry made citizens richer, more entrepreneurial, flexible, and resourceful. There was an emergence of ‘home makers’, people that started businesses by making upcycled products from the waste streams of nearby manufacturers. Like many other pilot cities, industrial development impacted the urban development and growth of the city, attracted more residents, and ensured a stable household income for citizens.

Table 21. Summary of Kaunas’ past

	INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
positive	ship building, aviation (collapsed), tank restoration, porcelain, electronics, chemistry, furniture, printing, logistics through Nemunas (river)			
	home-makers during soviet times upcycled items thrown away from manufacturers, more entrepreneurial citizens			
negative		polluting production		

6.5.3 Present – resources and needs

6.5.3.1 Resources

In terms of industry, various sectors were mentioned as existing sectors of interest. In terms of high-tech industries, the city has expertise of Nano technology and bio-technology. Consumer goods were mentioned, such as food, textile, furniture, and printing. Industries related to the built environment were mentioned, including the construction industry and metal working. The city has a well-functioning system of collection and recycling of packaging, an initiative that engages public companies, private companies, and citizens.

Participants mentioned that makers and the ‘Fourth Industrial Revolution’ were shaping new trends in production. The ‘Fourth Industrial Revolution’, or ‘Industry 4.0’, is a trend towards automation and data exchange in manufacturing technologies and processes, which include digital fabrication, the internet of things (IoT), cyber-physical systems (CPS), cloud computing, and artificial intelligence.

In terms of sustainability, Lithuania is currently harmonising EU regulation and national policy towards a strategy in plastics and waste management.

In terms of society, Kaunas’ population is creative and entrepreneurial. The city is home to start-ups and arising makers, such as the Kaunas makerspace, as well as craftsmen and artists. The city also hosts a strong academic community, from the Kaunas University of Technology.

In terms of urban development, Kaunas sits in a convenient logistical location, and has the potential to become a leader in logistics and production in the Baltic countries. The city has various areas that are waiting for urban expansion, such as the city’s former aviation factory, as well as the neighbourhoods Aleksotas and Vilijampolė. There are unused buildings belonging to the municipality that could host the future makerspace of Pop Machina. The city has community gardens, which creates the potential for urban farming and producing food locally.

The city founded the ‘Kaunas Free Economic Zone’ since 1996, which is a 534 hectare industrial development area which offers favourable taxes for investors that invest at least 1 million euros into the area. There are currently investments into chemical and furniture industry there.

In terms of events that the Pop-Machina project could connect to, Kaunas has been selected to be the European Capital of Culture in 2022. The city’s cultural programme will need a strong European dimension, and will involve the city’s residents, stakeholders, and neighbourhoods, and should attract visitors from the whole country and Europe. More detailed plans can be seen [here](#).

Kaunas celebrates hanseatic days, which is a festival with a medieval theme, as part of the celebration of the birthday of the city of Kaunas. Kaunas is the only Lithuanian city that is part of the union of the New Hansa cities. The festival features mediaeval culture, music, dances, plays, games and crafts, as well as knights fighting in an international tournament to a win a sword of the chief of the Lithuanian army.

Table 22. Summary of Kaunas’ resources

INDUSTRY	SUSTAINABILITY	SOCIETY	URBAN DEVELOPMENT	EVENTS
nano technology, bio tech, food, wood, construction, textile, furniture, printing, metalworking, well-functioning collection and recycling of packaging	national policy on plastic, waste management	creative, entrepreneurial, talented citizens	former aviation factory	Hansa days, Kaunas European Capital of Culture 2022
makers, fourth industrial revolution		EU funded projects, initiatives led of business and civilians	Aleksotas, Vilijampolė waiting for urban expansion; community gardens; unused buildings of the municipality	
		start-ups, craftsmen, artists	free economic zone of Kaunas	
			free economic zone Kaunas	
		strong academic community		

6.5.3.2 Needs

In terms of industry, there is a need for more promotion of SMEs (small medium enterprises) in the local production of products and renewable energy. There is a need to revitalise the diminishing light industry from the past, such as the sewing industry. Related to that, there is a large amount of waste produced by the existing textile industry, which could serve as secondary raw materials.

In terms of sustainability, the city’s knowledge and consciousness of the issue needs to be increased. There should be more education of society on circular economy principles, and the importance of sustainable production. Participants hope for a revival of the endangered habit to repair, which was more prevalent in the past. Participants identified several waste streams of interest, namely plastic packaging and bio-waste, because of this, the sustainable operation of supermarkets was mentioned.

In terms of society, participants identified the socially vulnerable groups in the city as disabled and elderly people, as they were less integrated in society. Education and training were topics of interest, and participants identified that there could be more re-skilling and retraining in industrial skills and new industry trends for socially vulnerable groups. Like many other pilot cities, participants saw the

need for better dialogue between the diverse stakeholders in the city on this issue – the local government, civil society, and SMEs.

In terms of urban development, there is a need for more publicity and transparency during urban planning processes in the city. The city has several problematic areas with bad infrastructure, such as Vilijampolė, Aleksotas, Ž.Šančiai, Dainava.

Table 23. Summary of Kaunas' needs

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
textile waste, sewing industry	revival of endangered habit to repair	disabled, older people	problematic areas with bad infrastructure: Vilijampolė, Aleksotas, Ž.Šančiai, Dainava
	plastic packaging, supermarkets, bio-waste	retraining older people in new industrial trends, reskilling vulnerable groups	publicity and transparency in urban planning
		better dialogue between local government and communities, business ecosystem for SMEs	

6.5.4 Future – goals and barriers

6.5.4.1 Goals

The goals in sustainability and industry are combined in this section, because all the goals relate to both topics. For existing industry, manufacturers should be asked to take more responsibility for their environmental impacts and the circular economy. There could be more promotion of a zero-emission industry. The development of smart technologies can help production to be as close to the consumer as possible, decreasing costs and pollution from transport. Items and material flows throughout the city could become more traceable, allowing stakeholders and makers to understand where they can source secondary raw materials.

In terms of society, there could be a platform that allows for a stronger relationship between makers, researchers, and politicians. In terms of education, there could a strong focus on society, starting with the younger generation. There could be tailored training programmes that are focused on practical skills and results.

In terms of urban development, there are areas in the city that can be made use of, such as the former radio factory, and the city's water territory in Žaliakalnis. Participants suggested a goal to create a Bohemian district in Kaunas, which could host different events like re-making or repair workshops, creative workshops, and educational events.

Table 24. Summary of Kaunas' goals

SUSTAINABLE INDUSTRY	PEOPLE	URBAN DEVELOPMENT
manufacturer's responsibility	more communication between makers, researchers, politicians	make use of the city's areas like Radio factory, Kaunas water territory in Žaliakalnis; create bohemian district, creative workshops, educational events
smart technology, production close to the user (decrease costs and pollution from transportation)	platform for communication	
traceability of items	for young generation; on training programme with practical results	
minimise incineration	tax reduction, supervisory mechanism for manufacturers	

6.5.5 Project – plans and ideas for next steps of the Pop-Machina project

Kaunas City will increase citizen participation in circular economy by creating a makerspace and empowering them to commercialise their ideas. The city is considering to use one of the municipality's own buildings, which will be converted into a makerspace. The Kaunas team intends to use subcontracting for remodelling the interior of the building and adapting it to the needs of the community that will be co-producing there. The building will have space for experimentation and small scale production as well as a co-working space where different teams can work together and share their ideas and capacities, maybe even find fields for common project and activities. The centre would be used for public events, training, etc.

The Kaunas team finds it important to enable makers not only to create the products based on circular economy principals but moreover commercialise their ideas and be able to sell the products to the public. Therefore, a large part of the makerspace activities will be related to training and marketing. This is also an opportunity to encourage young people to create circular economy-based start-ups. The makerspace would work in close cooperation with other start-up communities in Kaunas. Subcontracting will be used for organising these training and marketing activities.

Based on the needs of the people working in the makerspace, the necessary equipment will be purchased. This may include a 3D-Printer, a laser cutter, CNC machining/routers for rapid prototyping and small-scale production, plastic recycling machinery or some other electronic devices needed for production prototyping.

The target group consists of the following:

- students (environmental engineering, etc.);
- non-governmental organisations (environmental organisations, etc.);
- young people (start-upers, young entrepreneurs).

6.5.6 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.5.7 City strategy map

Figure 25. Map of Kaunas' stakeholders

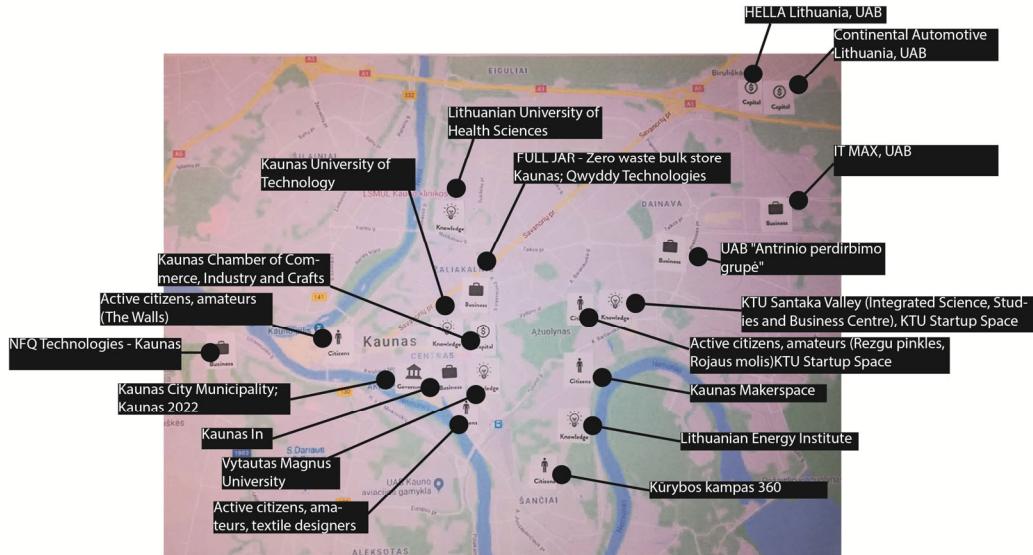


Figure 26. Map of Kaunas' resources and needs



6.6 Thessaloniki

Population	1,108,000
Area	1,285 km ²
Density	7,100 people/km ²

Figure 27. Satellite image of Thessaloniki

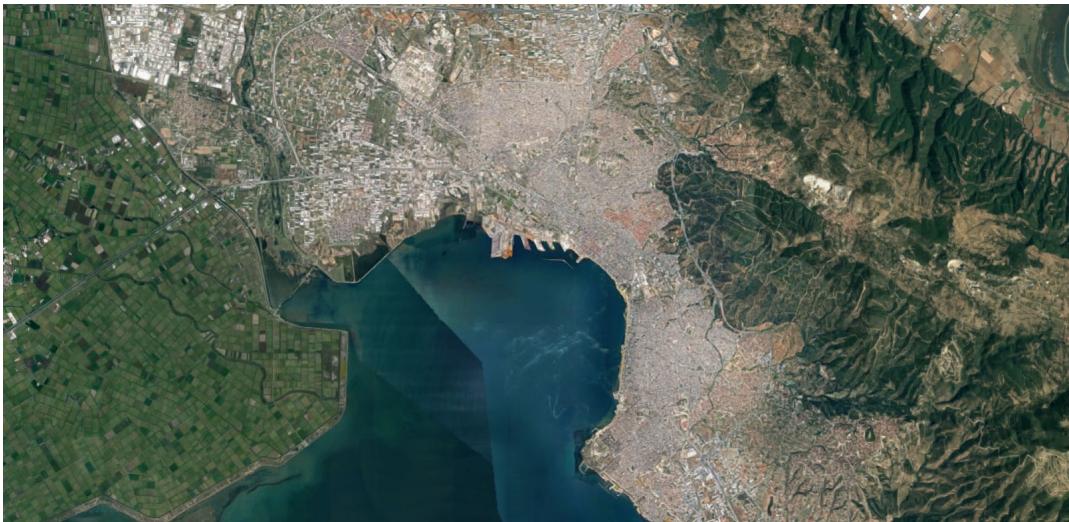


Figure 28. Photo of the Thessaloniki workshop



6.6.1 Introduction

The pilot profile workshop of Thessaloniki was held on 25 January 2020, in the OK!Thess Start-up Hub, there were 10 participants in total, from the following sectors:

- industry: 3;
- civil society: 2;
- general public: 1;
- policy makers: 3;
- media: 1.

The event was aimed at gathering the perspective of stakeholders relevant to Pop-Machina's objectives. To this end representative were invited from all stakeholders of the quadruple helix including higher education, civil society, industry/business sector and governmental (central & local) sector.

In addition to the aims set by WP5 leaders, the overarching goal of the Thessaloniki workshop was to introduce the participants to the goals and objectives of the Pop-Machina project as touchpoint for makers active in the field of circular economy and how the municipality and especially the Department for Entrepreneurship, responsible for running the project, aims to build on it in terms facilitating grassroots maker initiatives.

Following a brief introduction to the project and the presentation of the Pop-Machina video, which received positive comments and feedback in terms of clarity, Ms Elli Vouzoglani, leading the Dep. of Entrepreneurship addressed the participants on how the project aligns with other municipal initiatives in the field of entrepreneurship and especially innovative efforts with international scope. She went on to describe the municipality's vision in terms of how grassroots efforts could be supported not only to dive deeper into what circular economy has to offer, but also how they could be in due time, facilitated by the right tools and networks, be transformed to scalable entrepreneurial activities.

Subsequently the participants were greeted by Mr. Vyron Chrysovergis representing the umbrella start-up initiative of OK!Thess, who pointed out how significant it is for the hub not only to provide knowledge and coaching to its start-up teams but also to help teams addressing more tangible projects have access to a fully equipped makerspace for quick prototyping and small pilot productions. Considering the buzz around circular economy and changing mentalities, he continued to say, that relevant start-ups from Thessaloniki and the wider region will now be able to enter the arena and fully commit to taking the next steps. Additionally he pointed out that OK!Thess's network of makers and mentors will be made fully available to the wider network of the project.

Following that Mr Nikolaos Tsioniotis presented Pop-Machina in more detail providing information about its consortium, the project's scope and the wider picture as supported by the consortium partners and the European cities involved. The specific goals of the workshop were to:

- source information about Thessaloniki's past and present state, as well as attempt to imagine how the future of the city could look like;
- identify its needs, stakeholders, resources and goals as these correlated with the project's objectives;
- elaborate on the stakeholders active in the city that could be proven valuable allies to the project's activities and potentially leverage its outcomes;
- elaborate the resources and needs of Thessaloniki on large scale physical maps, in order to visually indicate areas of interest and the correlation between current conditions and required urban and peri-urban planning required in the future.

The participants were highly engaged to the discussions that took place, providing valuable feedback stemming from their unique views including historical and sectoral knowledge. Correlating their diverse backgrounds, they were able to augment their initial thoughts on the questions posed during the workshop providing valuable informational content and reaching a consensus on the needs of the city driving it to the future. This was highly useful considering the municipality as well as decision

makers from the prefecture of Central Macedonia were present, as their discussions informed some of their next steps in the upcoming innovation voucher schemes.

The workshop was concluded in a hyped atmosphere about the future of the project and how grassroots efforts can be assisted in their endeavours as part of the circular economy, as well as instigated a number of appointments already arranged for the coming weeks between the municipality, OK!Thess and two of the civil society initiatives in order to discuss further strengthening cooperation starting Q2 of 2020.

6.6.2 Past – positive memories and negative trauma

In the past, Thessaloniki's industry featured the production of tobacco, clothing, and agricultural products. The city had a closed and introverted economy, and was mainly driven by family businesses. Because of its port access,¹² the city's trading boomed, generating wealth. Now, according to the participants, the city is moving towards the tertiary sector, focusing on education, tourism, and retail.

In terms of its people, Thessaloniki is a multicultural city, with its culture infused by changing populations. Educational institutes were set up in the city by the US, Germany, and France, representing foreign powers affecting the local culture and economy.

In terms of negative memories, the city experienced recessionary periods that crippled the primary and secondary sectors, causing high unemployment over several periods. The city landscape has changed abruptly over the years, and until recently, the quality of infrastructure suffered.

¹² The Port of Thessaloniki (Greek: Λιμάνι της Θεσσαλονίκης) is one of the largest Greek seaports and one of the largest ports in the Aegean Sea basin, with a total annual traffic capacity of 16 million tonnes (7 million tonnes dry bulk and 9 million tonnes liquid bulk). The Port of Thessaloniki contains the second largest container port in Greece, after the Port of Piraeus.

Table 25. Summary of Thessaloniki's past

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
positive			
production of tobacco, clothing and agricultural products prominent		multicultural city	
closed and introverted economy, family business driven		culture infused by changing populations	
port access, trading boomed		representation of outside powers affecting culture and economy (Educational institutes by US, Germany, France)	
primary and secondary sector produced wealth		sports teams affected local culture as well	
moving to tertiary sector (education, tourism, retail)			
negative			
city landscape changed abruptly over the years		recessionary periods crippled the primary and secondary sectors	
infrastructure suffered until recent years		social and ethnic clashes existed changing the ethnic mix and affecting productive sectors	
		high unemployment rate over several periods	

6.6.3 Present – resources and needs

6.6.3.1 Resources

In terms of resources, the city listed tourism, universities, infrastructure, and international expos.

Table 26. Summary of Thessaloniki's resources

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT	EVENTS
tourism		universities	infrastructures (airport, railway, highways, port)	international expos

6.6.3.2 Needs

In terms of needs, the recession has cost the local economy its viability. The city suffered from 'brain drain', with talent moving away from the city, reducing human capital. Participants remarked that luckily, the establishment of educational institutes has recovered much of the lost talent.

There are needs associated with lack of communication between different organisations. There is a lack of 'extroversion' from institutions and companies, in the form of technology transfer and creating ties with local citizens. There is a need to connect institutional with grassroots efforts.

In terms of urban development, there is a lack of public spaces and green areas in several neighbourhoods. There is a lack of spaces for creativity.

Table 27. Summary of Thessaloniki's needs

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
	lack of strategy to circular economy	brain-drain reduced human-capital, yet educational institutes recovered much of it	lack of public spaces in several neighbourhoods
		unemployment	lack of creativity spaces
		lack of extroversion from institutions (i.e. Tech transfer, ties with citizens)	low quality public transport still a problem
		connecting institutional with grassroots efforts	less green areas than needed
		recessionary period cost the local economy its viability	

6.6.4 Future – goals and barriers

6.6.4.1 Goals

In terms of people, participants proposed goals that were related better communication between different stakeholders. Universities could be more extroverted, interacting with the local community, and conduction research with a social impact in mind. Meaningful alliances between citizens and authorities should be created, and communal efforts should be brought in the spotlight. In terms of entrepreneurship, there could be better support for new entrepreneurs and SMEs, with upfront funding rather than post-expenses compensations. People involved in initiatives should also be upskilled.

Table 28. Summary of Thessaloniki's goals

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
	- high quality specialisation	extroverted universities	- innovation zone
	- green & sustainable development	research with a social impact in mind	
		create meaningful alliances with citizens and authorities	
		support new entrepreneurs and SMEs with upfront funding rather than post-expenses compensations	
		bring communal efforts in the spotlight	
		upskill people involved	

6.6.5 Project – plans and ideas for next steps of the Pop-Machina project

6.6.5.1 General agreements of the workshop

Plans and next steps for the Pop-Machina project were discussed during and after the workshop, and focused mainly on the creation of a makerspace, better communication and engagement of the stakeholders, as well as some steps towards diverting and reusing waste streams.

It was agreed that the establishment of a fully equipped makerspace is a much-needed enabler for Thessaloniki's maker especially for prototyping activities, and that a wider European network of maker communities would be a good step forward for the city's extroversion and exchange of best practices.

For the engagement of stakeholders, discussions focused on connecting grassroots efforts with the municipality's efforts, as well as developing a better environment for entrepreneurs from the perspective of Pop Machina. Civil Society representatives were highly engaged with the vision of Pop-Machina expressing their interest in further discussions which are already set up for the following weeks. Non-participants also contacted the municipality, following the event, expressing interest in discussions about the breadth of the project and how they could support/benefit from further engaging with it. A common ground was that more openness is required if grassroots efforts are to be supported now and in the future, coupled with a closer interaction between local authorities and citizens in order to support a more sustainable urban planning process.

For entrepreneurship-related stakeholders, prefecture representatives were particularly interested in listening to other participants in order to identify room for improvement in funding programmes and especially the upcoming innovation vouchers. OK!Thess, a start-up incubator, identified initial interest in forming collaborations with other citizen initiatives than resonate to its mission in supporting innovative and sustainable entrepreneurship.

In terms of transitioning the city towards a Circular Economy, the municipality found a strong base interest in diverting some of the collected recyclable material to makers as raw material for creative work. Also, an interesting potential collaboration is already in the making with the InCommon NGO, which deals with circular neighbourhoods, and is currently funded by its Swiss HQs. The training curriculum and the accessibility to the makerspace were of particular interest to them.

6.6.5.2 Project actions

To this end, part of the facilities of the municipality's innovation ecosystem and start-up pre-incubator, OK!Thess, will be accordingly redesigned and adapted to serve as an open access makerspace for the city's makers, whilst taking into account all required safety regulatory requirements. The facility will subsequently be ready to host a set of equipment, machinery and relevant workstations stemming from the local ecosystem's needs and requirements identified. These will include among others 3D printing and CNC Machining/Routers for rapid prototyping and small-scale production, plastic recycling/repurposing machinery, as well as electronic equipment and tools required for electronic circuit prototyping and testing. All the provided equipment will be accessed either locally, via use of purpose specific workbenches, control panels and desktop computers, or remotely to the extent possible, whilst participants will be empowered via direct and online training in safely and productively utilising the makerspace equipment capabilities.

6.6.6 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.6.7 City mapping

Figure 29. Map of Thessaloniki's resources and needs



Figure 30. Map of Thessaloniki's stakeholders



6.7 Piraeus

Population	448,997
Area	50.417 km ²
Density	8,900 people/km ²

Figure 31. Satellite image of Piraeus



Figure 32. Photo of the Piraeus workshop



6.7.1 Introduction

The Piraeus pilot profile workshop was held on 29 January 2020. There were 16 participants, from the following sectors:

- scientific community (higher education, research): 1;
- industry: 4;
- civil society: 2;
- general public: 1;
- policy makers: 3;
- media: 1;
- investors: 4.

The workshop was held in the premises of the Municipality of Piraeus and was introduced with an inaugural speech given by the Deputy-Mayor of Programming and Development Mr. Dimitris Karydis. Mr. Karydis welcomed and thanked the present stakeholders and informed them about the Municipality of Piraeus participation in the Pop-Machina project. He mentioned amongst others that

'... The project relates with circular economy and entrepreneurship and emphasises the creation of collaborative employment schemes, giving priority to specific population groups (women, the disabled, the unemployed, etc.). The Municipality of Piraeus has emphasised and prioritised on the promotion of blue growth and entrepreneurship in the areas related to the sea and shipping and to urban development/revitalisation as there are many under-developed areas. It also focuses on waste management and its high priorities for the city at a local, regional and national level. The Pop-Machina project offers a chance to create products that would otherwise be waste and bring new business opportunities to light.'

Gathering ideas, data and ways - in which, the attendees of the workshop could collaborate with UOM and PIR - was made possible and by the end of the workshop, many potential stakeholders - from all types of stakeholders groups (business, knowledge, capital, society, government) - expressed their interest in collaborating.

This discussion led to a better understanding of the ways in which different stakeholder groups could face local pressing needs and challenges and further collaborate in spinning off circular economies from local collaborative production processes, makerspace development and the development of an overarching maker movement in Piraeus.

6.7.2 Past – positive memories and negative trauma

The main activities, which took place in Piraeus, since ancient times (5th century BC), were based on trading. All trading activities were based on a pre-set taxation system and all its economic activities were tightly related with sea-networks. Thus, one could describe Piraeus as a city with retail and trading being based around the shipping industry (e.g. ship building, naval activities, and exchange of foods).

Piraeus is the most ancient organised port in the world that concentrated and still concentrates all the import and transit trade of Athens and more. Since the Golden Ages of Athens, the city was seen as the 'Long walls' of defence to fortify Athens and has seen rapid growth but also declines through its history between 5th century BC and 3rd century BC. As it has always been associated with transportation activities, as well as tourism to the islands of the Greece, Piraeus is since the Modern era, bustling with maritime activities. This sets Piraeus in the position of the largest harbour, marine, maritime and commercial-industrial centre in Greece.

Nowadays, Piraeus is the largest passenger port in Europe that services more than 20 million passengers per year. It is placed among the top ten container traffic ports in Europe and the top container port in the East Mediterranean. The Municipality of Piraeus has hosted major athletic events such as

the 1896 and 2004 Summer Olympics. Piraeus is being highlighted nowadays as one of the key future rail and port network hubs not only in Greece but also globally. It is home to major Chinese investments and retains its strong position in the global sea trade and transport market.

Its population (living within its administrative boundaries) is 163,688 people, which makes it the 5th largest Municipality of Greece.

6.7.3 Present – resources and needs

6.7.3.1 Resources

The type of making involved in Piraeus is based predominately on ship services and part refurbishment as well as on SME activities related with sea/trade/transport activities. The amount of waste being disposed by the 20 million annual visitors of the port of Piraeus pollutes the city as, although it might be considered a small city, it attracts twice the size of the nation. The Piraeus Port Authority (PPA SA) has developed and implemented a management plan in line with the European Directive 2000/59/EC. It aims to reduce of waste discharges into the sea, port and marine environments. These are cargo residues (liquid and solid waste) but can also be domestic or operation waste. This project will focus on domestic waste, which is mainly packaging materials, paper, plastic, cans, bottles and more (e.g. food waste, medical waste, etc.).

Due to wastewater treatment needs, Piraeus has developed an innovative technology on sewage reception services in the Piraeus cruise area, where a wastewater treatment plant is actively used (in the area of Psittalia). The construction of wastewater treatment networks started during the Olympic Games ‘Athens 2004’. Some of the reasons for this development was based on catering for cruise ship discharge time, needs for saving energy and fuel as well as ensuring for better air quality.

Table 29. Summary of Piraeus' resources

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
	high quality specialisation green and sustainable development national/EU related policies in place on waste management local production and circular activities (as a future goal based on blue lab/blue cycle/blue growth completion) second-hand product development based on citizens engagement as well as based on local School initiative (see, ARGO) need for more resources and documentation of methods to innovate in the city of Piraeus in marine related plastic recycling and re-use	EU/EU programmes national resources municipal resources private resources	business associated with port activity tourist related transportation (islands) touristic development related with cruises

6.7.3.2 Needs

In terms of needs, the city's port areas and coastal areas, such as the marinas and beaches, need upgrading. There needs to be more public-private developments that promote new economic activities with a social interest. A suggestion is creating more social engagement through gaming.

There is also a need to develop a digitised service method in public services as this is considered as time and resource saving. Local businesses use digital services however these remain to be developed further.

Table 30. Summary of Piraeus' needs

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
	need for adjustment in the circular economy Structures	special needs	city safety, lighting, cleanliness and improvement of cultural outreach
		reduce unemployment	upgrading environmental quality and urban landscape
		digital skills for local businesses	port areas and coastal areas (marinas, beaches) need upgrading
		social engagement through gaming	
		public-private developments, promoting new economic activities with social interest	

6.7.4 Future – goals and barriers

6.7.4.1 Goals

In terms of sustainability, the city aims to become a sustainable city focused on growth in the blue economy. The European Commission defines the blue economy as ‘All economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors.’ This can be related to activities on the port, with the aim that Piraeus becomes the home port of the Mediterranean for cruising. New business technology in relation to Piraeus’ blue development could be promoted, as well as actions in relation to corporate social responsibility.

In terms of society, existing infrastructure of knowledge could be better utilised, such as the Blue Lab and Blue Cycle. There could be a strengthening of public/private partnerships for the production of new products in the city. Financing programmes for start-ups and social businesses could facilitate this. The [Blue Lab](#) is the ‘blue’ innovation lab of the Municipality of Piraeus, where young people with an interest in blue development can find the right conditions and services to develop new skills, experiment with new technologies and develop business ideas that will translate into sustainable business plans. The [Blue Cycle](#) is a model lab, fully equipped to process marine plastic waste, and to promote research and development. The lab is the first facility in Greece for the processing and recycling of plastic equipment derived from fishing and shipping activities.

In terms of urban development, degraded areas in the city could be stimulated. There could also be better transportation for tourists who are interested in visiting the city’s islands.

Table 31. Summary of Piraeus' goals

INDUSTRY	SUSTAINABILITY	PEOPLE	URBAN DEVELOPMENT
	blue growth city	utilising existing infrastructures and knowledge such as Blue Lab, Blue Cycle, etc.	stimulation of degraded areas
	- promotion of actions in relation with corporate social responsibility	strengthen municipal/public and private partnerships for the production of new products	- adjustment with the needs created by climate change (lighting, security and needs of homeless people)
	- optimisation of network functions of transportation, waste management and use of technologies	financing programmes for start-ups and social businesses/creating new products	tourist related transportation (islands)
	blue development, port activity	STEM on recycling and material reuse	
	- promotion of new business technologies in relation with Piraeus blue development		
	- Piraeus is the home port of the Mediterranean for cruising		
	establish and manage a separate waste sorting system		

6.7.5 Project – plans and ideas for next steps of the Pop-Machina project

After the workshop, ideas were generated by the stakeholders on the potential next steps of the Pop-Machina project. Sxedia, a local stakeholder, presented some of their products and techniques and offered to actively collaborate with the Municipality of Piraeus and the University of Macedonia on the spirit of Pop Machina. Blue Lab offers, for free, specialised equipment/materials/resources and facilities for use by users who can be trained (internally) to use them. ARGO,¹³ a local stakeholder, is interested in increasing the city's inclusiveness towards people with special needs through recycling and re-use activities, however, they are in need of resources and finances. The organisation is interested to learn more about fabrication and re-use technologies. Plastikourgio suggested that mini plastic labs could be included in schools.

There are some initiatives related to energy. The Urban Camel project aims to combine recycling and renewable energy resources with the blue economy. Centre for Research and Technology Hellas (CERTH, Pop-Machina partner) aims to take action to produce bio-energy locally through the reuse of organic waste.

The municipality has some ideas for next steps. There is an initiative that is already about to start, which aims to recycle clothing and shoes locally, which can collaborate with Pop Machina. Efforts will need to be taken in order to raise awareness of circular making amongst citizens. The municipality plans to develop incentives for recycling within cities, and to include more separation bins of recyclable materials in local business such as restaurants.

Local funding options are currently being considered to create larger multidisciplinary centres for public engagement in recycling and collaborative production. The team hopes to raise awareness of the benefits of collaborative production in makerspaces with local makers.

Participants discussed a partnership with the stakeholders Plastikourgio, ANTAPODOTIKH, and SXEDIA. Plastikourgeio S.A. (Capital Stakeholder) is an Athens-based shop and laboratory where customers can be trained on plastics recycling and re-use technologies but can purchase products of

¹³ ARGO - Association of naval parents of children with special needs is a Piraeus-based organisation which aims to train people with special needs on acquiring basic and social skills.

'green-economy' activities. Plastikourgeio S.A. collaborates with Rokani (Knowledge Stakeholder), that is an Athens-based maker space that is organised and functioning and would like to contribute and exchange infrastructure with the Municipality of Piraeus.

Shedia (citizen based local stakeholder) is an NGO, which distributes a Greek street paper in Athens and Thessaloniki since 2013 as well as holds a wide network of activities (such as creating and selling products from recycled materials) as well as engaging unprivileged members of society in social activities and events. They are in discussion with the municipality and the University of Macedonia on ways in which they can contribute in the Pop-Machina mission.

Rewarding packaging recycling Antapodotiki Analyklosi applies contemporary recycling methods to engage citizens' voluntarily in the recycling processes in Piraeus and elsewhere. They are in action and willing to collaborate for the Pop-Machina project. Methods are still in discussion.

6.7.6 Stakeholders

In order to limit the number of pages of this deliverable, the full list of stakeholders can be found in the annex (Section 12.6).

6.7.7 City strategy map

Figure 33. Map of Piraeus' resources and needs

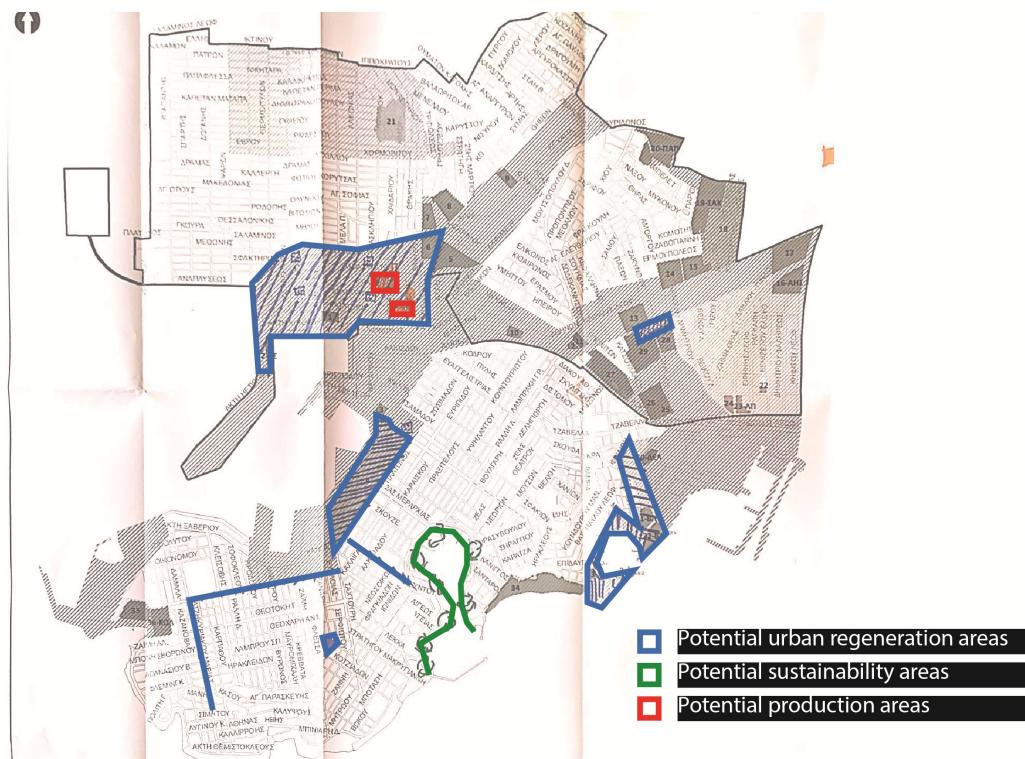
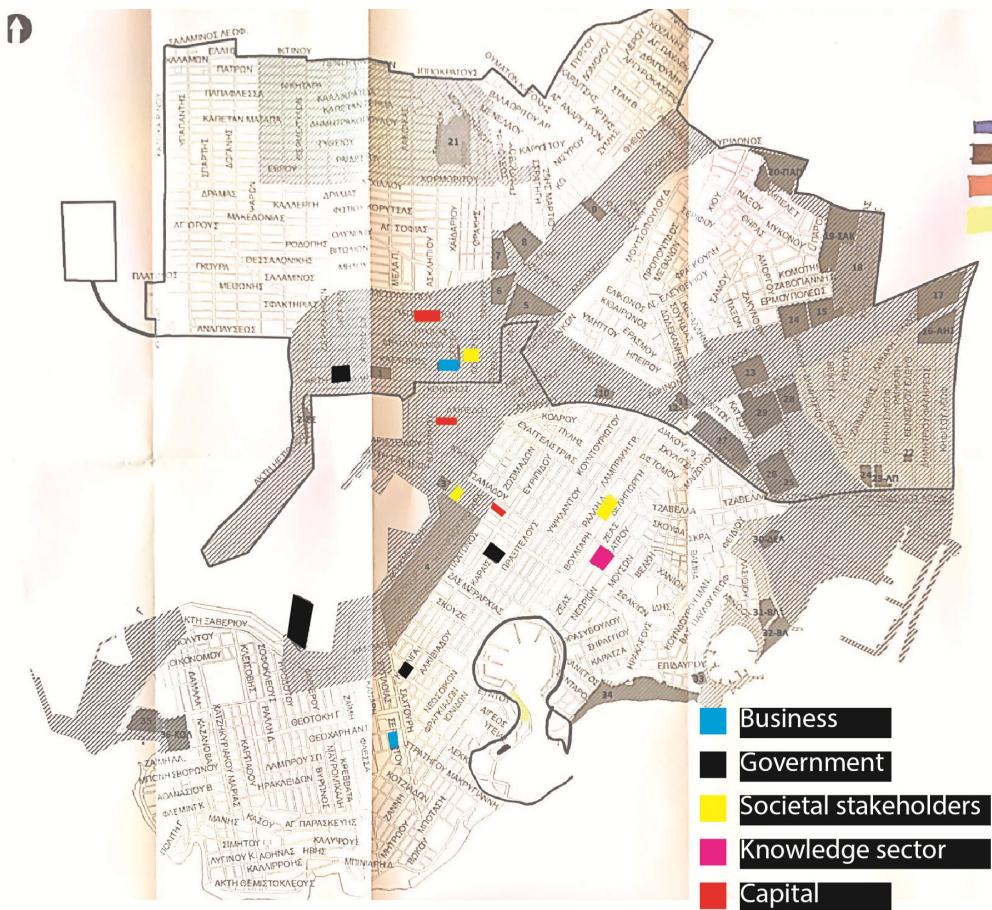


Figure 34. Map of Piraeus' stakeholders



7. Cross-case analysis

7.1 Introduction

This section will compare the seven cities' using the same topics and themes as the individual city profiles (Section 6, pilot profiles). The topics of discussion are past, resources, needs, goals, barriers, and stakeholders. These topics were discussed in four themes: society, sustainability, industry, and urban development. For more information on how these discussions were conducted with participants, we refer to Section 5, methodology.

There are three main reasons why comparing the seven cities is beneficial to the Pop-Machina project. Firstly, by combining the data from all seven workshops, specific topics mentioned by multiple cities can be identified. During the workshop, participants were asked to discuss the general topics of resources, needs, goals, and barriers; under the general themes of sustainability, urban development, society, and industry. When the workshop data was analysed across all seven cities, it was found that multiple cities covered similar sub-topics during the discussion (e.g., 7.3.1.2 Support Ecosystem, 7.4.1.3 Education and training, etc.). These common sub-topics can be the topics of focus for the next steps of WP5.

Secondly, a cross-case comparison of the seven cities can create clusters of cities that have similar traits under each topic. This allows the municipalities to know which other cities are similar to them, allowing them to support each other and share resources provided by the Pop-Machina project. Finally, the cross-case comparison can also create an understanding of the strengths and weaknesses of the cities when compared to each other.

A table summarising all the results of the workshop has been placed in the annex.

7.2 Past

At the beginning of each workshop, during the 'city timeline' exercise, participants were asked to list out positive and negative memories in four themes: industry, society, sustainability, urban development (see Section 5 for more details about the exercise).

The result of these conversations is a first glimpse of local stakeholders' perceptions of the city's past: which industries were prominent, how these industries affected the livelihoods of the city's residents, and whether these industries still have a presence in the city today. Discussions of the city's past creates a better understanding of each city's identity, and what local citizens are proud of about their city. It also indicates which industries could be revived in the city in the future.

7.2.1 Positive memories

7.2.1.1 Industry

The exercises started with thinking about past industries that existed in the city and how they affected the livelihoods of citizens. The list of past industries that existed in the cities also gives an indication of which industries could be suitable for the area now.

The industry mentioned the most was food and agriculture, by Leuven, Istanbul, Santander, Venlo, and Thessaloniki. Most cities mentioned food and agriculture generically, but Venlo and Istanbul mentioned activities specific to their region. For Venlo, the city invented and manufactured the

'Venlokas', a greenhouse design that is still used internationally.¹⁴ For Istanbul, participants spoke about 'Bostans', or local gardens, that produced food locally – a tradition that has lasted for centuries, and that still goes on today.¹⁵

The sectors of logistics, which is an essential part of any product supply chain, was mentioned by four cities – Piraeus, Venlo, Kaunas, and Santander. Piraeus is the world's most ancient organised port which connects Athens to the world. Currently, the port is the largest harbour, marine, maritime, and commercial-industrial centre of Greece. Piraeus is the largest passenger port in Europe, if the two ports of the city, Port of Piraeus and Port of Perama, are combined. The ports of Piraeus allow the city to have marine transportation activities, transporting tourists to other tourist islands of Greece.

Kaunas and Santander also mentioned water logistics in their city. Kaunas is situated in the Nemunas, the biggest river in Lithuania. Santander is a sea-side city that has a port and related maritime activities, such as shipbuilding. Venlo is a large logistics hub in the Benelux area (Belgium, Netherlands, Luxembourg), and serves as a connection between the Netherlands and the Ruhr area in Germany.

Because many of the cities are situated next to the sea or a river, maritime industry was mentioned often – by Piraeus, Kaunas and Santander. Santander has fishing operations, maritime shipyards, and fishing-related manufacturing. Kaunas had a shipbuilding industry. Piraeus has businesses and industries that relate to its ports' activities and has a specific interest in the blue economy. Strangely, maritime industry was not mentioned by participants in the Thessaloniki workshop, despite the fact that the city has the second largest sea-port in Greece. This perhaps indicates that the port is not visible to local residents and stakeholders.

Table 32. Summary of past industries¹⁶

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
food/agriculture	v	v	v	v			v	5
logistics			v	v	v	v		4
maritime			v		v	v		3
tobacco/alcohol	v		v				v	3
chemical industry		v	v		v			3
craft	v			v	v			3
technology	v			v	v			3
furniture/household goods			v		v			2
metallurgy	v		v					2
fashion/textile		v					v	2
wood			v	v				2

7.2.1.2 Positive effects of industry

The positive effects of industry were discussed during the workshop. The most discussed topics were access to trade routes and the development of local employment and skills.

14 <https://www.horconex.nl/en/Greenhouses/Venlo-greenhouse>

15 <https://www.citylab.com/equity/2013/07/centuries-old-gardens-are-latest-battleground-rapidly-developing-istanbul/6192/>

16 Interestingly, when summarising all the past industries mentioned in the seven workshops, we noticed that four types of industries were mentioned (as well as others) – food, furniture, fashion, and fabrication. This loosely corresponds to an interview we did with an expert on urban manufacturing, Nina Rappaport. When asked which industries were suitable for urban manufacturing, she mentioned the '4Fs' – food, furniture, fashion, and fabrication.

For trade routes, Santander's port access allowed an opportunity for maritime trade with the US. Venlo was a connection between the Netherlands and the German Ruhr area. Leuven's industry created a trade axis between Leuven and Brussels. Thessaloniki's port access allows for a boom in trade.

For local skills and employment, Kaunas participants spoke of 'home makers' during the Soviet times of the city – citizens made many products by themselves from waste that was discarded from manufacturers nearby. Leuven's highly educated technical staff had a positive effect on business. In Istanbul, craftsmen used to live in the city, but have now moved to rural areas.

7.2.1.3 Negative industrial development

Negative memories associated with industry was generally quite similar amongst the seven cities. Participants perceived a decrease in industrial activity due to globalisation, mass production, and automation. For some cities, this led to population decline.

Table 33. Summary of positive and negative developments of industry

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
positive development							
trade routes	v		v	v			v
local employment and skills	v	v			v		v
neighbourhood improvement	v	v					
knowledge and innovation	v				v		
sustainability		v		v			
negative development							
industry leaving the city	v	v	v		v		v
globalisation	v			v			
mass production/automation	v	v					
population decline			v	v			

7.3 Resources

7.3.1 Society

When asked to discuss the societal resources available in each city, specific sub-topics appeared in many cities' discussions – existing support ecosystems, population, and knowledge industry. For the next phase of WP5, local partners can aim for a deeper understanding of these sub-topics by creating an inventory of resources according to these sub-topics.

7.3.1.1 Support ecosystem

The topic of 'support ecosystems' was mentioned consistently in many cities. Although participants called this topic other names such as 'network' or 'connectors', the concept is similar – some cities have an existing support ecosystem that provides services, guidance, and networking opportunities for makers. This corresponds to the research on 'Maker-enabling Entrepreneurs' by Dr. Laura Wolf-

Powers, professor in economic urban development. In her article ‘The Maker Movement and Urban Economic Development’ (Wolf-Powers et al., 2017), she investigated urban manufacturing-related stakeholders in Portland, New York, and Chicago in the US. She found that makers are often supported by ‘maker-enabling entrepreneurs’, who provide a wide range of services: access to technology, real estate, business technical assistance, finance or capital access, sales or marketing platforms, and networking and advocacy.

Different types of support were mentioned in the various workshops – existing civic organisations that supported makers, circular economy networks, digital platforms, and incubators. For existing civic organisations, Leuven mentioned a strong network of social economy organisations that already have a focus on textile, rubber, and plastics. Istanbul has multiple makerspaces, although these spaces don’t necessarily know of each other. Santander has a fablab, as well as a corporate social responsibility network for companies in Cantabria.¹⁷

An existing support ecosystem for a circular economy was touched on by Istanbul and Venlo. Istanbul has formal organisations such as NGOs that promote sustainability, as well as The Business Council for Sustainable Development of Turkey,¹⁸ which is building a ‘Turkish Materials Marketplace’, a cloud-based platform designed to facilitate cross-industry materials reuse among Turkish companies and communities.¹⁹ Venlo mentioned the Cradle2Cradle expo lab, consultants specialising in the practical application of cradle to cradle principles in the built environment and governmental policy.²⁰

Most interestingly, participants in Istanbul discussed informal stakeholders who are part of the support ecosystem for a circular economy. Waste collectors, repair shops, and doorkeepers (building managers of apartments) all have access, and some amount of control over the waste flows of the city. Engaging with these stakeholders could provide extra connection to close the material loop, turning waste back into resources.

Leuven and Venlo mentioned existing digital platforms. Leuven has the Leuven 2030 website, which publicises the city’s strategy plans for a sustainable future.²¹ This website has the potential to serve as a platform for makers as well. Venlo is developing a ‘Duurzaamheidsloket’, a ‘sustainability information counter’, where citizens can approach and ask the municipality for advice on turning their homes more sustainable.

Table 34. Summary of support ecosystems

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
existing civic organisations	v	v	v				
existing circular connectors		v		v			
existing digital platforms	v			v			
existing incubators		v					
network between municipality, knowledge, civil society		v					

7.3.1.2 Population

Multiple cities mentioned members of their population as societal ‘resources’ of the city. The sectors of the population mentioned are listed below.

17 <http://www.rsecantabria.com/>

18 <http://www.skdturkiye.org/en>

19 <http://turkey.materialsmarketplace.org/>

20 <https://www.c2cexpolab.eu/en/what-we-do/>

21 <https://www.leuven2030.be/over-ons>

Table 35. Summary of resources in relation to the local population

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
highly educated experts	v	v	v					3
citizens with awareness in sustainability	v	v	v					3
youth		v	v					2
migrants	v			v				2
practical skills				v				1
entrepreneurs				v				1

7.3.1.3 Knowledge sector

Stakeholders in the knowledge industry were mentioned by all cities as resources for the city. Although universities were mentioned the most, vocational high schools were also mentioned as highly relevant to the activities of Pop Machina, especially the project's aim of providing education on practical making skills.

Table 36. Summary of resources related to the knowledge sector

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
universities	v	v	v		v		v	5
vocational high schools	v	v		v				3
secondary schools	v							1
training centres			v					1

7.3.2 Industry

7.3.2.1 Existing industrial sectors

For industrial resources, cities mentioned the existing industrial sectors of the city. This list of sectors provides a first idea on industrial processes and material flows that are prevalent in each city. However, participants were not explicitly given time to list out all industrial sectors of the city, so this information needs to be further developed and validated in the next year of WP5.

Table 37. Summary of existing industrial sectors

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
high-tech/electronics	v		v	v	v			4
tourism			v	v		v	v	4
household products (appliances, furniture, decorations)		v	v	v	v			4
metal work				v	v	v		3
recycling		v	v		v			3
food	v				v			2
wood					v	v		2
digital production	v					v		1
construction/built environment						v		1
logistics					v			1
repair		v						1

7.3.3 Sustainability

When discussing resources in terms of sustainability, not much was mentioned by the cities. This is partly because some resources partially related to sustainability are allocated to other themes, such as civic organisations that promote sustainability (under the theme of society), or industrial activities that contribute to sustainability (under the theme of industry).

Leuven, Santander, and Venlo mentioned existing knowledge sources on sustainability in their city. For Leuven, the existing maker community is highly educated about circular economy, and workshop participants were able to name strategies such as circular procurement and product service systems during the workshop discussions. Santander has access to the Centre for Environmental Education in Cantabria. Venlo has the C2C Expo lab, as well as the *Duurzaamheidsloket* (sustainability information counter).

Table 38. Summary of sustainability resources

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
knowledge	v		v	v			

7.3.4 Urban Development

For resources in terms of urban development, participants discussed areas in each city that are awaiting further urban development.

Interestingly, every city has a port and a surrounding industrial area, even the ‘inland’ cities Leuven and Venlo. From what is recorded from the conversations, Santander, Kaunas, Piraeus, and Thessaloniki have many industries and business activities that benefit from or relate to the port.

The cities of Santander, Venlo, Piraeus, and Thessaloniki intend to attract tourists by developing touristic areas within the city. Former industrial areas were mentioned by Leuven and Kaunas. For Leuven, it is the Vaartkom, a former industrial area surrounding its port; and for Kaunas, it is the former radio factory and aviation factory.

Table 39. Summary of resources related to urban development

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
port	v	v	v	v	v	v	v	7
touristic areas				v	v		v	4
high-tech areas	v	v	v					3
former industrial areas	v				v			2
maker neighbourhoods		v						1
logistics hub				v				1

7.4 Needs

7.4.1 Society

7.4.1.1 Support ecosystem

Similar to the societal resources section, the support ecosystem was an emerging theme in the conversations about societal needs for makers. Participants identified a need for a support network for maker entrepreneurs, in order to support local business in making, as well as to connect local maker businesses. Leuven, Santander, and Kaunas suggested supporting local circular entrepreneurs, creating spaces dedicated to entrepreneurship projects, upscaling innovative projects into self-sustaining ones, as well as creating a better business environment in general.

To connect local businesses, Istanbul suggested a makerspace network, where members can share resources, knowledge, and experience. Venlo suggested for their cradle to cradle network to be enhanced through knowledge events and platforms.

The sharing of knowledge within the existing ecosystem was mentioned often during the workshops. In general, there is a lack of initiatives, events, and platforms that share knowledge and tools on circular economy and making. There is a need for knowledge stakeholders such as academia and high-tech industry to share their knowledge with public authorities, citizens, and smaller businesses.

In addition to the business and maker network, there needs to be more understanding of the ‘circular economy network’, understanding different stakeholders in the supply and waste chains of makers in order to identify opportunities to close the material loop.

Table 40. Summary of needs for support ecosystems

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
entrepreneur/maker network	v	v	v	v	v			5
knowledge sharing		v	v	v	v		v	5
connect with local government					v	v	v	3
connect with big industries		v	v					2
waste/CE network	v			v				2

7.4.1.2 Education and training

Although it was not explicitly asked about, education and training were major topics for many cities’ discussions when it comes to needs. Participants asked for education and training to focus on the topics of sustainability (such as reuse, repair, demolition expertise), digital skills and making (such as

coding and access to digital services), and entrepreneurship (such as responding better to market developments and business problem-solving skills).

Target audiences of education and training were identified during the discussions. While awareness of sustainability in general was considered for citizens, sustainability, reuse, repair, and digital skills were considered for makers and local businesses. For decision makers, the need was sustainability and circular economy. Interestingly, Istanbul identified bottom-up stakeholders within the city who could create a positive impact if given the right training – door-keepers and waste collectors. As mentioned in the previous ‘resource’ section, these stakeholders have access, and some degree of control of waste flows in the city.

Table 41. Summary of needs for education and training

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
suggested topics								
on sustainability/CE	v	v	v	v				4
on digital skills	v	v				v		3
on making	v	v						2
on entrepreneurship		v		v				2
on design		v						1
suggested audience								
for citizens/consumers		v	v	v	v			4
for makers/local businesses	v	v				v		3
for decision makers		v						1

7.4.1.3 Population

Aspects of the cities’ population were a concern for cities. The most mentioned concern was ‘brain drain’: a situation where residents are moving away from the city in search of better opportunities elsewhere, resulting in less-skilled workers in the city’s labour force. Santander, Venlo, and Thessaloniki had this concern.

Santander, Venlo, and Kaunas mentioned the topic of an aging society. This is a topic of concern because the elderly cannot contribute to the workforce. However, a Venlo participant suggested that the city could take advantage of the ‘silver economy’ – businesses and services that cater to the elderly. Discussions mentioned other vulnerable groups in each city as well – the elderly, immigrants, the disabled, and the poor.

Table 42. Summary of needs related to the local population

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
brain drain			v	v			v
aging society			v	v	v		
immigrants	v	v		v			
disabled		v			v	v	
population decline			v	v			
poverty		v					

7.4.2 Sustainability/industry

Since participants' comments on sustainability and industry were almost always interrelated, the needs for the two themes have been combined into one section. Participants were mainly concerned about a lack of awareness on sustainability amongst citizens and decision-makers, and that there is no common framework that all stakeholders can work on together.

Multiple cities discussed the topic of waste. Leuven, Istanbul, and Santander identified that there are barriers when turning waste into secondary raw materials. Makers neither understand the value of waste materials, nor have access to recyclable materials because they are not in contact with waste-related stakeholders. Waste streams are often not 'pristine', meaning that waste streams of one material could contain contaminants, making it less useful as secondary raw material. For some cities, Kaunas and Istanbul, waste was seen as a problem – Kaunas participants wanted to focus on plastic packaging and bio-waste, and Istanbul participants on organic and food waste.

Table 43. Summary of needs related to the themes of 'sustainability' and 'industry'

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
lack of awareness/not mainstream	v		v	v	v		
waste	v	v	v		v		
local production		v		v	v		
sustainability strategy					v	v	

7.4.3 Urban Development

In terms of urban development, Istanbul, Santander, Venlo, and Kaunas listed out 'problem neighbourhoods' in the city that are in need of urban renewal. For more details, refer to the individual city pilot profiles under Section 6.

Table 44. Summary of needs related to urban development

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
problem neighbourhoods		v	v	v	v		
dying city centre			v	v		v	
lack of space for creative industry	v		v			v	
urban green		v				v	
lack of storage space for industry	v						

7.5 Goals

7.5.1 Society

7.5.1.1 Support ecosystem

During the discussion on societal goals, the sub-topic of support ecosystems was again frequently mentioned during the workshops. The support ecosystem goals mainly relate to involving particular types of stakeholders, and upscaling valuable initiatives.

For the support ecosystem, participants identified that there could be a goal to involve academic stakeholders, the government, the private manufacturing sector, and citizens. The idea of involving the private manufacturing sector is worth exploring and is relatively less emphasised in the Pop-Machina project brief. How can larger (sometimes global) manufacturing companies work with local smaller businesses? It is often the case that a large factory creates ‘spin off’ initiatives in the surrounding area, because of the knowledge and secondary raw materials that are provided. A historical example was even mentioned during Kaunas’ workshop – ‘home makers’ during the Soviet times who took advantage of the waste materials from nearby factories to create products for themselves.

In terms of upscaling, participants identified local SMEs (small medium enterprises) and local social initiatives as the target. Interestingly, some cities’ participants were more interested in SMEs, such as Venlo and Thessaloniki; and some more in local social initiatives, such as Leuven and Kaunas. Istanbul, Santander, and Piraeus mentioned both. This could suggest two interests of the cities – developing SMEs, which has more of a focus towards entrepreneurship, economic development, and reducing unemployment; and developing local social initiatives, which will focus on vulnerable populations and solving societal issues. These two interests are probably two sides of the same coin, but it is worth knowing that there are two potential directions for each city.

Table 45. Summary of goals related to support ecosystems

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
involve knowledge industry		v	v	v	v	v	v
upscale local SMEs		v	v	v		v	v
upscale local social initiatives	v	v	v		v	v	
involve government			v		v	v	v
involve private manufacturing sector	v	v	v	v			
involve citizens			v	v			v

7.5.1.2 Platforms

The workshops included discussions about a common platform. Istanbul participants were the most interested the topic and provided the most ideas. These ideas were repeated by Leuven, Santander, and Kaunas. Ideas for the platforms can be categorised into four topics:

- sharing and renting resources;
- networking – a platform that connects makers to each other, and provides a matchmaking services for makers with different skillsets;
- secondary raw material platform – a platform that facilitates the exchange of secondary raw materials available in the area;
- selling – a platform for makers to sell their products, connecting makers to the public.

Table 46. Summary of goals related to platforms

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
sharing platform	v	v					
networking platform		v			v		
secondary raw material platform		v		v			
selling platform		v					

7.5.2 Sustainable industry

7.5.2.1 Sectors of interest

Workshop participants mentioned industrial sectors or materials that their cities could focus on. However, this topic was not discussed as much as expected, and most cities either did not list any materials or only listed one or two, with the exception of Istanbul and Leuven. In order to establish which material flows each city could focus on, the topics should be clarified in the next workshops²² of WP5. By establishing potential material flows, industrial symbiosis opportunities can be explored.

Table 47. Summary of sectors of interest

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
local consumption	v	v			v			3
food/agriculture	v	v						2
tourism/hospitality				v		v		2
blue economy					v			1
fashion	v							1
construction	v							1
design	v							1
glass		v						1
packaging		v						1
electronics		v						1

7.5.2.2 Circular industry

Goals on how to make a transition towards the circular economy were discussed. Leuven, Istanbul, Santander, and Kaunas mentioned ideas related to the tracking of materials, from mapping material streams to creating a repository of potential secondary raw materials. Business models were mentioned, such as developing products as a service and public circular procurement. There were suggestions for better regulations, such as preventing the use of composite materials, and clarifying regulations on the circular economy.

²² There are some existing tools available online that facilitate group discussion on material flows and industrial symbiosis opportunities, such as the value system game by Superuse Studios, an architecture firm in the Netherlands; and the circular design guide, by the Ellen MacArthur Foundation, a not-for-profit promoting the circular economy.

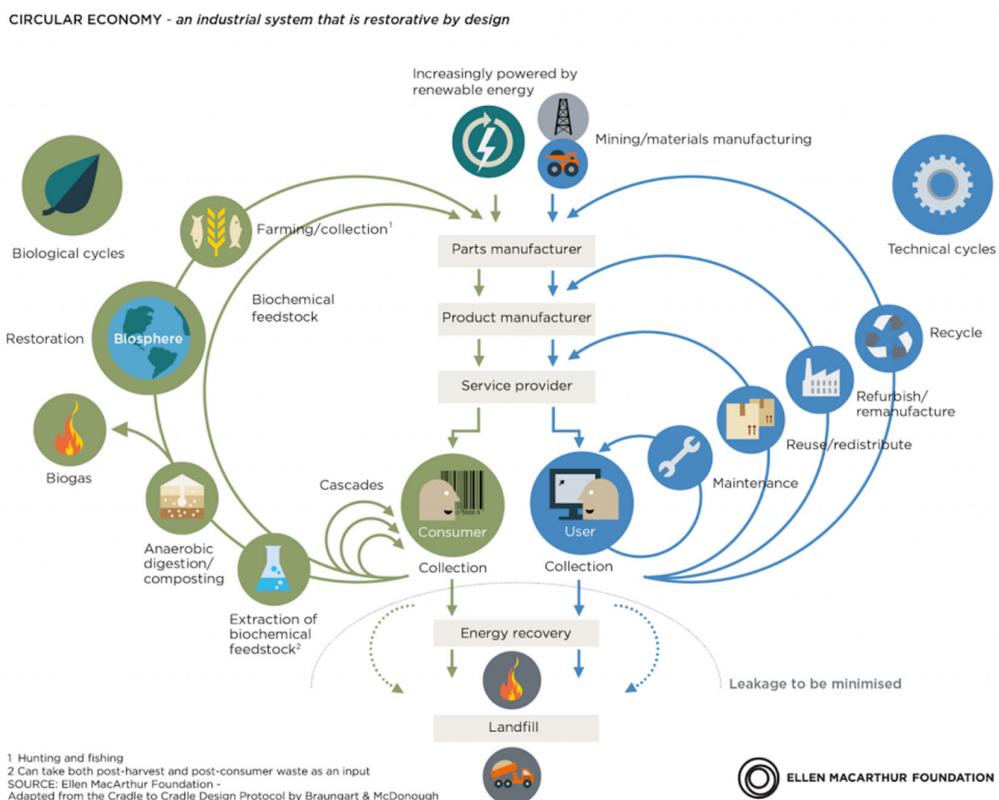
Table 48. Summary of goals related to circular industry

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
material tracking	v	v	v		v			4
business models	v	v						2
better regulations		v	v					2

7.5.2.3 Closing loops

Goals related to closing material loops were mentioned by participants. The term ‘closing the loop’ in this context means turning waste into secondary raw materials through the processes such as recycle, repair, and reuse. The ‘circular system diagram’ below by the Ellen MacArthur Foundation explains this visually.

Figure 35. Circular economy system diagram (Ellen MacArthur Foundation, n.d.)



As seen on the right side of the diagram above, the bigger the loop (e.g. recycle), the more processes and energy are required to turn waste into resource. Interestingly, the bigger the loop a process has, the more it was mentioned during the workshops. The next steps of WP5 can be to encourage participants to think of solutions that utilise the smaller loops, such as repair, reuse, and sharing.

Table 49. Summary of goals related to circular economy processes

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
recycle	v	v			v	v		4
repair	v	v						2
reuse				v				1
share		v						1

7.5.3 Urban Development

In terms of urban development, participants were most interested in setting goals on making use of industrial areas and urban regeneration in general. Leuven has the old industrial port area of Vaartkom, Istanbul has neighbourhoods that are already rich with makers, Venlo has the Brightland Campus and Greenport, and Kaunas has the old radio factory and water territory in Zaliakalnis.

In terms of urban regeneration, Istanbul plans to create local solutions tailored to each district, Venlo has aims to develop the Kazermet Kwartier (old army barracks) as a future tourist area, Kaunas wants to create a bohemian cultural district, and Piraeus wants to stimulate the city's existing degraded areas.

Table 50. Summary of goals related to urban development

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
make use of industrial areas	v	v		v	v			4
urban regeneration		v		v	v	v		4
urban green		v						1

7.6 Stakeholders

Stakeholders of the seven cities were listed out and categorised as five types: Knowledge, Business, Capital, Society, and Administration. For a detail description of these categories, please refer to Section 5, methodology.

Out of all the data collected from the workshop, participants' responses on stakeholders were the most comparable. While other categories such as 'resources', 'needs', 'goals', and 'barriers' can be interpreted differently by different municipalities and their participants, listing out stakeholders and categorising them is relatively unambiguous and straightforward.

By analysing the stakeholders listed during the workshops, the full stakeholder ecosystem of each city can be understood. It was decided amongst the academic partners of Pop-Machina that the list of stakeholders collected during the workshop and the municipalities themselves can be further categorised and analysed in detail.

For now, the table below shows the number of stakeholders present for each category in each city, and the percentage each category represents in each city. This gives a first glimpse of which types of stakeholders are prevalent in each city. A full list of stakeholders can be seen in this online sheet,²³ as well as in the annex of this deliverable.

²³ <https://docs.google.com/spreadsheets/d/1b0RHWazNjhGnsaCRM0vCRwtFaw-MZ-zIXCvRWD07h4/edit?usp=sharing>

Table 51. Summary of stakeholder types

	Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus	%	Thessaloniki	%
Knowledge	14	24	53	37	15	25	12	27	5	15	3	10	6	17
Business	19	32	19	13	16	26	20	44	9	26	5	17	7	19
Capital	1	2	22	15	7	11	2	4	10	29	10	34	6	17
Administration	9	15	23	16	11	18	3	7	4	12	2	7	7	19
Society	16	27	25	18	12	20	8	18	6	18	9	31	10	28
Total	59		142		61		45		34		29		36	

8. Conclusion

8.1 Summary of findings

During the workshops, it was found that many cities have a rich history in making, with thriving industries in the past, and can be a source of pride for residents of the city. In most cities, the presence of industry (and its eventual disappearance) had a significant impact on the citizens' lives and on the image of the city. Many of these industries have a connection to the city's culture and geography and looking at a city's historical 'making' origins can give an indication of which industries, skills, and materials to focus on in each city in the future.

When the results of the workshop were being analysed, bigger themes began to emerge. What was discussed in the workshop can be categorised in three perspectives, space, people, and materials; and three topics, circular economy, business, and making. This provides a framework that could guide the next steps of the Pop-Machina project. The topics of discussion are summarised in the framework below.

Table 52. Proposed Pop-Machina WP5 framework

	space	people (stakeholders, support network, education)	materials
circular economy		stakeholder network needed to 'close the loop' education needs for CE	industrial symbiosis opportunities material tracking secondary raw material flows of interest
business	spatial needs for businesses	entrepreneurship training local making businesses building business support network	market place for secondary raw materials
making	spatial needs for making maker neighbourhoods old industrial areas	education in fabrication maker support ecosystem	industrial sectors/materials of interest

Space is an essential perspective for WP5 of the Pop-Machina project because the next steps of WP5 require municipalities to choose a space within their city to start a physical makerspace. In order to choose a location and to ensure that the location has a positive effect on the neighbourhood, a spatial understanding of the pilot cities is needed. During the workshops, participants mentioned issues related to the lack of space for makers in the city, areas in the city that need to be improved, and areas of interest in the city that are being developed.

Although the theme 'urban development' was used throughout the exercises as a guide for discussions, the connection between space and the activities of Pop-Machina is not yet clear in WP5. This is partly because spatial issues in the Pop-Machina project are tackled by another academic partner, the University of Cambridge. In the next phase of the project, WP5 aims to work with Cambridge to integrate their research creating the D5.2, the pilot deployment plan.

'People' is the perspective that was most easily understood by participants and the most widely discussed. The topic of support ecosystems and platforms emerged from many of the workshops and should definitely be a focus of WP5 in the future. In order for the Pop-Machina project to reach its goals, there needs to be a better support ecosystem for local makers.

Education and training requirements were discussed frequently by the workshop participants. The topics of education fell broadly into the topics in the framework above: circular economy, business and entrepreneurship, and making. The targets of education were numerous: citizens, decision-makers, makers, and trainers. Related to this, many workshops mentioned the need for knowledge stakeholders, such as universities, research institutes, and high-tech businesses, to collaborate with broader society. Local stakeholders' ideas on their city's educational needs provide interesting insights to the Institute for Advanced Architecture of Catalonia (IAAC), the academic partner of Pop Machina, who is responsible for developing the Pop-Machina training programme. WP5 aims to work with IAAC to integrate local stakeholders' needs into the training programme.

The discussions on materials focused on enhancing the circular economy, as well as which industrial sectors and material flow to focus on in each city. Some cities were interested in establishing a system for tracking materials in order to find opportunities to turn waste into secondary resources. Processes required for the circular economy, such as repair, recycle, and refurbish, were mentioned as well.

Some participants mentioned existing industrial sectors and materials flows of interest for their city. This is an important theme that should be explored in greater depth in the next phase of WP5. The next phase of WP5 intends to ask municipalities to collect information on the material usage of key stakeholders that are interested in working with the Pop-Machina project. Once there is a deeper understanding of the material flows available for the Pop-Machina project, potential industrial symbiosis opportunities can be established.

8.2 Recommendations for next steps of WP5

The next phase of WP5 is to create a pilot deployment plan together with the municipalities and their local stakeholders, based on the first directions provided by the first workshop results. Although workshop participants were asked to formulate first ideas on the future plans for the Pop-Machina project, the ideas provided were rather generic and vague. Perhaps this is because it was too early to ask for concrete plans. However, participants' contributions to the resources, needs, goals, and barriers of the city indicate a few rough directions for the pilot deployment plan.

Firstly, there needs to be a deeper understanding of the existing resources of each city, based on the three main perspectives established in the workshops: space, people, and materials. For spatial resources, WP5 should take information from the work of Cambridge in T3.1: Circular makerspaces and urban regeneration strategies. For human resources, WP5 will ask municipalities to further categorise their list of stakeholders, in order to create a clearer picture of the existing ecosystem in each city. For material resources, municipalities will be asked to choose key stakeholders related to making (e.g. makerspaces, local manufacturing businesses, recyclers) and collect data on the quantity and type of materials that are being processed.

This deeper understanding of available resources allows for municipalities to have a clearer direction of their upcoming plans. Once a clearer direction has been established, a series of workshops will be run in each city in order to co-design the plan with local stakeholders. Like the exploration in resources, the workshops will make decisions on topics under the three perspectives: space, people, and materials. For space, each city will decide where to setup their makerspace, and how this will impact the surrounding neighbourhood. This could be done in collaboration with University of Cambridge. For people, each city will decide how to enhance the existing ecosystem in order to better fulfil the needs of local makers. For materials, each city will explore industrial symbiosis opportunities using the material resources information previously collected by the municipality.

9. Caveats

9.1 Strengths and weakness of workshop data

An important observation that emerged from the writing process of this deliverable is the strengths and weakness the data collected from workshops. While the workshop results do not reflect the reality of each city, they reflect the perceptions and opinions of the individual participants.

The most valuable information collected from the workshops is the type of information that cannot be collected through other means of research. For example, the personal needs for local makers when it comes to their support ecosystem can be clearly understood through a workshop, but cannot be accurately seen from municipal statistics. This can be seen in the fact that major topics emerged in relation to makers' needs, in terms of their support system and education and training.

On the other hand, some topics participants were asked to discuss were not best suited for a workshop format. For example, it is not possible to get a clear and accurate picture of material flows through the city by asking participants in the workshop. This can be seen in Section 7.3.2 Industry resources, where some participants listed out existing industrial sectors of the city which resulted in an incomplete picture of material flows. Although the workshop results here give an idea of industrial sectors in the city, it does not give a clear or accurate picture. This kind of information would have been better collected by municipalities, by analysing statistical data.

For the next steps of WP5, it is important to keep in mind which types of information are best collected through workshops, and which types of information is best collected through other means. Because of the shortcomings of workshop results, the next phase of WP5 will use other means of collecting data as well. For more details, see Section 8.2 Recommendations for next phase of WP5.

9.2 Lost in translation

The workshop exercises and presentation were created in English, translated to five local languages, and the workshop results were then translated back into English. Through these translation processes, some data was probably lost.

The instructions for how to run the workshop and the workshop exercises themselves proved to be too complicated. Although all the municipalities were able to run their workshops successfully and collect some results from the participants, the exercises were interpreted differently in different cities. This was especially evident in the final city mapping exercise, where participants were asked to pinpoint all they have discussed on a physical map of the city. Because the instructions were too vague, the results of the different cities differed a lot and it was difficult to compare them.

Another example was the project ecosystem canvas (for more details, see Section 5 Methodology). Participants were supposed to give suggestions on the plans of the Pop-Machina project and match existing resources and needs of the city to the project. Again, the interpretations of this exercise varied a lot.

9.3 Selection of stakeholders

Because this workshop was the first opportunity for municipalities to introduce the Pop-Machina project to local stakeholders, everyone was invited to the table and there was no selection procedure

for the workshop participants. This is not a problem, because the workshop is a good chance to publicise the project and get a general overview of the stakeholders available.

However, because there were many types of stakeholders, the discussion was less focused for some municipalities, leading to generic results. For examples, instead of listing out resources specific to a stakeholder group, a workshop listed out the city's resources as 'municipal resources', 'national resources', and 'EU resources'. This is very generic response and does not add any additional insight to the resources of the city.

9.4 Ideas for improvement

The next phase of WP5 can be improved based on the caveats mentioned above. Firstly, data collection for WP5 should not only rely on workshops, limiting results to qualitative data on perceptions and opinions of local stakeholders. Although local opinions are very important, this information should be further enhanced by data collected by the municipalities themselves, who have a good top-down overview of their city. For more details, please refer to Section 8.2 WP5 next steps.

Instead of having one long workshop attended by multiple types of stakeholders, there should be multiple shorter workshops, each focusing on one specific topic. This allows municipalities to be more selective when inviting participants, and deeper discussions into each specific topic.

10. Acknowledgements

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12. Annex

12.1 Summary of city timeline for all seven cities

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
Positive Industry	the circular makerspace will be here							
companies	Philips site, Stella Artois, Marie Thumas, Yenibosna (tobacco), Metallurgy (BBG, Scordeur), handicrafts and trade with market places to support that	chemical industry in Yenibosna, textile industry in Laleli	Fishing-related manufacturing: shipyards, breweries, household appliances (Cork, Tekla), faience factory (tin-glazed pottery), Tobacco (tobacco), Metallurgy (global steel wire, saint gobain, ferroatlantica), cattle industry, chemical industry (solvay)	agriculture, green houses, butchers, wooden pallets, breweries, wool, ceramics, Oce (ink), lamp and cable factory, C2C companies	Ship building, aviation (offshore), boat restoration, porcelain, electronics chemistry, furniture, printing, logistics through Nemunas (river)	port activity, tourist transportation	tobacco, clothing, agriculture	
food / agriculture	v	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
logistics		v	v	v	v	v	v	4
maritime		v	v		v	v		3
tobacco / alcohol	v		v				v	3
chemical industry	v		v		v			3
craft	v			v	v			3
technology	v			v	v			3
furniture / household goods			v		v			2
metallurgy	v		v					2
fashion / textile		v					v	2
wood		v	v	v				2
Philips site	- There was a chemical industry in Yenibosna, now it's better.		fishing operations	- Agriculture/horticulture/ auction houses (greenhouses/Ventokas)	Aviation (already collapsed)	- Business associated with Port activity	- Production of tobacco, clothing and agricultural products prominent	
Stella Artois brewery			shipyards	- Familycompanies with products aimed at direct utility value (vegetables, meat, fruit, sigarettes, coffee)	shipbuilding	- Tourist related transportation (islands)		
Marie Thumas			Breweries	- Over 50 butchers resided in Venlo	tank restoration	- Development of the second area sector		
Vanderelist (tobacco)			Bank of Santander	- Crate makers/pallet making industry	Porcelain	largest passenger port in the EU		
making is substituted by knowledge/innovation			Iberotanagra: faience factory Cork: household appliance factory	- Breweries	Electronics			
Metallurgy (BBG, Scordeur,...)			Teka: household appliance factory	- Manufacturing industry (for example wool, ceramics and later on Van der Grinten/Ocd)	Chemistry			
Food industry	In the past much more handicrafts and trade (and the spaces to support that: markets everywhere)		La Marga: Wood factory - Tobacco manufacturing (Tabascader)	- Lamp and cable Factory (Pope/Philips and Belden)	Printing industry			
Trade axis brussels leuven			Gas factory	- Metal industry/mechanical engineering	Motor vehicle production (already collapsed)			
			Fishing-related manufacturing	- C2C certified companies (AMI, AGMI, Blue Engeneering, ECOR, Jalema, Staco)	Logistics Nemunas (the biggest river in Lithuania flowing through Kaunas)			
			- Cattle industry in the near surroundings					
			- Chemical Industry (Solvay)					
positive effects of industry	local employment, knowledge hub, high education technical staff, blue collar neighborhoods	80 or 90 industries of the country represented in Istanbul, Laleli neighborhood improved thanks to textile industry	maritime trade relationship with America	trade between Venlo and Germany (Ruhr area), inland port (Seacon), developed into logistic hotspot	home-makers during soviet times upcycled items thrown away from manufacturers, more entrepreneurial citizens,		family businesses, port access, moved to service sector	
external investment		Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
trade routes	v		v	v	v	v	v	4
local employment	v		v	v			v	4
local skills	v		v		v		v	3
neighborhood improvement	v		v					2
knowledge and innovation	v			v				2
sustainability	v		v					2
local employment		Industry, migration and job opportunities expanded the city.	maritime trade relationship with America	- Structural connection and trade between Venlo and Germany (Ruhr area)	Industry impacted that citizens became more entrepreneurial, richer, flexible, resourceful		- Closed and introverted economy, family business driven	
Knowlegde hub			- Local commerce	- Inland port/container transhipment (Seacon)	Emergence of home-makers during the Soviet times – people did many things by themselves from the items thrown away by manufacturers		- Port access, trading boomed	
Pool of highly educated, technical staff => positive effect on business		- Industries were established in Turkey (at least 80 or 90 of the industries of the country were also visible in Istanbul).		- Developing into a logistic hotspot (road/rail) near the German border	- Industry development impacted urban development and growth of the city, attracted people and ensured household income		- Primary and secondary sector produced wealth	
Social inclusion: positive correlation between city and suburbs		- The textile area helped the improvement of that area.					- Moving to tertiary sector (education, tourism, retail)	
sustainable energy (water mill)		- After 19. century, factories emerged in the city, then they moved outwards.						
blue collar workers								
neighbourhoods commerce								
infrastructure								
sustainability								
		Bostans (local gardens) for local and circular production, craftsmen were in the city (now in rural areas), more repair work		Greenest city in EU in 2003, C2C development, circular building, C2C expolab, C2C certified companies				
		- In the past, Istanbul had Bostans (local gardens) for local and circular production. They don't exist anymore.		- Awarded "Greenest city in EU" in 2003				
		- There were many craftsmen such as packaging using old newspapers, repair, etc. Which are only visible in rural areas today.		- C2C development				
		- We used to repair.		- C2C/circular building (Venlo City Office, IKC De Zuidstroom, Sportcomplex Egerbos)				
		- Before there was no knowledge about sustainability, but local people were doing it.		- C2C ExpLab				
				- C2C certified companies (AMI, AGMI, Blue Engeneering, ECOR, Jalema, Staco)				
People								
university had positive effect	less congested	summer holidays of royal family, tourism, industry moved to surroundings	Floriade 2012 and campus buildings established after WWII, secularization, Transport academy - later Fontys Venlo				multicultural city, sports team, cultural centers (education institutes from US, germany, france)	

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
presence of university very positive influence on evolution of the city		- There was no traffic jam.	summer holidays the royal family	- Floriade 2012 (campus development)			- Multicultural city. - Culture infused by changing populations	
			Altamira Caves	- Secularization			- Representation of outside powers affecting culture and economy (Educational institutes by US, Germany, France)	
			Health tourism: wave baths	- WW II bombings and rebuilding after WW II			- Sports teams affected local culture as well	
			Trade port at the city but industry in surroundings	- Transport Academy (later on Fontys Venlo)				
Negative industry								
globalization, automation, Vaartkom (no heavy industry in Leuven), industries such as Remy moved out, blue collar workers dispersed through Leuven	mass production - craftsmanship lost, lost agriculture to urban development, competition made local production decrease, illegal industries	80's - conversion of industrial activity to services, most industry left the city causing population decline						
industry leaving the city	v	v	v					3
globalisation	v			v				2
mass production / automation	v	v		v				2
population decline								1
lost jobs								0
globalisation and de-localisation	Because of mass production, craftsmanship is lost.	80's: conversion of industrial activity to services						
automation	- We lost agriculture areas to make buildings.	Limited social impact of industry						
Vaartkom (no heavy industry in Leuven)	- Competition affected both positively and negatively during the latest years. Positive: prices go down, negative: local production decreased.	Most of the industry left the city and the economy was based on services and commerce. As a result, population gradually declines.						
Without Remy site, no Wijchmaal	- There were too many illegal industries and illegal working opportunities (not safe for workers).							
blue collar workers homes used to be in Vaartkom, now dispersed around Leuven	- The leather market has decreased.							
sustainability								
	increased plastic use, linear economy				polluting production			
	- Plastic use increased. - Linear economy. low adaptation to new business models				- Polluting production and lack of ecological awareness			
urban development								
	unplanning urbanization, internal migration to urban areas						infrastructure suffered, city landscape changed abruptly	
	- Istanbul received immigration, which caused unplanned urbanization.	Complicated geography of the city	- Maas flood 1993 and 1995				- City landscape changed abruptly over the years	
	- Not in a good way, the population increased due to internal migration from rural areas.						- Infrastructure suffered until recent years	
	- Internal migration has collapsed the city: cars, work, nature, city centers, the association between neighbors.							
	The city has been growing very fast. This affects everything							
	- Negative aspects of population increase, like traffic.							
People								
		conservative society with little entrepreneurship/innovation attitude	financial crisis 2008, globalization in late 90s, secularization				recession, social and ethnic clashes, high unemployment	
unemployment			v				v	1
financial crisis							v	2
lack of entrepreneurship		v						1
		Conservative society with little entrepreneurship/innovation attitude	- Secularization				- Recessionary periods crippled the primary and secondary sectors	
							- Social and ethnic clashes resulting in changing the ethnic mix and affecting productive sectors	
			- WW II bombings and rebuilding after WW II				- High unemployment rate over several periods	
			- Maas flood 1993 and 1995					
			- Globalisation late 90's					
			- Financial crisis 2008					

12.2 Summary of resources for all seven cities

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
People								
highly educated migrants with technical education and awareness of sustainability	growing awareness of sustainability, young generation, more experts	environmental awareness of youth, and ICT firms	practical skills, cross border workers from EU	creative, entrepreneurial, talented citizens				
highly educated experts aware of sustainability	v	v		Kaunas	Piraeus	Thessaloniki	Total	3
youth migrants	v	v	v					3
practical skills entrepreneurs	v	v	v					2
			v					2
			v					1
			v					1
People eager to enter the labour market Readiness/support with local population	(4) Making use of the young generation (5) Finding sensible volunteers that have time	Young people demand changes in the society - Environmental awareness of the society	- Practical skilled personnel - Cross-border workers from EU	- Very creative, entrepreneurial, talented citizens in the city – their cooperation would accelerate the boost of circular economy - Labour force potential				
highly educated, awareness about sustainability		- There are more experts in the city than before. - There is a growing awareness of sustainability with projects such as Sıfır Atık. But they are not adequate.						
migrants (technical education employment)		- Stakeholders interested/in contributing-to sustainable production						
support ecosystem / network								
strong local bottom up initiatives in CE, and strong local network between municipalities, knowledge, and citizens. Leuven 2030 could be the communication platform	bottom up waste collectors and repair shops, incubation centers, and SKD working on "turkish materials marketplace"	local fablab, initiatives with youngsters, corporate social responsibility network	Cradle to cradle network, a lot of SMEs	EU funded projects, initiatives led of business and civilians				Total
existing civic organisations	v	v	Venlo	Kaunas	Piraeus	Thessaloniki	Total	4
existing circular connectors	v	v						2
existing digital platforms	v	v						2
existing incubators		v						1
network between municipality, knowledge, civil society	v							1
Strong local network and cooperation between different groups of stakeholders (municipality – civil society – knowledge – citizens)				- Structural connection and trade between Venlo and Germany (Ruhr area)	- Initiatives led by business and civilians			
Communication platform (Leuven2030 website)	(4) Incubation Centers - SKD is working on "Turkish Materials Marketplace"	social impact on social networks Engage with other initiatives with youngsters			The EU funded projects			
	(1) Independent street collectors can be integrated into the system and given educations and tools			- A lot of SMB's				
	(5) Metal/electronic waste collectors	Use makerspace as meeting point for entrepreneurs		- Combining projects and resources (also outside of the municipal organization)				
Pop up formula start ups	local Fablab	C2C expo lab						
Strong, local bottom up initiatives in circular economy	(3) Electronic device reuse service (6) Givi, Letgo, sahinden, gittigidiyor, dolap, modacruz, ihtiyacvarisi, gardrop. (existing repair shops)			- Corporate Social Responsibility network (www.rescantabria.com)				
App for repaiders								
Civic organisations								
social economy organisations in textile, rubber, plastics	social economy organisations in textile, rubber, plastics	innovation hubs and NGOs on sustainable production, such as Atik Nakit	Fablab santander, young space (initiative of city council)	KanDoen	Startups, craftsmen, artists			
Strong social economy organisations	Many makerspaces		Epectives: City Council, University of Cantabria, Government of Cantabria, NGOs, citizens' associations					
MindGate		- The Atik Nakit Project raises awareness.	- Fablab Santander		Start ups, arising makers			
social economy organisations in textile, rubber, plastics	content	There are some innovation hubs and NGOs. Sustainable production is a critical topic for them.	young space (initiative of the City Council)		- Conceptual makers, leading craftsmen, artists			
Hal 5								
Fablab								
VElo services								
governance / policy								
	zero waste program, good recycling system	2030 agenda for sustainable development, smart city initiatives		Free economic zone Kaunas	EU programs			
Progressive governance	(1) Municipal labor (6) Funding for social entrepreneurship (1) Zero waste program	Başakşehir Municipality has a good recycling system with an app Vocational high schools such as ISMEK, KOSGEB, Zemin, BTM, Is-Kur; digital design skills	- Spanish national government is developing its '2030th agenda' plan to achieve a sustainable development model - Local government is very active on smart city initiatives		- Free economic zone in Kaunas	EU / EU programs		
					National resources	Municipal resources		
					Private resources			
Knowledge industry								
KUL, UCLL, secondary schools	Leuven	Istanbul	public hospital, small but prestigious university	vocational high schools	strong academic community	universities		
universities	v	v	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
vocational high schools	v	v		v	v			4
secondary schools	v							3
training centers	v							1
								1
KUL			- Vocational high schools, Ismek, Kuyumcuken, Tekstilken are established	knowledge (universities)	- More higher educational institutions	Strong academic community in the city		
UCLL			- İsttek is a very strong stakeholder with many local academics and different topics.	Renowned public hospital	students can be linked to projects (as researcher but also as volunteer)	Growth of research and experimental activities		
UL			- There is also a good base for digital design skills which can assist the circular movement.	Small but prestigious university with good record of research and innovation				
secondary schools			- University of Cantabria training experience					
education providers		(4) ISMEK educations						
		(4) KOSGEB (business training)						
		(4) Zemin İstanbul (4) BTM (Bilī Teknoloji Merkezi) (4) İ̄s-Kur						
Industry								
existing industrial sectors	Med tech Bio tech, food, 3d printing, software	Glass in Beykoz, packaging waste, recycling companies (atik nakit, Başakşehir), cell-phone repair places	ICT, smart city, sea-borne trade, agriculture, food, energy, appliances, steel wire, waste recycling (AMICA), tourism and local craftsworks	Canon, AMI, AGMI, Blue engineering, ECOR, Jalema; C2C certified companies	Nano technology, bio tech, food, wood, construction, leather, metal, metalworking, well functioning collection and recycling of packaging	tourism		
high tech / electronics	v	v	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
household products (appliances, furniture, decorations)	v	v		v	v	v		4
metal work		v		v				3
recycling		v		v				3
food	v			v				2
wood				v				2
digital production	v			v				1
construction / built environment				v				1

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
logistics repair		v		- Manufacturing industry (Canon, AMI, AGMI, Blue Engineering, ECOR, Jalema, PKF/Post Venlo) - C2C certified companies (AMI, AGMI, Blue Engineering, ECOR, Jalema, Stava, VDL)				1 1
big companies				mechanical engineering, agro tech Canon printers, VDL bus manufacturers	Nano technology, bio tech			
bio tech / high tech	Med Tech- Bio Tech							
electronics								
hospitals	Hospitals							
tourism			tourism			tourism		
food	Food & Beverage				food industry,			
wood				ECOR fibre boards, PKF/Post wooden pallets	Wood			
digital production	3d printing / software			Strong ICT companies development in Smart City				
construction		Few organizations focusing on local industries such as Glass at Beykoz.			Construction			
glass								
maritime				sea-borne trade				
automotive				automotive / port				
textile					Textile industry,			
home appliances		Few organizations focusing on local industries such as Glass at Beykoz.	Home appliances industries (two factories)					
furniture				ECOR fibre boards, jalema office supplies	furniture industry,			
printing					printing industry,			
metallurgy			Large steel wire industry	AMI aluminium, AGMI traffic signs, Staco metal grids logistics hub of europe	metallworking, Logistics	v		
logistics					Well functioning collection and recycling of packaging - engaged public and private companies, civilians			
waste		(1) PAGÇEV organization for packaging waste (1) Dissemination of "Atık Nakit" (1) Smart recycling container (1) Clothes Recycling Container						
recycling		growing Recycling Industry (1) Başakşehir Recycling System	- Small industry for waste recycling/recovering (AMICA)		- Recycling, re-utilisation, sorting			
repair, reuse		(2) Second-hand festivals (2) Municipal furniture collection trucks (2) Cell-phone repair places can and repair the collected cell phones						
		(2) Scrap furniture can be repaired by small furniture producers.						
existing makers / making activity	fablabs, maker community	traditional making skills (halıtmek), fablabs	local craftsworks for tourism		makers, fourth industrial revolution			
"traditional" making		(2) Our traditional potential of practical making (halıtmek)	- Tourism and local craftsworks					
maker movement		(3) Fablab (3) Industry and Maker Lab's can start hackathons for circular products (Unilever - Maker Turkey)			Makers are shaping new trend responding to globe tendencies			
					Fourth industrial revolution			
governmental incentives		1 and 2. industry district incentives			Developed free economic zone in Kaunas – investments to chemical industry, furniture industry			
Sustainability								
summary	maker community are highly educated on Circular Economy		CEDREAC resources and documentation for environmental education in cantabria	projects in randstad, C2C expolab, sustainability desk (duurzaamheids-loket)	national policy on plastic, waste management			
knowledge institutions	v	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	3 1
knowledge institutions	maker community are highly educated on Circular Economy		- Take advantage of CEDREAC: Resources and documentation center for environmental education in Cantabria, part of the environmental research center (CIMA).	- Use information about projects that already exist in Randstad or EU and translate this locally				
				- C2C Expolab				
				- Sustainability Desk (Duurzaamheids-loket)				
				- Energy reduction voucher scheme (voucherregeling reductive Energie RRE)	- EU regulation and harmonization with national policy towards plastic strategy, waste management			
incentives / regulations								
urban development								
industrial / high tech areas	Vaartkom, Leuven Noord	base for maker communities in Kadıköy, Kurtuluş, Beyoğlu, Beşiktaş; technoparks	Mid-size but specialized (mainly car trading) port; technology park PCTCAN	- Inland port/container transhipment (Seacon), greenport Venlo	former aviation factory	port		
port	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
touristic areas		v	v	v	v	v	v	6
high tech areas	v	v	v	v		v	v	4
former industrial areas	v							3
maker neighborhoods		v		v				2
logistics hub				v				1
								1
	Vaartkom	(4) Industry zone incentives - There is a base for maker communities around the Kadıköy, Kurtuluş, Beyoğlu, Beşiktaş areas.	Mid-size but specialized (mainly car trading) port	- Rail/road/water connections to harboursities and Europe	- Developed airspace and water infrastructure			
	The Vaart				Due to convenient logistical location Kaunas may become a leader in the Baltic countries			
high-tech areas	Leuven Noord - Parkveld (high tech KUL areas)	- Techno parks emerge.	technology park PCTCAN	- Greenport Venlo - Inland port/container transhipment (Seacon)				
urban expansion	Old airport, Levent Alt Çarşı	docks, city center, sardineria southern slope of General Dávila street	villages like Arcen en Steijl and a lot of events/festivals, attractive landscape	Aleksotas, Vilijampolė waiting for urban expansion; community gardens; unused buildings of the municipality	touristic development from cruises, islands for tourists			
	(2) Levent Alt Çarşı	Areas being enhanced: docks, city center, Sardineria	- Attractive leisure city (villages like Arcen en Steijl and a lot of events/festivals)	- Aleksotas, Vilijampolė are the city parts waiting for urban expansion	Tourist related transportation (islands)	Infrastructures (airport, railway, highways, port)		
	old airport	good climate for tourists	Attractive landscape around Venlo	- Keunas airport	- Touristic development related with cruises			
	(2) Shopping mall(old)	Areas: southern slope of General Dávila street		- Idle premises depending to Kaunas city municipality - Unused buildings which depend to the Municipality - Community gardens				
Events								
repair & share fest, fair fashion		fair of nations, smartweekend, "the night is young" workshops, reworking in climate change	summer festivals, carnival	Hansa days, Kaunas European Capital of Culture 2022		International expos		
Repair & share fest		fair of nations (summer event)		Hansa days in the city, Kaunas European Capital of Culture 2022				

12.3 Summary of needs for all seven cities

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
policy and regulations	Clearly on regulation (employment, waste regulation, resource regulation) + knowing which policy level is in charge for which regulation (municipality – region – federal)	Governmental regulations need more work and this needs to happen from bottom up.		- Stimulating local legislation/directives for sustainable and local food	Avoid short-sighted lobbying of manufacturers, entrepreneurs Improvement of legal framework			
better ecosystem / network	support for local circular entrepreneurship	network for makerspaces, collaborating with big companies (agent and buyers), waste material exchange, individual garbage collectors, sales platform for makers	entrepreneurship ecosystem, spaces, ICT industry involvement, knowledge sharing initiatives	C2C network, knowledge events and platforms	Better dialogue between local government and communities, business ecosystem for SMEs	public-private developments, promoting new economic activities with social interest	Institutions from transfer knowledge and tech to citizens, connecting grassroots efforts with institutions	
entrepreneur / maker network	v	v	v	v	v	v	v	5
connect with knowledge industry	v	v	v	v	v	v	v	5
connect with local government				v	v	v	v	3
connect with big industries	v	v	v	v		v	v	2
waste / CE network	v			v				2
knowledge industry		- Academy and Industry are not collaborating	- Lack of initiatives for sharing knowledge/tools (repair cafes)	- Knowledge events and platforms	- Active and effective cooperation of academic and public authorities Better dialogue between local government and communities		- Lack of extroversion from institutions (e.g. Tech transfer, ties with citizens) Connecting institutional with grassroots efforts	
local government		Support for local, sustainable, entrepreneurs / makers circular making/entrepreneurship	Promote an ecosystem of entrepreneurship (1) Sharing economy (between communities - source, knowledge, experience)		More favorable environment for doing business	Promotion of new economic activities with a social interest		
big industries		- Academy and Industry are not collaborating	Leverage innovative projects into self-sustainable projects - Promote mentors and coaching for kick-starting innovative ventures		To increase the "value" of makers			
circular economy / waste management		- The entertainment and beverage industry is huge but no awareness of the circular economy. - Big companies are not that involved in the maker ecosystem.	Foster the interrelation among existing industries - Cooperation among different companies in the area. Establish trust relationships between stakeholders (citizens and/or companies)					
potential collaborations		waste material exchange needed (4) Supporting and organizing individual collectors (4) Local government should bring together NGOs, makers, Big Industries, and the public (4) Academy, R&D, Industry, and makers should collaborate for solutions	More ICT industry to avoid young people depopulation - Lack of initiatives for sharing knowledge/tools (repair cafes)	remixing economic sectors with social enterprises		- Collaborative development of Public-Private sectors		
platform ideas		(5) Platform support and promotion of maker communities (2) Sales platform for recycled products created by maker communities		- Knowledge events and platforms				
Sustainability								
mainstreaming	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
waste to secondary raw materials	v	v	v	v	v			4
local production	v	v	v	v	v			4
sustainability strategy						v	v	3
								2
knowledge / consciousness	circular economy needs to be mainstream and affordable		understanding of value of waste materials	not enough circular awareness	Revival of endangered habit to repair	- Need for adjustment in the Circular Economy Structures	Lack of strategy to circular economy	
Making circular economy mainstream			Garage sales should be more popular as a way to empower circular economy	not enough circular awareness	- Education of society on circular economy principles, importance of sustainable production	- Need for adjustment in the Circular Economy Structures	Lack of strategy to circular economy	
Making circular products affordable for everyone					Revival of endangered habit to repair			
waste	waste streams not 'pristine'	access to recyclable materials, organic and food waste, grey water			plastic packaging, supermarkets, bio-waste			
access to waste streams	waste streams not 'pristine'	- Maker communities need access to recycling/upcycling materials	Increase the consciousness of the value of dismissed materials		- Waste management vs Simulated waste management - Plastic packaging management - Sustainable operation of supermarkets - Containers for bio-waste - Promote renewable energy utilizing existing infrastructure			
waste streams of interest		(1) Organic and Food waste is a very big issue for Istanbul						
		(1) The use of greywater						
Industry								
local production		urban farming, local solutions for food, shelter, and health		healthier and more circular food	textile waste, sewing industry			
general		(2) Local production is not valuable			High level of emigration impacts the lack of seasonal employees A large amount of secondary raw materials emitted (textile) Promotion of local production (SME, renewable energy)	- Recessionary period cost the local economy its viability		
food		(3) Urban farming areas.		- Healthier and more circular food in all hospitality facilities - Stimulating local legislation/directives for sustainable and local food				
sewing		(5) Local solutions for food, shelter, and health			- Revitalization of enervated light industry remaining from the past (sewing industry)			
knowledge gap		(2) We need to understand how collective production works. (1) Supply and demand analysis and adjusting the production based on data						
maker movement		(1) Economical sustainability for the maker community (3) Neighborhood maker spaces						

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	
Urban development								
problem neighborhoods	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki	Total
dying city center		v	v	v	v	v		4
lack of creative space			v				v	3
urban green		v					v	2
lack of industrial space	v						v	2
lack of storage space	v							1
								1
general problems		- The big industries within the city should be moved out of the city.	Foster the vision of Santander as a place to live not only to visit		- Publicity and transparency in urban planning	City safety, lighting, cleanliness and improvement of cultural outreach Upgrading environmental quality and urban landscape		
lack of space	lack of affordable space for making and storage of materials	Lack of venues to sell products	Lack of space for innovative projects				lack of public spaces and creative spaces	
Affordable space		(2) Lack of venues to sell hand made products	Lack of space for innovative projects				Lack of public spaces in several neighbourhoods	
Storage space (for materials)			industrial space				Lack of creativity spaces	
problem areas		Fikirtepe, Kusêtepe, Gültepe, Tarlabası, more urban green needed	Cabildo, Calle Alta, Cueto, Monte, city entrances; dying commerce in city center because of surrounding shopping centers	vacant stores in city centre, problem neighborhoods	problem neighborhoods with bad infrastructure: Vilijampolė, Aleksotas, Ž. Šančiai, Dainava	port areas and costal areas (marinas, beaches) need upgrading		
		(3) Fikirtepe, Kuştepe, Gültepe, Tarlabası	Zones: Cabildo, Calle Alta	problem neighborhoods	Integration of problematic city areas with poorly developed infrastructure (Vilijampolė, Aleksotas, Ž. Šančiai, Dainava)	Upgrading port areas		
			- Areas in decay: Cueto, Monte, city entrances	vacant stores in city centre	Thoughtful strategic urban development – newly built waste incineration factory in the suburbs of Kaunas	Upgrading coastal areas (marinas, beaches)		
infrastructure		public transportation	- Traditional commerce in the city center is dying in favor of big shopping centers in the surroundings.					
urban green		(3) Urban farming areas. (1) City parks and their use of organic waste	- Public transport network does not really invite citizens from the surrounding areas when they visit the city center, so the traffic increases.		Modernization of the transport system		- Low quality public transport still a problem Less green areas than needed	
urban regeneration		(3) Urban regeneration should not be on the building level, it needs bigger policies (3) Urban projects about recycling						
		- Urban regeneration is destroying the neighborhood feeling and dynamics.						

12.4 Summary of goals for all seven cities

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
sustainable industry							
general goals	corporate social / sustainable responsibility of big producers	increasing circular production in industrial areas	local production and consumption	strong regional position economically and in sustainability	manufacturer's responsibility	blue growth city	specialization, sustainable development
corporate responsibility	v	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
local production		v			v		
	big producers should reduce their impact	- Encourage green brands. - Increasing the use of sustainability and circular production within the industrial areas.	local production and consumption Achieve a sustainable development model according to national initiatives (2030th agenda)	- Strong euroregional position economically and in sustainability	Promotion of zero emission industry - Manufacturer's responsibility for circular economy	- Promotion of actions in relation with corporate social responsibility - Optimization of network functions of transportation, waste management and use of technologies Piraeus to become a blue growth city, a green sustainable and smart city	- High quality specialisation - Green & Sustainable development
industrial sectors of interest	food, fair fashion, construction, 3D printing	food, Glass + Packaging + Electronic Waste + City Agriculture		industry and hospitality (german tourists)	smart technology	blue development, port activity	
local consumption	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
food / agriculture	v	v			v		
tourism / hospitality				v		v	
fashion	v						
construction	v						
design	v						
glass		v					
packaging		v					
electronics		v					
food	Local food chain	- The city should be self-sufficient in food.					
	CSA - active consumer participation in agriculture	Legislation for food waste.					
fashion	Fair fashion						
construction	better constructions (architect)						
design	How to integrate 3D printing in local make industry? mass customizations						
smart technology					Development of smart technologies	- Promotion of new business technologies in relation with Piraeus blue development	
hospitality						- Business associated with Port activity - Piraeus is the home port of the Mediterranean for cruising	
consumption	Change the course of consumerism and shift it into prosumerism	- Consumers and producers should be educated about sustainability and recycling. - We need to re-design the consumption habits.	- Promote a more sustainable consumption based on local production when available.	- Show that working on sustainability is fun and gaining support for the assignment - After participating in work, joining in pleasure - Include residents and companies in the sustainability challenge	Production as close to as possible to the user (decreasing costs, transport pollution)		
circular economy	product service systems, circular procurement of municipality; mapping material streams	mapping material streams, especially on materials of interest - glass, packaging, electronic waste, city agriculture	registry of secondary raw materials		traceability of items		
material tracking	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
business models	v	v	v		v		
better regulations	v	v	v				
business models	product as a service	Organized Industry areas should have local circular organizations					
material tracking	mapping of material streams to be able to close loops	- Being able to follow the artifact/resource route in the city. (1) Specific topics such as Glass + Packaging + Electronic Waste + City Agriculture	Registry of potential secondary raw materials		- Traceability of items		
regulations related to circular		(3) Preventing the use of composite materials, creating laws against them	Clarify the regulation framework for circular economy and promote changes to enable it		Coherent city's policy towards sustainable production complying with EU regulation - In 2030 CO2 reduction is obliged to reduce		
closing loops	reuse in construction sector, professionalizing repair movement, repair hub	urban recycling festivals, common compost areas, goods exchange system, sharing	reuse	minimize incineration	waste sorting system		
recycle	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
repair	v	v	v		v		
reuse	v			v			
share	v						
recycling	Reduction in consumption and use of materials/resources through stimulating reuse and starting up collaboration with construction sector	(4) Urban recycling festivals		- minimize incineration	Establish and manage a separate waste sorting system		
		(4) Common compost areas					
		(2) Decide about the most abundant waste that can be converted into circular economy products and then look at its feasibility					
		(4) Recycling system inside makerspaces					
		(3) Establishing a transparent process of waste management					
	Professionalising the repair movement in Leuven; repair hub	(2) Goods exchange system (Sterilisation, repair)					
reuse				- Transition to (re)use of raw materials in all areas			
sharing		(3) Sharing vehicle, machine, space, workforce					
Social cohesion							
support ecosystem / network	interaction with world players like imec, materialize; business / social economy / maker movement / knowledge actors; upscaling small initiatives	expert suggestions for makers, universities, NGOs, vocational high schools; partnerships with big companies; local SME support; incubation centers collaborate with local government; directing makerspace products to the market	existing smart city initiatives, private companies; tourism, recycling; retain talent; maker community into entrepreneurs; more interaction between youth and elderly	citizens, companies, knowledge institutions; upholding SMEs	makers, researchers, politicians	blue lab, blue cycle knowledge; public-private partnerships to produce new products	Extroverted universities; upfront funding for SMEs; community efforts brought to a spotlight

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
Leuven		Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
involve knowledge industry		v	v	v	v	v	v
upscale local SMEs		v	v	v	v	v	v
upscale local social initiatives	v	v	v		v	v	v
involve government			v		v	v	v
involve private manufacturing sector	v	v	v	v			
involve society			v	v			v
<i>knowledge industry</i>		(1) Take suggestions from other experts (makers, universities, NGOs)	Joint efforts with existing smart city initiatives (i.e. do not create yet a new novel thing)	- Working on Venlo 2030-2050 with citizens, companies and knowledge institutions	Building relationship / interaction between makers, researchers / politicians	Utilizing existing infrastructures and knowledge such as Blue lab, Blue Cycle, etc.	Extroverted universities
		(3) The collaboration of academy, industry, and government to replace the materials					Research with a social impact in mind
		(4) Using the potential of vocational high school					
<i>government</i>			Joint efforts with existing smart city initiatives (i.e. do not create yet a new novel thing)			Strengthen Municipal / Public and Private Partnerships for the Production of New Products	Create meaningful alliances with citizens and authorities
<i>big companies / private sector</i>	Interaction between world players like Incx, materialize and local makers	(1) Partnerships with Big Companies	- Engage private companies on the circular economy movement	- Working on Venlo 2030-2050 with citizens, companies and knowledge institutions			
	Strengthening the collaboration between business/social economy/makers/movement/knowledge actors to create more local employment		- Social and economic integration of: tourism, culture and recycling				
<i>upscale SMEs / small initiatives</i>	Upscaling small initiatives	local SME support	Create a habitat for retain and attract talent	- Upholding SMB's	Strong makers community	Financing programs for start-ups and social businesses / Creating new products	Support new entrepreneurs and SMEs with upfront funding rather than post-expenses compensations
		Funding for social entrepreneurship maker projects	promote and develop the maker community as a business and entrepreneurship				
		incubation centers collaborate with local governments					
		directing makerspace products to the market					
<i>society</i>			- Promote interactions between youngsters and elderly people	- Social inclusion, everyone is allowed and able to participate at his/her level			Bring communal efforts in the spotlight
				- Working on Venlo 2030-2050 with citizens, companies and knowledge institutions			
				- Creating chances for employment within gasfree neighbourhoods			
<i>Employment</i>							
<i>platforms</i>	<i>sharing platform</i>	match-making for skills, resource sharing, connecting makers, selling things	marketplace for secondary materials				
	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
sharing platform	v	v			v		
networking platform		v					
secondary raw material platform	v	v					
selling platform	v						
	<i>share platform</i>	for match-making: finding experts and skills for resource sharing and renting for connecting makers with other makers for connecting makers with the public for selling things for digital and smart systems for decision makers, door keepers, waste collectors, trainers; on making; with ISMEK, libraries	Create a marketplace of secondary raw materials workshops in festivals for citizens; for practical actions for Santander; repository of circular ideas; on repair and prototyping		- Platform for communication		
<i>education</i>	already addressed in needs		workshops in festivals for citizens; for practical actions for Santander; repository of circular ideas; on repair and prototyping	for young generation; on training program with practical results	STEM on recycling and material reuse	upskilling	
	<i>on sustainability</i>	for decision makers, district authorities and door keepers for the public for trainers "train the trainers" for youth, on circular economy and waste management	Workshops in popular festivals for citizens on specific practical actions of santander on which circular practices are feasible	- Sharing knowledge for a sustainable city - Creating awareness about sustainability	Strong focus on education of the society, starting with kids and young generation	STEM Education (Citizens, businesses etc.) with respect to recycling and material reuse	
	<i>on making</i>	makerspaces (3) Bringing together the public and craftsmen for training	repository repair and prototyping		Tailored training programs focused on practical results		Upskill people involved
<i>existing organizations</i>		(4) Lifelong Learning Centre (ISMEK) · Libraries should have maker areas. (1) Education- Industry collaboration					
<i>governance</i>	<i>financial incentives</i>	tax reduction, local governments should play more prominent role, entrepreneurship council to solve local government problems · Promote a decrease in tax for social entrepreneurship.	clarify sustainability transition directives	ownership in district agreement	tax reduction, supervisory mechanism for manufacturers Favorable tax system for makers		
	<i>regulations and policy</i>	(2) Legal action legislation for social entrepreneurship	- Clarity legislation/directives energytransition		Supervisory mechanism to observe the manufacturing process of the manufacturers based in Kaunas green-economic zone (management of waste, pollution)		
<i>local government</i>		· Local governments should take a more prominent role. (2) Establishing entrepreneurship council to solve local government problems/needs with start-ups (1) NGOs from communities and industries should be involved in the decision making and operation of the project		- Ownership in district agreements - Practice what you preach			
<u>urban development</u>							

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
quality of living		local solutions tailored to each district, green areas, accessible open spaces		- Development of the "Kazernekwartier" (old army barracks, future tourist area)			Stimulation of degraded areas
urban regeneration with local solutions	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
make use of industrial areas		v		v	v	v	
urban green		v		v	v		v
district identity		(1) Local solutions for different districts. (4) Localization of maker culture according to the district		- Development of the "Kazernekwartier" (old army barracks, future tourist area)	· To create Bohemian district in Kaunas, which could host different workshops; creative making workshops, creative workshops, educational events, it could be the center, the center from which communication originates		Stimulation of degraded areas
<u>urban green</u>		(2) A city with green areas (4) Accessibility and open places					
industrial areas		industrial symbiosis, organization of recyclable outputs and resources; Specific Areas rich for Makerspaces: Kadıköy, Yeldeğirmeni, Kurtuluş, Karaköy		make use of brightland campus and greenport ; make use of being a shrinking region	Make use of the city's areas like Radio factory, Kaunas water territory in Zaliakanlis; create bohemian district, creative workshops, educational events		innovation zone
		(2) Improving the quality of industrial areas.		- Maintaining a strong infrastructure in rail/road/water	· Use of the city's areas like Radio factory, Kaunas water territory in Zaliakanlis		- Innovation zone
		(3) Organized Industry Regions: symbiosis and organization of recyclable outputs and resources		- Make use of Brightland campus and Greenport			
urban growth (de-growth)		(4) Specific Areas rich for Makerspaces: Kadıköy, Yeldeğirmeni, Kurtuluş, Karaköy		- Make use of being a shrinking region	· To create Bohemian district in Kaunas, which could host different workshops, creative making workshops, creative workshops, educational events, it could be the center, the center from which communication originates	- Adjustment with the needs created by climate change (lighting, security and needs of homeless people)	
infrastructure					- Development of public transport system (seeking to reduce commuting to work by car)	Tourist related transportation (islands)	

12.5 Summary of barriers for all cities

	Leuven	Istanbul	Santander	Venlo	Kaunas	Piraeus	Thessaloniki
urban development							
	Not enough space for makers		transport infrastructures are bad	too much focus on Venlo centre, and not on surrounding neighborhoods			uncontrolled urban development, misalignment with wider Balkan area
availability of space	Not enough space for makers						- Uncontrolled urban development - Miss-alignment with the development of the wider Balkan area
infrastructure			transport infrastructures				- Overstressed inner-city infrastructures
social cohesion							
	lock-in of current production system, profit and sustainability, lack of strong EU vision		Global economic crisis, not enough funding, aging population, brain drain	aging population			Geopolitical pressures
policy	Need of strong European vision and policy making/regulation battle between profit and sustainability						- Geopolitical pressures
economics	Economic situation region of Flanders		- Global economical crisis	- Affordable energytransition			
	Model shift		- Need of big sponsors for funding	- Upscaling			
population	High housing prices		ageing population talent drain non mobility image	- Aging population Include society in the task at hand			
			- Society (both citizens and industry) tend to be focus on the short term				
			- Need of a greater political awareness				
Sustainability (industry)							
	no pristine waste streams, large scale agriculture, citizens not involved with industry		lack of support for CE, not enough lobbying, strong competition with neighboring regions, too focused on hospitality	robotizations, weak definition of sustainability			
waste streams	Waste streams are not "pristine"						
existing industry lock-in	large scale agriculture		lack of support for circular economy				
	industry still needs to involve citizens in reverse logistics		Need of lobbies to really promote circular economy over the traditional linear one.				
	circular is not always sustainable						
economic development			strong competition from neighbouring regions economy very focused on hospitality				
competition				- Robotization			
				- To much grey areas in definitions of sustainability, environment			
fake sustainability				- CO2 compensation is not reduction			

12.6 Summary of stakeholders for all seven cities

	Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UoM being its Support Partner)	%	Thessaloniki	%
Knowledge	14	24	53	37	15	25	12	27	5	15	3	10	6	17
Business	19	32	19	13	16	26	20	44	9	26	5	17	7	19
Capital	1	2	22	15	7	11	2	4	10	29	10	34	6	17
Administration	9	15	23	16	11	18	3	7	4	12	2	7	7	19
Society	16	27	25	18	12	20	8	18	6	16	9	31	10	28
Total	59		142		61		45		34		29		36	
Knowledge														
KUL: Katholieke Universiteit Leuven (university)			- Sivil Toplum Çalışmalar Derneği = Civil Society Studies Association, Bilgi University		University of Cantabria: Public university of the region. It has a broad range of areas of formation and research. Small compared with others in Spain but very productive		Delft University of Technology		Kaunas University of Technology (KTU) = KTU design center; KTU national innovation and business center; Kaunas science and technology park		University of West Attica (UNIWA) (Knowledge Stakeholder) = This University which is based in Athens, offers technical and technological expertise in the field and can support maker movement activities with respect to plastics and other material re-use		- Universities (Auth, UoM, HUA...)	
UCLL University Colleges Leuven-Limburg (higher education)			- Turing		UNED: Spanish National Remote University. Public university which offers non-presental courses and degrees.		Maastricht University Venlo campus		Vytautas Magnus University		University of Piraeus (UNIP) (Knowledge Stakeholder) = Department of Management Studies has been in touch with PIR/UoM in order to discuss about the kind of materials produced one could develop from recycled plastics.		- Research Centre (CERTH)	
De Ark: elementary school IMEC: Interuniversity Microelectronics Centres (IMEC) is an international research & development and innovation hub, active in the fields of microelectronics and digital technologies.			- Takat Derneği = Takat Association		UIMP: Summer International University, Research university which every summer hosts the organization of short courses with tight follow-up of social challenges and wide interdisciplinary scope.		Fonyi university of applied sciences		KTU Santaka Valley = Integrated Science Studies and Business Centre		Centre for research and technology (CERTH) (Knowledge Stakeholder) = We can learn more on innovative methods and technologies to secure a more sustainable environment through the re-use of recyclable materials in Piraeus		- Private educational institutes	
Bio Incubator					UEA - European University of the Atlantic: Private University.		HAS university of applied sciences		Lithuanian University of Health Sciences				- OKIThess	
VITO We accelerate the transition to a sustainable world. We reduce the risk of natural disasters, combat climate change and strengthen the economic and social fabric of Flanders with interdisciplinary research and large-scale demonstrators.			- TTGV =Technology Development Foundation of Turkey		Municipality Workshop School: The Workshop Schools and Craft Houses Program is a mixed employment and training program designed to improve the employability of young unemployed people through training in alternative work professional practice, through performance of real and productive work. The Workshop Schools and Crafts Houses Programme is aimed at unemployed young people under 30 years of age who are registered at the National Youth Guarantee System.		- Citaverte college		Lithuanian Energy Institute = a center of excellence in science, innovation and technology in energy and related fields				- i4G	
CVO centre for adult education			- Sosyal Kulüpü Merkezi = Social Incubation Center		Createcture, ASOCIATION: The CREATECTURA project addresses different types of activities around space design, architecture, arts and technology.		- ROC Gilde training Venlo							- Public technical schools
VDAB The VDAB is the public employment service of Flanders			- Sehrine Ses Ver = Voice Your City		AMIC(ANGO) Amica is a social initiative whose mission is to discover the capabilities in each person. The Association works with family members, people with disabilities and professionals. It provides, among others, environmental management services such as landscape recovery, waste management and environmental outreach.		- Bibliotheek Venlo (library)							
Vormingplus non profit organisation focussing on education			- NGBB = Nezahat Gökyiğit Botanical Garden		Innovative schools: Alatala, Verdermar, Castroverde		High schools							
STEM education CORE: CORE is a cooperation of innovative engineering students and engaged partners who develop and support projects aiming efficient and sustainable energy consumption.			- İmecə = social innovation platform: A network of social institutions that create change meet and work together to find solutions to social, ecological and cultural issues		FabLab Santander: is a non-profit making community open to all kinds of profiles, made up of curious people eager to learn in a friendly working environment.		- C2C ExpolAB - cradle to cradle consultancy							
Stad & Architectuur society that promotes the role and value of architecture			- Acibadem University Incubation Center		Official Chamber of Commerce, Industry, And Shipping of Cantabria provides services to businesses		Daan de Haan Design - designer, consultant							
KUL Materials Department			- Iskele 47 (makerspace)		Local Development Agency (ADA): It is the municipal service that groups and coordinates the bodies dedicated to the areas of economic promotion, employment and training. It has its own organizational structure responsible for designing, maintaining, mobilizing and managing all resources and projects aimed at combating unemployment, based on a core of training, employment and local development services.		- 3D Café - Hackerspace Venlo							
FabLab			- Robotel (makers, produce 3D printed prosthetics)		- European University of the Atlantic (UEA)									
Cekul Foundation			- Denizemiz Dergi = Marine Clean Association / Turmepta		- Nature and humans foundation									
World Resources Institute														
Başiskehir Living Lab			- Atölye=creative platform and strategic design studio											
Özhanar Külliye = Özhanar Club: a social club that develops projects that establish a dialogue with the environment in the focus of repair, production and education.			- Can Ocağı = The Glass Furnace is Turkey's largest and best-equipped glass and art center											
ISMEK = lifelong learning center			- TAGES= TAGES provides project management, consulting, R&D and innovation management services for SMEs, companies, NGOs, public organizations and local authorities, academic and research institutions											
RREC Education Centers			- Acibadem University											
RREC Turkey = Regional Environmental Center (REC) for Central and Eastern Europe is an international organization with a mission that supports addressing environmental issues														
TAGES= TAGES provides project management, consulting, R&D and innovation management services for SMEs, companies, NGOs, public organizations and local authorities, academic and research institutions														

	Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UOM being its Support Partner)	%	Thessaloniki	%
			<p>- BCSD = Business council for sustainable development</p> <p>- Çekül Vakfı = Foundation for the Protection and Preservation of the Environment and Cultural Heritage (CEKUL) strives to foster and build a nation-wide awareness and network for the preservation of the urban and rural built and natural environment.</p> <p>- Fablab İstanbul (Kadir Has)</p> <p>- Fikir Küpü = Idea Cube, platform for generating, collecting, maturing, evaluating and implementing innovative ideas.</p> <p>- Gelecekhanе = CONSULTING FIRM</p> <p>- BTM</p> <p>- Girişim Fabrikası = The Entrepreneurship Factory, which is a brand of Ozyegin University support entrepreneurship.</p> <p>- Girişimcilik Merkezi Boğaziçi = Bogazici university Entrepreneurship Center</p> <p>- Coder Dojo: global movement of free, volunteer-led, community-based computer programming clubs for young people</p> <p>- Hackerspace = makers</p> <p>- Hackquarters = startup accelerator and corporate innovation platform</p> <p>- InnoCampus = collaborative nonprofit project providing an innovation and entrepreneurship experience to young entrepreneurs</p> <p>- Invest in Istanbul = Invest in Istanbul Platform, the official organization founded specifically to consolidate the investment support services in Istanbul</p> <p>- Work Up = Türkiye is bank entrepreneurship program</p> <p>- Yıldız Kulupu = Yıldız university incubation program</p> <p>- Hamdi Ulukaya Girişimcilik Vakfı = Hamdi Ulukaya Entrepreneurship Foundation</p> <p>- Bu Gençlikte İş Var (TUSIAD): There is a Job in This Youth (TUSIAD) entrepreneurship program that provides a wide range of support from education to business interaction, incubation, acceleration, etc.</p> <p>- Geleceğin Yazarları Kadınlar: Women Writing the Future, Turkcell support women in developing mobile applications by training women in software, and to increase their management capacity and entrepreneurship of women in these areas</p> <p>- KADEM = Women and democracy association</p> <p>- KAGIDER = Women Entrepreneur Association of Turkey (KAGIDER) is a non-governmental organization aimed at strengthening women entrepreneurs.</p> <p>- Kadın Girişimci Dergitürkme: Vakıf Support of Women's Work. It supports women to lead local development initiatives that develop and transform social, economic and political opportunities for their families and the communities in which they live.</p> <p>- Lonca Girişimcilik: Entrepreneur Center; It was founded by Kavaklı Türk Participation Bank to enable entrepreneurs with technology-oriented, scalable business ideas to turn their project ideas into a sustainable model and also quickly into commercial activities</p> <p>- PAGDER= Turkey companies operating in the plastics industry and under one roof PAGDER Plastics Industry Association, established in 1969 is one of the most active civil society organization with approximately 500 members of the plastics industry.</p> <p>- Sucool= Sabancı University startup league</p> <p>TunnelX = Koc University makerspace</p>											
Business														
	Interleuven cooperation structure between municipalities combining services		<p>- Production Cooperatives</p>		<p>PCTCAN (Technological Park): It holds the premises of companies focused on ICT and innovation</p>		<p>- Het Goed = thrift shop</p>		<p>"Antrin perdiþrimo grunge" = collection and recycling of used tire waste</p>		<p>Blue Lab Piraeus (Business stakeholders) = Piraeus-based model lab, innovation, technology and business centre .This centre is led by person who work also with PLANET.</p>		<p>- Alumini</p>	
	Leuven MindSite is one of the world's prime regions for health, high-tech and creativity. A region with a unique ecosystem of universities combining with knowledge institutions and the government, creating a perfect breeding ground for companies, entrepreneurs, investors and talent.		<p>- Ekolojik Marketler Topluluğu = Ecological Markets Association</p>		<p>ASCENTIC association: ICT companies association</p>		<p>- Bijenhof-kopen.nl = social enterprise selling beehotels</p>		<p>"IT Max" or "Refurbas" = RETAIL AND WHOLESALE OF USED COMPUTER EQUIPMENT, COMPUTER EQUIPMENT RECYCLING</p>		<p>Blue Cycle (Business Stakeholders) = Piraeus-based model lab, fully equipped to process marine plastic waste, to promote research and development.</p>		<p>- Kleemann</p>	
	VOKA employers federation		<p>- Çeviko= CEVKO (environmental protection and packaging waste foundation) Foundation adopts the "Integrated Waste Management" principles in all works performed by it pursuant to its purpose of establishment</p>		<p>CEO/CIEPYME (employers' association): Spanish Confederation of Employers' Organisations</p>		<p>- Hela Thissen = company that develops saucers</p>		<p>"INFO academy" = Trainings led by qualified lecturers (IT professionals), retraining, qualifying</p>		<p>Athens Mini Maker Faire (Business Stakeholders) = This is a gathering of interested citizens who enjoy learning and who love sharing what they can do. From engineers to crafters, from artists to crafters, Maker Faire is a venue for these "makers" to show hobbies, experiments, projects.</p>		<p>- Business and Cultural Development Centre (KEPA)</p>	
	LE:ION network of organisations aiming to support startups		<p>- Teb Girişimi= TEB Entrepreneurship House is a business development center established to ensure the development of projects of enterprises producing high added value.</p>		<p>BSH= largest manufacturer of home appliances in Europe and one of the leading companies in the sector worldwide</p>		<p>- Dutch Graphic Group</p>		<p>Qwidd Technologies = ADD VALUE TO YOUR BUSINESS THROUGH INNOVATION</p>		<p>Eco Elastika (Business Stakeholders) = Ecelastika is a non-profit organization whereby 5 largest tire importing companies in Greece, aiming at the creation of a Collective Alternative Management System for End of Life Tires.</p>		<p>- Telecoms companies</p>	

	Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UoM being its Support Partner)	%	Thessaloniki	%
	Group Intro focusses on education, empowerment and job opportunities		- Arcelik garage: Arcelik's work to strengthen the entrepreneurship ecosystem		TEKA: German company which manufactures and commercialise kitchen and bath products		- Dings Kartonages = company that develops paper logistic solutions		FULL JAR = Zero Waste Bulk Store Kaunas		Urban Camel (Business Stakeholder) = This is an environmental and plastics-related community group that could be endorsed in the Municipality of Piraeus Pop-Machina activities		- SNF.org	
	Social Economy		Istanbul Ticaret Odası= Istanbul Chamber of Commerce		Global Steel Wire: company engaged in manufacturing wire rod in extensive range of steels and dimensions		- Brinkhaus Fietsen = designer and builder of bicycles		Enterprise Lithuania Kaunas branch = promotion of entrepreneurship, business support		Rokani (Business Stakeholder) = Athens-based maker space that is organised and functioning as well as developing with Plastikourgeio S.A. and would like to contribute and exchange infrastructure with the Municipality of Piraeus		- Local breweries	
	Content shop		- Atölye=creative platform and strategic design studio		Companies which already have environmental consciousness		- Brightland Campus = Focuses on healthy food & nutrition, future farming and biocircular economy		Startup Lithuania; Startup Kaunas = Facilitating startup ecosystem				- IVF and medical tourism entities	
	Miss Miagi real estate agency focussing on societal benefits		- Imece = social innovation platform where people and institutions that create change meet and work together to find solutions to social, ecological and cultural issues		Business Associations		- Greenport Venlo = Greenport Venlo is a region of both national and international interest that is developing strongly. In this unique area, companies from various sectors such as agriculture, food, trade and logistics are located in different industrial estates.		InvestLithuania = Advice on business					
	Construction Federation				Official Chamber of Commerce, Industry, and Shipping of Cantabria		- Onderneemend Venlo = representing the interests of companies		Flagships of eco industry: Auga = organic food producer from field to shelf; BOP = lenses, CV, DVD, manufacturer of solar cells and solar panels; researcher and installer of solar energy systems; Continental = Sensors products factory; Hella = Manufacturer of high-end electronic components and systems for the automotive industry					
	SPIT reuse centre		- Technoloera = Technoloera is a venture building company focusing on the process of consistent start-up creation by using shared expertise and resources.		- Hospitality sector: Grupo DeLuz		- Social Label = an attractive 'work tool' with which we use art, design and communication to create new openings and fixed structures with regard to care and work 'reframing'.		ECOR = company that develops a composite material (an alloy) formed from cellulose fibers, pressure, water and heat. The raw panels can be made from residuals such as old paper, cardboard, coffee ground, hemp, cotton, paddy straw or any type of plant material.					
	VITES network of social economy organisations active in reuse sector		- Atik Nakit = collect recyclable wastes in the factories and offices of all domestic, small and large production companies in our country		- Supermarkets (Lupa, BM, ...)				- Caron = innovators, creating exceptional technologies, products and services for the main markets in printing and workflow management.					
	VELO social economy organisation focussing on bike repair and rental		- Maker cocuk = makerspace for children		- EIT Climate KIC									
	KunLabora Kunlabora is the Esperanza word for collaboration. We believe that collaboration with the customer and 'speaking the same language' is key for developing high-quality software solutions.		- Maker Atölye = makerspace		- Ranching				- Scelta = food service					
	Compartiment is a dynamic and expanding company that excels in the process of engineering and designing novel products and machinery.		- Impacthub =network focused on building entrepreneurial communities for impact at scale		- Valdecilla hospital				- AMI= producer of aluminum building hardware and industrials					
	Materialise headquartered in Leuven, Belgium, is active in the field of additive manufacturing, also known as 3D Printing. Materialise NV is one of the largest and most prominent global independent companies in the 3D printing / additive manufacturing sector.		- Arcelik garage: Arcelik's work to strengthen the entrepreneurship ecosystem		- Textil Santanderina				- AGMI = producer of traffic signs and lights					
	UNIZO UNIZO has over 82,000 members including craftsmen, service providers and professionals, companies in the commerce and distribution (retail) sectors		- REC Türkiye = Regional Environmental Center (REC) for Central and Eastern Europe is an international organization with the mission that supports addressing environmental issues		CISE, Santander International Center for Entrepreneurship				- Blue Engineering = innovating company that is inspired by the blue economy					
	Loving Hut vegan restaurant		- TAGES= TAGES provides project management, consulting, R&D and innovation management services for SMEs, companies, NGOs, public organizations and local authorities, academic and research institutions						- Jalema= producer of office supplies					
	Foodhub sustainable food shop		- Robotel Türkiye - Robotel (makers, produce 3D printed prosthetics)						- Staco = producer of metal rosters					
	Circular Conceptstore		- Disposable plastic water bottle-waste prevention and aimed at improving usage habits, functional and healthy water bottle						- Thrift shops					
Capital									Onze Oogst = company focused on producing healthy food					
	KBC Financial institution (bank)		- Melek Yatirimcilar (Angel Investors)		SODERCAN, society for the development of Cantabria		- LIOP = is the regional development company of the Province of Limburg		Kaunas chamber of commerce, industry and crafts		Blue Growth Competition (Capital Stakeholder) = This is an umbrella of actions to promote business ideas relating to the local sea and aquatic resources through environmental & economic development		- Angel investors	
			- Incubation Centre		Angel investor		- Banks		Industry, construction companies		Plastikourgeio S.A. (Capital Stakeholder) = Athens-based shop and laboratory where customers can be trained on plastics recycling and re-use technologies. It can also manufacture products of "green-economy" activities		- Venture Capitals	

	Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UOM being its Support Partner)	%	Thessaloniki	%
											Association of Hellenic Plastic Industries (Capital Stakeholder) = The Association of Plastic Industries of Greece was founded in 1958 and from then until today remains the leading force in the Greek industry, active in the field of all plastic products. Members of the Association are members of the plastic products industries such as film, tubes, crates, sheet extrusion and thermoforming products. Masterplast is a regular member. Also members are machine manufacturers as well as importers of raw materials. Members of the Association represent about 60% of Greek plastic production.			
			KOSGEB= Republic of Turkey Small and Medium Enterprises Development and Support Administration		Santander City Council through ADL (Local Development Agency)				Lithuanian Confederation of Industries		- Banks			
			. MÜSİAD = Independent Industrialists and Businessmen Association (MÜSİAD);		Caixa Foundation				Lithuanian trade companies' association		- Association of the Greek manufacturers of packaging and materials		- Innovation Vouchers	
			Yeşilist = first green platform for sustainable living		Municipality				Employers' Confederation		Piraeus chambers of crafts (TECHNOMEP) (Capital Stakeholder) = A crafts based Chamber that focuses on crafts and might also offer the potential to endorse some of the maker community activities today and in the future		- H2020 etc	
			Albaraka Garage= Startup Acceleration Center, from Albaraka bank		Banks: Santander bank, Caixa foundation, Bankia, Liberbank)				Flagships of eco industry: Auga = organic food producer from field to shelf; BOD = lever, CV, DVD = manufacturer of solar cells and solar panels, researcher and installer of solar energy systems; Company = Sensory products factory; Hella = Manufacturer of lighting and electronic components and systems for the automotive industry		Rewarding packaging recycling S.A. (ANTAPODOTIKI ANALYKLDSI) (Capital Stakeholder) = Applies contemporary recycling methods to engage citizens voluntarily in the recycling process in Piraeus and elsewhere			
			. Garanti BBVA= Bank		- Bolin foundation				The banks with Scandinavian capital		APPLIANCES RECYCLING S.A is a company for the Management of the Waste of Electrical and Electronic Equipment (WEEE) in Greece functioning on a non-investment basis. The company's financial resources are mainly received financial contributions of the registered companies that manufacture, import or resell electrical and electronic equipment			
			. TTGV=Technology Development Foundation of Turkey						The EU Structural Funds		Piraeus Traders Association (Capital Stakeholder)			
			. GIZ = German International Cooperation Agency						EEA funds		Piraeus Chamber of Tradesmen (SMEs) (Capital Stakeholder)			
			. İmecce = social innovation platform where people and institutions that create change meet and work together to find solutions to social, ecological and cultural issues						Private funds oriented towards future based decisions					
			. Garanti, İş bankası = BANKS											
			. Angel investors											
			. ITU cekirdek / teknoparks											
			. SKD = BCSD, Business council for sustainable development											
			. European Bank of Development											
			. Local Development Agencies											
			. TÜBİTAK - Research Support Program											
			. KOSGEB= Republic of Turkey Small and Medium Enterprises Development and Support Administration											
			. Dutch Consulate											
			. Geleceğin Yazar Kadınları= Working for the Future											
			Turkcell supported in developing mobile applications by training women in software, and to increase the employment capacity and entrepreneurship of women in these areas											
Administration											Zea Marina SA (Government Stakeholder) = Zea marina is located in Piraeus in Athens and it is one of the finest marinas in the Mediterranean. A port with great ancient history as it was a Naval base where the fleet of trireme ships was based. It is located in closeby area to PIR and has expressed their interest to contribute the best they can given their historical background.			
	Stad Leuven municipality		. İBB İlçe yönetmiler = İstanbul Metropolitan Municipality district administrations		Government of Cantabria		- KanDoen		Kaunas Municipality		- Municipality of Thessaloniki			
	Vlaanderen Circular economy centre on Circular Economy of the Flemish Government		. Zemin İstanbul = makerspace from İstanbul Metropolitan Municipality		Santander City Council		- Gemeente Venlo		City Council		Piraeus Port Authority (Government Stakeholder) = Is a central organization that offers port large-scale services and contributes to local and national economy.		- Prefecture of Central Macedonia	
	Municipal department of cleaning			CISE, Santander International Center for Entrepreneurship			- Crossroads Limburg		Kaunas European capital of culture 22					- Government
	Ecoworx local waste management company for city of Leuven		. ISMEK = lifelong learning center		Municipal Workshop School				Hansa days = city festival, city birthday					- Int'l Expo of Thessaloniki
	Province of Vlaams Brabant		. Muhtarlar Müdürlüğü = Muhtar's Directorate. (Muhtar is the person who is the head of the management of the village or neighborhood)		National administration									- Chambers
	OVAM (Public Waste Agency of Flanders) and is responsible for waste management and soil remediation in Flanders													
	Flemish DCI Flanders District of Creativity supports, promotes and connects the Flemish creative industries.		. TTGV =Technology Development Foundation of Turkey											
			. KOSGEB= Republic of Turkey Small and Medium Enterprises Development and Support Administration		Municipality									
	EU Urban Agenda		. SKD= BCSD, Business council for sustainable development				- Regional government							
	VVSG association of Flemish cities and municipalities				- ADIF									

Leuven	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UOM being its Support Partner)	%	Thessaloniki	%
		<ul style="list-style-type: none"> - AGED = Waste Paper and Recyclers Association (AGED) - Bayakşehir Living Lab - Dutch Consulate - World Resources Institute - BTM - CEVKO= Çevko= ÇEVKO (environmental protection and packaging waste foundation) Foundation adopts the "Integrated Waste Management" principles in all works performed by it pursuant to its purpose of establishment. - Fincube = A digital garage sponsored by QNB Finansbank, where ideas, people and projects come together. - Girişim Fabrikası = The Entrepreneurship Factory, which is the brand of Ozyegin University support entrepreneurship. - Girişimci Merkezi Boğaziçi = Boğaziçi university Entrepreneurship Center 		<ul style="list-style-type: none"> - CEDREAC/CIMA - FEMP (Spanish cities and regions association) 									
		<ul style="list-style-type: none"> - Hackquarters = Hackquarters startup accelerator and corporate innovation partner - Bilī Çekirdē =ITU Core Early Stage Incubation Center organized by BILGI Career Center - Lona Girişimcilik= Entrepreneurship Center; It was founded by Kureyt Türk Participation Bank to enable entrepreneurs to technology transfer, scientific business ideas to transform their project ideas into a sustainable model and also quickly into commercial activities - PAGEV - Turkish Plastic Industry Research, Development and Education Foundation, - Yıldız Kuluçka = Yıldız university incubation program 											
Society													
De ruimtevaard non profit organisation working on poverty and inclusiveness		<ul style="list-style-type: none"> - Onaranlar Kulübü = Onaranlar Club. Volunteers club that develops projects that establish a dialogue with the environment in the focus of repair, production and sharing. 		retirees, unemployed		- Stadstuinderij = an urban agriculture initiative		"Mes Ziydim" = a place where unnecessary plants can be left and continue to live		Association of naval parents of children with special needs "ARGO" (Citizen Stakeholder) = This is a Piraeus-based organization which tries to train people with special needs on acquire basic and social skills		- OKIThess	
Femma (Meekerij) makerspace from women movement		<ul style="list-style-type: none"> - Robotel (Maker Türkiye produce 3D printed prosthetics) 		AMICA, NGO social initiative for people with disabilities		- Zomerpark-feest = biggest event in Venlo		"Task Isavva" = NGO. Meeting the needs of people with intellectual disabilities, involving them in public life.		SeaScouts of Greece (Citizen Stakeholder) = voluntary educational movement for young people with a special emphasis on boating and water activities.		- ARSIS	
1 Lampka non profit organisation working on poverty and empowerment in neighbourhood 'Ridderstraat'		<ul style="list-style-type: none"> - Buğday Derneği = Ecology association 		"Transformando Futuro", NGO environmental issues		- Rendiz = social enterprise		"Kaunas maker space" = makerspace for welding or carving, programming, etc.		Ma...Zel (Citizen Stakeholder) = Social Partnership for the Inclusion of Vulnerable Groups in Piraeus. Its purpose is to integrate and educate children and youth with disabilities and special educational needs.		- Labatoire	
FOODWIN Foodwaste innovation network		<ul style="list-style-type: none"> - Kobi Derneği = Small and Medium Sized Enterprises Association 		Red Cross		- Repaircafé's Venlo		"Performatieve design agency" = Performatieve design is a hybrid field, operating with a set of socially oriented applied methodologies from various design and performative arts practices		Professional High School for disabled students (Citizen Stakeholder) = Specific members of which could contribute in organizing local events.		- Comvos	
		<ul style="list-style-type: none"> - Cobarda Tuzun Olsun = "get salt on your soup" ngo raising awareness about the people living on the streets, provide their basic needs and bring them back to society 		Sports clubs		<ul style="list-style-type: none"> - Stichting Het Beleg = an urban agriculture-citizen initiative, aimed at the production, processing and marketing of food within the city, such as food production along the edges of the city and everything related to it. 		<ul style="list-style-type: none"> - Makers "The Wall" = textile design; front walls on clothes; - "Rezgi pinkies" = textile design, "Rojas mols"= ceramics, pottery, Gegüze = mols"= ceramics, pottery, Gegüze = https://www.facebook.com/pg/astategue/about/?ref=page_internal 		Organization Earth (Citizen Stakeholder) = it is a Greek, non-profit, non-governmental organization. Its purpose is to consolidate the concept of Sustainable Development.		- TopTeam	
Minder & meer sustainable retrofitting for vulnerable target groups		<ul style="list-style-type: none"> - Aşhane = Aşhane "My Neighbor Will Not Go Hungry" <p>This social social responsibility project, which aims to distribute soup every night to the homeless</p>		Neighbourhood associations		<ul style="list-style-type: none"> - Duurzaam Dorp = organises the meeting between villages, offers an (internet) platform for sharing knowledge and ideas. 		<ul style="list-style-type: none"> - "Kirybos kampos 360" = social initiative that develops ideas for reducing primary consumption and secondary design; caring for a cleaner and healthier environment. 		<ul style="list-style-type: none"> - Helmepta (Citizen Stakeholder) = This is the Hellenic Marine Environment Protection Association. It is a pioneering voluntary commitment of Greek seafarers and ship owners to safeguard the seas from ship-generated pollution 		- Open coffee	
(Energy) cooperatives		Esenf Sanatkarlar Odası= Chamber of Tradesmen Craftsmen		UNATE		<ul style="list-style-type: none"> - Limburgs Landschap = protector of natural areas in the province of Limburg 				<ul style="list-style-type: none"> - SHEDIA (Citizen Stakeholder) = SHEDIA is an NGO which designs a Greek street paper in Athens and Thessaloniki since 2013 as well as holds a wide network of activities (such as creating and selling products from recycled materials) as well as organizing unprivileged members of society in social activities and events. 		- Local meetups	
Wonen & Werken social economy organisation				FabLab Santander		<ul style="list-style-type: none"> - Stichting Stadsmunt Vastelaovend = The website "Vastelaovend" ("Vlondermarkt") was established in 2005 as a convenient means of payment for all permanent residents 				<ul style="list-style-type: none"> - Church of Piraeus (Citizen Stakeholder) = The church has a means of collecting recyclable and reusable cloths and foods for people in need. 		- Parallaxi	
Bond Beter Leefmilieu NGO working on climate		<ul style="list-style-type: none"> - ÇEVKO = Çevko= ÇEVKO (environmental protection and packaging waste foundation) Foundation adopts the "Integrated Waste Management" principles in all works performed by it pursuant to its purpose of establishment. 		University students						<ul style="list-style-type: none"> - First and Second Grade Education Authorities (Citizen Stakeholder) = Directory departments of education authorities could contribute in awareness raising and in dissemination of information in local events 		- Creativity platform	
Netwerk Bewust Verbruiken network of organisations working on sustainable consumption and circular economy		<ul style="list-style-type: none"> - Ashoka 		NGOs: AMICA, Greenpeace, Cruz Roja, ARCA,								- InCommon	

	%	Istanbul	%	Santander	%	Venlo	%	Kaunas	%	Piraeus (with UOM being its Support Partner)	%	Thessaloniki	%
Leuven 2030 Leuven 2030 encourages citizens, businesses, schools, organizations and public authorities to take action and work together for a climate neutral Leuven. Leuven 2030 inspires, facilitates and informs. ... Their ultimate goal is a sustainable, resilient and livable Leuven.		- Impacthub		Friday for future, Transformando futuros, ...									
UNIZO		- Turkish national committee on Solid Wastes		- Elderly care homes									
Rikolti NGO working on sustainable food sector		- Iskele 47											
Riso community building network		- Kriton Curi Environment Foundation											
Share & Repair vzw		- World Resources Institute											
Hal 5 community of old industrial building hosting community building, social inclusiveness organisations and maker movement		- AGED = Waste Paper and Recyclers Association (AGED) - Başakşehir Living Lab - Atölye=creative platform and strategic design studio - Onaranlar Kulübü = Onaranlar Club. Volunteers club that develops projects that contribute to a dignified living environment in the focus of repair, production and sharing. - Cam Ocağı = The Glass Furnace is Turkey's largest and best-equipped glass and art center											
		- Sosyal Kuluçka Merkezi = Social Incubation Center - WWF											
		- Zemin İstanbul = makerspace from İstanbul Metropolitan Municipality											
		KADEM = Women and democracy association											

About Pop-Machina

Pop-Machina aims to demonstrate the power and potential of the maker movement and collaborative production for the EU circular economy. We draw from a number of cut-edge technologies (factory-of-the-future, blockchain) and disciplines (urban planning, architecture) to provide the support necessary to overcome scaling issues; a typical drawback of collaborative production; to find the areas more in need of our intervention and to reconfigure unused spaces. We put forth an elaborate community engagement programme to network, incentivise and stimulate through maker faires and events existing and new maker communities in all our municipalities. We build upon the current informal curriculum for maker skills development by nurturing the social side and we put educators and makers together to exchange ideas on the training modalities. A particular focus on the skill development of women and vulnerable groups will aim to empower these (underrepresented) segments to partake actively in collaborative production. In every pilot area we will demonstrate business oriented collaborative production of feasible and sustainable concepts from secondary raw material or other sustainable inputs, based on the needs and preferences of the local stakeholders. A thorough impact assessment framework with increased scope (e.g. social) will be codesigned with stakeholders after short basic assessment trainings and will be used in the assessment of our pilot work. Based on the findings we will kick-start a series of policy events to discuss openly – without pushing our results – the tax and legal barriers that hamper collaborative production.

Coordinator

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Municipality of Thessaloniki (GR)
Municipality of Piraeus (GR)
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