

SYNCHRONICITY



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Executive Summary

By creating a common technical ground for shared digital services, SynchroniCity is opening the global Internet of Things (IoT) market for both cities and businesses, aiming to improve the lives of citizens and grow local economies. SynchroniCity aims to address the current challenges across smart city infrastructure by overcoming monopoly-creating vendor lock-in issues by using a standardised technical framework that encourages replication, interoperability and scaling of services. The Open Call work package was tasked with bringing to life the framework through the pilot period of 16 groups deploying 50 IoT solutions in the 8 partner cities, and in 13 new cities. This report tells the story of the pilot deployment journey and the lessons learnt, while providing recommendations for the future.

At the core of this project, is the ability to exchange data and services between public and private entities in a safe, secure and respectful way. However, SynchroniCity was much more than creating local IoT infrastructure partnerships based on global dynamics. It has created input for policy and validated global standards for other cities and suppliers that can now be used to expand services across sectors, cities and communities.

The primary audiences for this report are small and medium enterprises (SMEs), particularly those working in consortium partnerships, as well as municipalities, particularly those working in the procurement and deployment of IoT solutions in smart city projects. Overall the strong market and business focus of this document is reflected in the language, which is not overly technical in nature.

The purpose of this document is to share the experience gained and lessons learnt from the SME-led pilot deployments and the process undertaken. This is with a view to providing future recommendations for SMEs and cities engaging in similar projects. The report also highlights key results from the pilot deployment period. Furthermore, it acts as a common intersection directing readers to the detailed results covering the pilots' deployment in the other work packages of the SynchroniCity project.

The future recommendations of this report provide insightful ways in which SMEs, cities and project management teams can maximise the value and impact of similar open calls. The recommendations also provide insights into how cities could improve municipality procurement processes for IoT-enabled solutions.

Abbreviations

API	Application Programming Interface
AAQM	Autonomous Air Quality Management
CEN	Comité Européen de Normalisation (European Committee for Standardization)
CENELEC	European Committee for Electrotechnical Standardization
CIM	Context Information Management
CIE	Cycling Industries Europe
DPIA	Data Protection Impact Assessment
D	Deliverable
EC	European Commission
ETSI	European Telecommunications Standards Institute
GDPR	General Data Protection Regulation
Gtfs	General Transit Feed Specification
ISG	Industry Specification Group
IoT	Internet of Things
KPI	Key Performance Indicator
MIM	Minimal Interoperable Mechanism
M	Month
NGSI	Next Generation Safeguards Initiative
NGSI-LD	Next Generation Safeguards Initiative – Linking Data
OASC	Open Agile Smart Cities
SME	Small to Medium Enterprise
WP	Work Package

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1 Introduction

The current smart city market is fragmented, making the investment landscape inherently more challenging. However, with challenge comes great opportunity and through using a common technical ground, based on best practice and emerging standards, the Minimal Interoperability Mechanisms (MIMs) developed by SynchroniCity, created this opportunity. In doing so, the SynchroniCity framework has helped overcome key market barriers to ensure the needs of local citizens are met.

The purpose of this report is to provide an overview of what occurred in the pilot deployment period of the Open Call of the SynchroniCity project, to report upon main lessons learnt and provide recommendations for future stakeholders.

This report has six main sections:

Pilots Overview – detailing each of the sixteen pilot groups, their solutions and the cities they piloted in.

Pilot Period Launch – detailing the months prior to the pilot period, including all the set-up activities that took place, the launch event and the first month, and all associated communication activities and lessons learnt.

Interim Pilot Period – detailing months two to four, including the reporting processes, communication activities and lessons learnt by the pilot groups.

Final Pilot Period – detailing months five and six and the reporting processes. In addition, this includes the months following the end of the pilot period, including the project end event, associated communication activities, and lessons learnt from the pilot groups and management team.

Key Results – highlighting the key results of the pilot deployment period and directing the reader to detailed results in other SynchroniCity reports.

Future Recommendations – highlighting the key recommendations, and summarising recommendations made throughout by stakeholder groups, SMEs and businesses, cities and project coordination teams.

Throughout this document we have included recommendations that are outlined a blue box, as shown below. These are to be used as a guide only and have been provided based on lessons learnt and by engaging with partners within the project but might also have been suggested by us in response to the lessons learnt directly from the pilot reports.

Recommendations:

- *Suggested recommendation for SMEs, cities and project managers*

2 Pilots Overview

133 groups of businesses and cities from all over the world applied to participate in SynchroniCity's €3m open call to deploy data-driven solutions. The mission was based on the philosophy and technical approach of Minimal Interoperable Mechanisms and responding to key societal challenges. SynchroniCity's vision to build a global market for IoT-enabled services in Europe *and* beyond, would tackle everything from seamless integration of legacy systems to optimising value-for-money and independence in innovation, whilst enshrining the interoperability so critical for solution providers to scale across cities and communities.

2.1 Open Call Process

The SynchroniCity open call launched in June 2018 and was open to countries worldwide for four months. The rules and requirements, as illustrated in the open call toolkit documents, were specifically tailored for small and medium enterprises (SMEs), whilst not excluding large businesses and cities willing to participate in support of SMEs as lead applicants.

The aim of the open call was to provide real-life solutions to demonstrate the SynchroniCity vision and technical framework. The SynchroniCity vision is to model large-scale standards-based innovation and procurement of IoT-enabled services, and to demonstrate the replicability, scalability and sustainability of these IoT-enabled solutions across cities.

Taking this vision forward, among the requirements for open call eligibility, pilots were to propose a solution that would be piloted in at least 2 cities and would tackle challenges in one of three specific and one general theme areas: Sustainable Mobility, Citizen Engagement, Environment and Wellbeing, Open Theme.

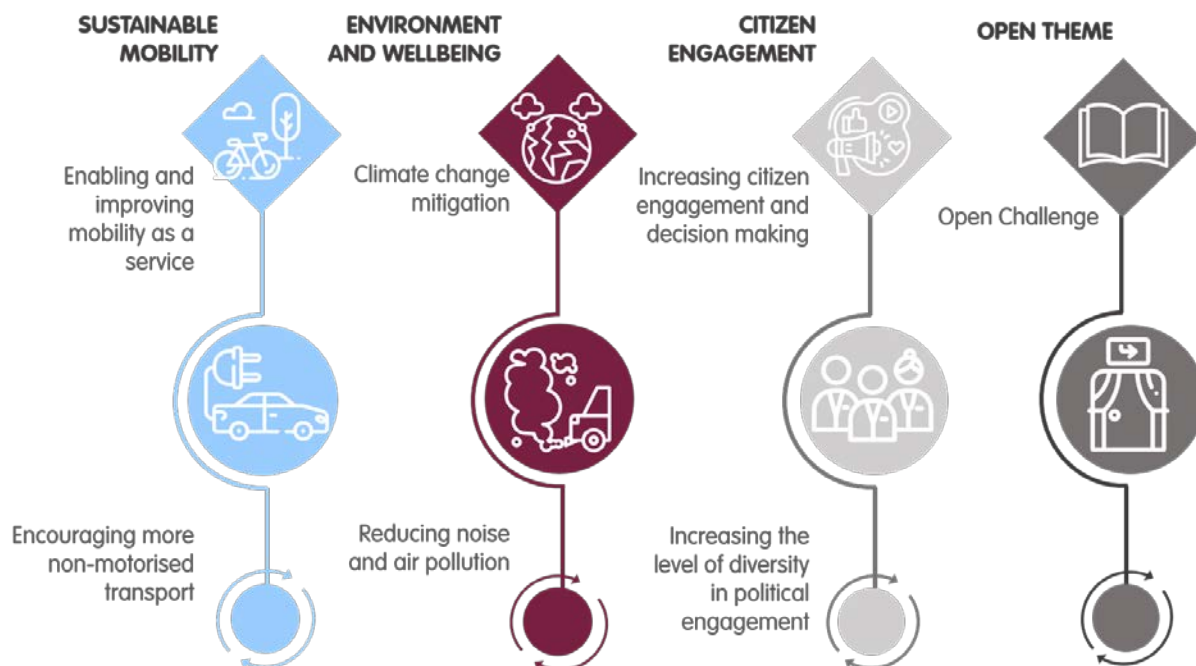


Figure 1: Overview of the SynchroniCity Open Call Challenges

During the application period more than 130 applications were received, from both single SMEs or full consortia (including new cities) and involving the SynchroniCity 10 Core Pilot cities. Pilots were submitted by lead applicants from more than 20 countries.

The initial core cities included: Antwerp, Carouge, Eindhoven, Helsinki, Manchester, Milan, Porto, Santander. Bordeaux and Seongnam also became core cities although they only deployed one solution each.

The most popular challenges were the open challenge, followed by decreasing air and noise pollutions, mobility-as-a-service and citizen engagement in decision making.

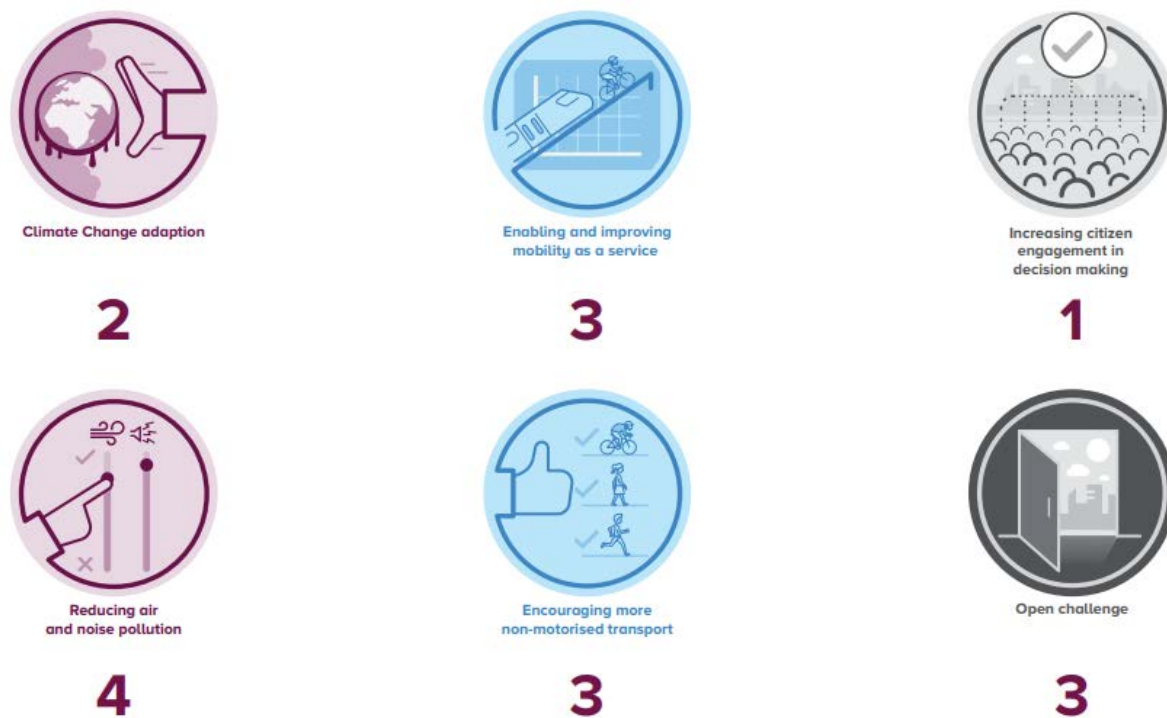


Figure 2: Number of selected pilot groups responding to each challenge

2.2 Selected Pilot Descriptions & Cities

The massive response to the open call allowed the selection of 16 high profile pilots, deploying 50 IoT and AI-enabled services in 21 cities delivered by 36 companies in six months. Figure 3 details a map of all the service deployments.

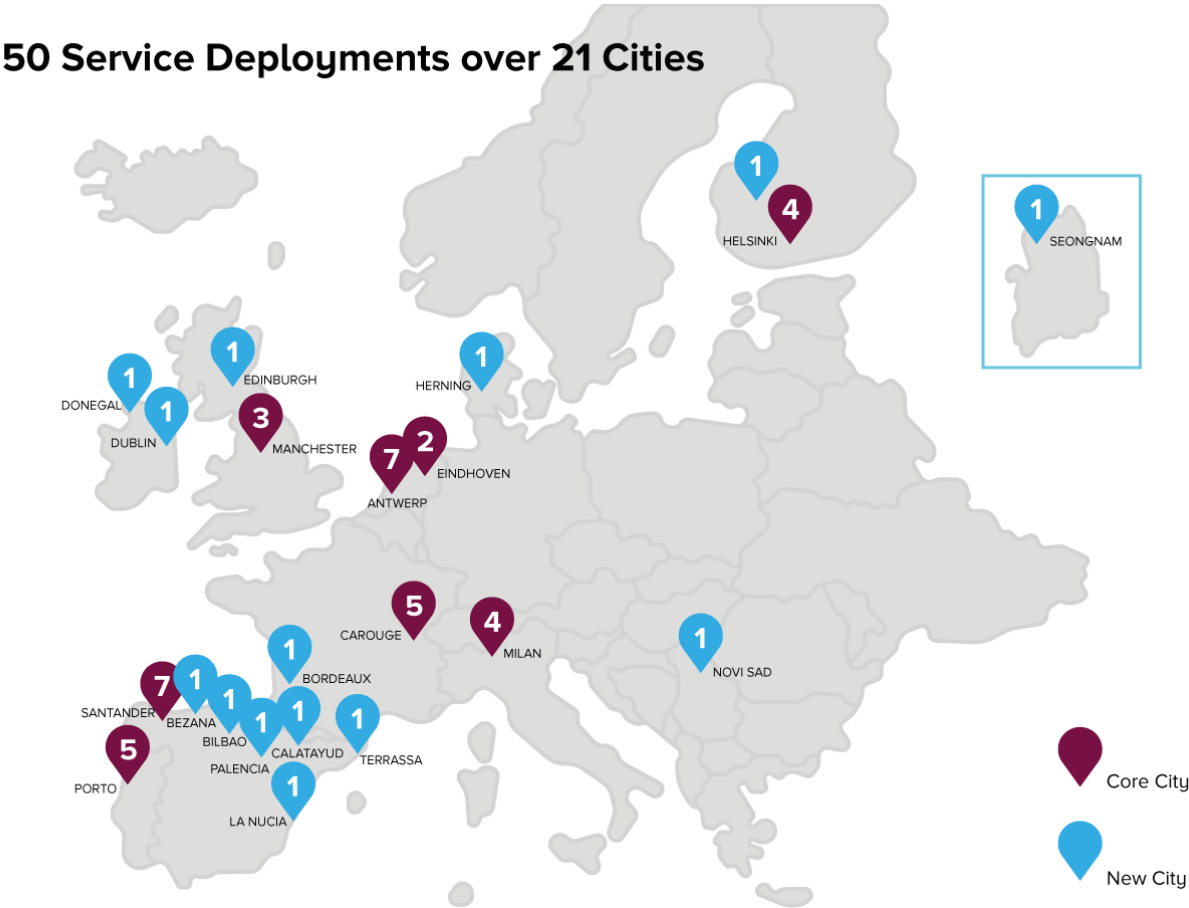


Figure 3: Map of Cities of Deployment for Pilot Groups

Figure 4 shows the cities of deployment for each of the pilot groups. In the final column it also details the new cities which pilot groups deployed in.

Pilot	Antwerp	Carouge	Eindhoven	Helsinki	Manchester	Milano	Porto	Santander	New City
Active Travel Insights									
ASAP-VALUE									Bordeaux, Seongnam
Autonomous Hub for Cyclist									Donegal, La Nucia, Bezana, Palencia
Autonomous Real-Time Field Service Solution									Tampere
BlueAlpaca									
Clean Air School Districts (CASD)									
Encouraging Cycling through use of Crowdsourced Data-Driven Insights									Dublin
Kimap-City									
Kissmybike									
Linc									
Neighbourly™: A Smart City Platform									Herning
NoiseAbility									Bilbao, Edinburgh
Quamtra Smart Waste Management									Calatayud
RainBrain, the smart blue-green roof									
Real-time traffic data with energy savings on street lights									
SmartImpact									Novi Sad

Figure 4: Cities of deployment by Pilot Group

Table 1 details descriptions of each pilot group solution by pilot name, the open call challenge of which they responded to, the organisations involved and the cities they deployed in. **The descriptions are the pilots' own.**

Table 1: SynchroniCity Pilot Group Descriptions

Pilot title Challenge Organisations involved	Description of pilot solution
<u>Active Travel Insights</u> Encouraging non-motorised (active) transport <i>Vivacity Labs Ltd</i> <i>iSensing Limited</i> <i>Tracsis Traffic Data Ltd</i>	Piloted in cities: Antwerp, Helsinki and Manchester. Active Travel Insights is a first-of-a-kind project, amalgamating data feeds from our sensors and comparative open data provided by the cities, to provide insights into how the routes of interest in each city are being used by modes of non-motorised transport. Active Travel Insights provides a detailed understanding of cyclist, pedestrian and vehicle movements across each city through the amalgamation of open, real-time and cutting-edge data. The solution combines data feeds from three types of sensors (Vivacity sensors, iSensing sensors, and air quality sensors) with comparative open-air quality data provided by the partner cities where available.
<u>ASAP-VALUE: A Standards-based Approach to enhancing VALUE from city data lake</u> Open Challenge <i>Sensinov</i>	Piloted in cities: Bordeaux, Carouge and Seongnam ASAP-Value is a data lake converging city data from different sources and exposing it to application developers through a standardised API to encourage application proliferation for Smart Cities. Sensinov offers a city data lake, consisting of hot pluggable connectors paving the way for a single standards-based API to encourage entrepreneurs to take part in a citizen-centric journey by leveraging high quality data and building applications. The data is enriched with contextual information and exposed according to NGSI-LD standards APIs developed by ETSI ISG CIM. A smart mobility application is deployed to demonstrate the benefits access to IoT data through an open data API. ASAP-Value has made a significant part of its development available as an open source, namely djane.io with the ambition to encourage other contributors as well as replication across cities.
<u>Autonomous Hub for Cyclist</u> Enabling Mobility as a Service (MaaS) <i>Intelligent Parking S.L.</i> <i>La factoría Bike-In S.L.</i> <i>TuryBike Emotion S.L.</i> <i>CITY La Nucía Municipality</i> <i>Eurovelo</i> <i>CITY of Donegal (Ireland)</i>	Piloted in cities: Bezana, Donegal, La Nucia, Palencia, and Santander Autonomous Hub for Cyclist is an App-based solution, with the objective to develop a network of safe parking for residents, which facilitates mobility by private bicycle storage through the city. Its features are: • Autonomous generation and consumption of energy using photovoltaic panels, aero-generator and support of batteries • Safe intelligent parking – connected, safe and with video-surveillance • 10 bike capacity • Easy installation • Environmental sensors • Sharing cargo e-bike • Self-maintenance for bikes • PVerde App The solution has validated the SynchroniCity vision and the technical framework as we have used data from the SynchroniCity platform, facilitation and ensuring the replicability and scalability of the solution in different Synchronicity-based cities. Other agreements are being made with other European Cities. The pilot started in TRL6 and has reached TRL9 with a full system testbed and operational in real environments.

<u>Autonomous Real-Time Field Service Solution for Public Real Estate Air Quality Management</u> Reducing Air and Noise Pollution <i>Multi-Agent Technology Ltd</i> <i>Metosin Ltd</i> <i>City of Tampere</i>	Piloted in cities: Helsinki, Santander and Tampere Autonomous Air Quality Management (AAQM) is a full-cycle solution to enhance air quality in public premises and buildings. AAQM helps improve the quality of life of citizens while bringing cost-saving solutions for cities. AAQM provides a full-cycle solution autonomously integrating all necessary phases: • Collecting building air quality data via sensors • Applying relevant open data for analytics in the planning process • Providing automatic alerts and maintenance tasks, including scheduling and resource selection for required maintenance operations • Executing follow-up and reporting requirements. To enable this whole cycle, we combine Internet of Things, analytics and autonomous artificial intelligence in our solution. Alongside a high-tech approach, our solution features a user-friendly game style experience making the solution extremely easy to use. Benefits for citizens: • Clear and easy to understand facts on the quality of their air • Responsive and improved air quality management. Benefits for cities: • Improved efficiency and service level in public space maintenance services • Holistic view, situational awareness in real-time • Less personnel on sick leave via improved air quality • Cost savings through: autonomous planning, optimal resource selection, improved action and reaction to issues around property management, and maximising the lifecycle of properties and therefore ensuring the highest return in use of real estate investment.
<u>BlueAlpaca</u> Open Challenge <i>U-Hopper srl</i>	Piloted in cities: Antwerp, Helsinki, Milan and Santander BlueAlpaca is a pilot project that aims to assess the technical replicability and scalability of a conversational information service (chatbot), developed by the Italian tech company U-Hopper, that enables rich interactions between the public administration and its citizens and makes information and smart city services easily accessible. The proposed solution offers smart cities a truly human-centred service with a lower total cost of ownership, unlocking innovation potential and lowering the entry barrier for cities to experiment with chatbot services. Similarly, citizens can benefit from timely information access, 24/7 multi-channel availability, no need to install any app, and faster, engaging interaction. The implementation involves the development and launch of different chatbots across four European cities, covering different use cases. BlueAlpaca in Helsinki and Antwerp provides suggestions and warnings related to air quality; in Santander, it supports access to the city bike sharing service; in Milan, BlueAlpaca facilitates access to public services online.
<u>Clean Air School Districts (CASD)</u> Reducing Air and Noise Pollution <i>Leapcraft ApS</i>	Piloted in cities: Antwerp, Carouge and Helsinki Clean Air School Districts utilises the deep sensing technology offered by Leapcraft's flagship environment sensors AmbiNode and CphSense in the context of a school and its classrooms to understand and solve the problem of poor indoor climate in classrooms. For the project, an activity kit for schoolteachers, including teaching material and smartphone app to incorporate environmental data in real-time into their classroom activities has been developed. A view of the dashboard is available as a public screen with live data on local air quality and noise to be installed in the school. This is designed to raise awareness and also display scores (leaderboard) from classroom activities and games designed to minimise air quality and noise issues. A cloud software tool for the city enables multiple stakeholders to share a common view of the data, run impact assessment models and benchmark the data

	against various classrooms and neighbourhoods.
<u>Encouraging Cycling through use of Crowdsourced Data-Driven Insights</u> (See.Sense Smart Cycling) Encouraging non-motorised (active) transport <i>See.Sense (Limeforge Ltd)</i> <i>BT</i> <i>Dublin City</i>	Piloted in cities: Antwerp, Dublin and Manchester See.Sense and BT delivered an innovative smart cycling project providing cities with new, crowdsourced mobility insights into travel patterns and the use of city infrastructure with the overarching aim of encouraging growth in active travel. The project engaged 800 citizens in the collection of cycling data (including near real-time location of journeys, speed, dwell time, road surface quality, collisions and qualitative survey data) gathered through the See.Sense bike lights and companion app. This data has been analysed and visualised in the BT DataHub, alongside other data sets that the cities hold. The pilot will also seek to contribute to the development of a new International Standard for cycling data, to be developed and applied in conjunction with Cycling Industries Europe (CIE).
<u>Kimap-City</u> Enabling Mobility as a Service (MaaS) <i>Kinoa s.r.l.</i> <i>ReteSviluppo s.c.</i>	Piloted in cities: Milan, Porto and Santander Kimap-City aims to remove the information barriers around accessibility of public transports by providing citizens with detailed accessibility maps, so they can better plan their movements. Kimap-City will provide citizens with a Map Visualization service, containing information on the accessibility level of streets, sidewalks and bus/tram/metro stops related to specific areas of the city. Our solution will help all the citizens affected by motor disabilities or by limited mobility capacity (e.g. old people), to find out which parts of the city are accessible for them and which public transports best fit their conditions. Kimap-City will be the first European accessibility portal of its kind, available in 5 languages and capable to scale-up and include more cities across the continent.
<u>Kissmybike</u> Enabling Mobility as a Service (MaaS) <i>KMB Lab srl</i> <i>Actum4 Innovation SL</i>	Piloted in cities: Antwerp, Milan and Santander Kissmybike is an IoT tracking device designed specifically for bicycles. Kissmybike enables the KMB Lab's Micromobility optimization platform – a solution for cities and micromobility operators, that improves city transportation system based on tracking data collected from bicycles. The tracking data analysis shows the patterns of bicycle usage by real cyclists in the city and allows optimization of micromobility fleet management and improvement of city infrastructure to meet the real needs of cyclists, e.g. determination of best places for cycling paths and parking racks. By closing the gap between current conditions of urban infrastructure and cyclists' real needs, we can encourage more and more people to use bicycles (and other non-motorised transport) instead of cars. KMB Lab's Micromobility optimization platform has been successfully deployed in our pilot cities.
<u>Linc</u> Open Challenge <i>Linc Systems ApS</i>	Piloted in cities: Carouge, Milan and Porto Linc has developed an IoT device that performs a detailed, real-time analysis of electricity consumption in any type of building – down to individual appliances and building systems. It helps identify inefficient operations, malfunctioning equipment, the selection of optimal tariff plans, and the integration of renewable generation. Linc's building energy management solution is available as an ultra-low-cost service with no upfront costs. It is compatible with all residential, commercial, and industrial buildings, new or old, and can be installed by an electrician in less than 40 minutes. Linc saves on energy costs and reduces carbon emissions by as much as 30%. Our SynchroniCity pilot has been deployed in our pilot cities and provides city planners and facility managers with an urban-scale overview of their municipal buildings. Based on data and learnings from these pilots, we are scaling up this solution into a specialised platform for smart-cities building management (www.linc.city).

<u>Neighbourly™: A Smart City Platform</u> Citizen Engagement: Increasing citizen engagement in decision making Wastehero Everimpact Zerocycle	Piloted in cities: Herning, Manchester, Porto and Santander. Neighbourly is a smart city platform that shows the impact of waste production and recycling on a city's environment, at the level of each neighbourhood. Our solution proposes an intelligent use of the available waste and CO₂ data that citizens produce to better shape the planning of their neighbourhood with local authorities. The goal of Neighbourly is to provide cities with a practical solution to encourage citizens to recycle more waste, leading to an improvement in a city's carbon footprint and environment. What's unique about our pilot is that we're using data that's already readily available (weight ticket/truck routes and satellite CO₂). Neighbourly solves citizen engagement for cities, by allowing them to concentrate their efforts on areas with the most need.
<u>NoiseAbility</u> Environment & Wellbeing: Noise pollution UrbanTide Limited The Lunar Works Ltd City of Bilbao - Bilbao TIK City of Edinburgh Council	Piloted in cities: Bilbao, Edinburgh and Eindhoven. Our vision for NoiseAbility is to demonstrate that cities can holistically incorporate noise measurement into their management of urban spaces for improving liveability. This project pilots the capacity for cities to understand noise in the context of the citizen's perceived level of noise acceptability, using IoT at the heart of citizen-centric engagement with noise; and with intelligent data at the core of city-based multi-layered responses. By linking noise monitoring to other city and citizen-centric data via USMART – a data integration platform – and to the acceptability of noise to specific citizen 'personas', we can unleash a powerful predictive tool for noise planning, linked to other strategic city objectives.
<u>Quamtra Smart Waste Management</u> Open Challenge Wellness Telecom, SL Ayuntamiento de Calatayud	Piloted in cities: Calatayud, Carouge and Porto Through the project Quamtra, Smart Waste Management, Wellness Telecom and the Municipality of Calatayud aim to foster innovation in the area of public and private interest in waste management by demonstrating the IoT technologies with potential to optimize current EU waste management operational methodologies and to establish a way forward for the standard adoption of a more sustainable model. Currently, the waste collection of solid urban waste is considered a non-optimized public service in the cities, based on predefined routes causing unnecessary energy and economic costs (e.g. empty containers collected, non-optimized routes), as well as an over or underutilization of the equipment. The Synchronicity Project brings to the consortium an excellent opportunity to test a solution which is capable of reducing the problems related to waste management, offering an optimized waste collection service. For this, we pilot a system that allows reducing the frequency of collection based on the level of filling of containers and bins. An optimized waste collection service results in lower investment and lower impact derived from the effects of externalities from collection operations (pollutant emissions, odours, noise, energy consumption)
<u>RainBrain</u> Climate Change Adaptation Sumaqua bvba Greenbeat Agilis AS	Piloted in cities: Antwerp and Eindhoven Green roofs are an important climate adaptation tool for cities. They manage rainwater, reduce floods, increase biodiversity and can even clean the air. However, extreme weather gives green roofs a hard time: extreme temperatures and long periods of drought have a devastating impact on the vegetation, limiting the positive impact of green roofs. RainBrain tackles this problem by optimizing the water availability in and around green roofs. The system monitors the vegetation health, watering needs and available water. RainBrain combines sensors, actuators and IoT with predictive models and open data. When plants need water, RainBrain automatically waters the green roof and if a heavy rainfall event is predicted that could lead to floods, RainBrain empties water buffers proactively to create more storage capacity.

	RainBrain is rolled out in our pilot cities together with an app to monitor green roof health and watering needs.
<u>Real-time traffic data with energy savings on street lights</u> Enabling Mobility as a Service (MaaS) <i>SixSq</i> <i>Schröder S.A.</i>	Piloted in cities: Antwerp and Porto This pilot leverages real-time traffic data to provide added-value services in the fields of adaptive lighting, environmental monitoring, traffic optimization, and public safety. Schröder and SixSq have developed the Volumlight solution, which optimizes street lighting based on traffic volume. With this system, lighting levels are continuously updated to reflect real-time traffic patterns, providing savings during periods of low circulation and ensuring safety at all times. Volumlight has a dynamic edge computing nature which allows for a continuous management of its data processing software. Therefore, this solution can be adapted, remotely and in real-time, to be compliant with other types of traffic data sources and data exchange platforms (like SynchroniCity). This pilot has been deployed in our pilot cities, and successfully integrated with SynchroniCity's framework, allowing for an easy exploitation of the collected traffic data in other uses cases, such as: mobility, traffic categorization, traffic analysis and traffic data visualization
<u>SmartImpact</u> Reducing Air and Noise Pollution <i>DNET Labs</i> <i>PUC Informatika</i> <i>ORBIWISE SA</i> <i>ALU MARKOM COM</i>	Piloted in cities: Carouge, Novi Sad and Santander SmartImpact provides IoT enabled service for the management of impact of urban development projects and public city activities by providing impartial evidence, real-time feedback and engagement between involved stakeholders such as city authorities, construction firms, entertainment venue operators and affected citizens. The impact measurement as a service provides unique opportunity for the municipality to assess the influence of different entities on the related pollution in the city. The service goal is to solve air quality and noise-related issues in the deployed cities.

2.3 Funding overview

The total budget for the open call was €3M. The breakdown rule for the funding was established that each application had be funded with up to:

- €100,000 if an SME applies alone;
- €200,000 for Pilot Groups with 2 organisations; or
- €300,000 for Pilot Groups with 3 organisations or more.

In addition, an in-kind contribution was requested for all proposals. The Synchronicity open call co-funded 80% of the total individual budget of each project. The remaining 20% was requested to be provided by applicants either as in-kind support or by bringing in funding to the project. Additionally, as SMEs were the main target for the open call, funding to cities and large businesses was limited to €60,000 per pilot group member.

Participants from countries not eligible to receive EU H2020 funding, (that is countries which are not member states or associated countries), were eligible to participate but would not have received funding from the open call, consistent with the H2020 rules¹.

¹ https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2016-2017/annexes/h2020-wp1617-annex-a-countries-rules_en.pdf

3 Pilot Period Launch

The 16 best pilot groups selected to launch Synchronicity then kickstarted an ambitious and intensive pilot deployment period that culminated in a kick-off 'bootcamp' event in London.

All project partners convened with the pilot groups at the Urban Innovation Centre in London. At the 'bootcamp', SME-led piloters were immersed in everything SynchroniCity was about – meeting everyone from city officials to their technical counterparts.

Everyone was working towards the first steps to outline and define the pilot integration into the SynchroniCity framework – in readiness for the work ahead.

This section provides an overview of the set-up of the pilot period, including: the official kick-off event, the mentorship program, the main meetings held, and the key resources provided to the pilot. There will also be a communications overview at the end of this section.

This pilot period launch covers the main activities which took place in the months before the pilot period and during the first month of the pilot period.

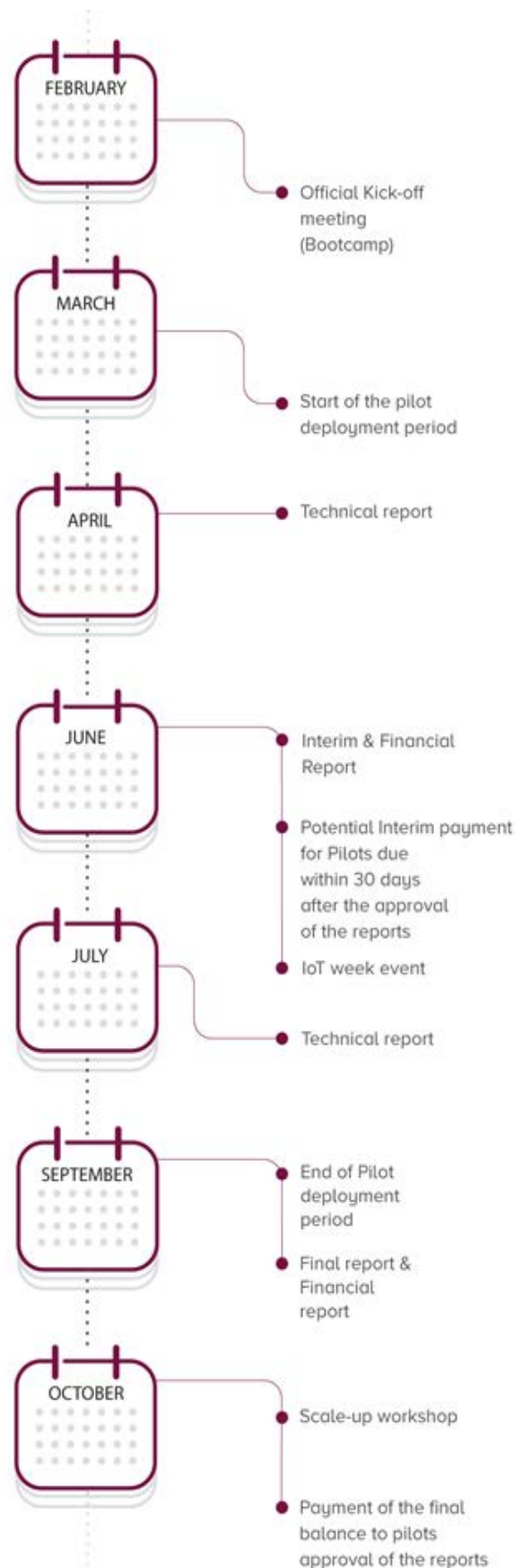


Figure 5: Timeline of the Pilot Deployment Period 2019

3.1 Setting up pilot period

3.1.1 Official kick-off meeting

After the selection process had taken place and the 16 pilots had confirmed they would be taking part, it was decided to hold a 2-day 'bootcamp' kick-off event in London. This ran from the 6th-7th February 2019 and marked the beginning of the piloting phase. The Pilot Groups were also given a SynchroniCity Pilot Handbook. Excerpts of this handbook can be found in the appendix.

The aims of the London bootcamp were three-fold:

Firstly, to ensure the pilots had all the information and materials needed to begin their pilots and to set expectations of what they were required to deliver during the pilot period

Secondly, to ensure the different stakeholders – Piloters, Cities, Mentors, Partners – had all met each other. This was to foster stronger communication and relationship development.

Thirdly, to create content for communication surrounding the overall project's aims and outcomes but also the individual pilots and cities. The bootcamp allowed for videos and materials to be produced for communication of both the pilots specifically and also the story of the project in general.



Figure 6: Bootcamp Kick-Off Event, Urban Innovation Centre, London

Format

To meet these aims, we had to keep in mind the complexity of the different stakeholders, their different levels of understanding and technical ability and to ensure everyone left with clear 'next steps' to implement their pilot. We also needed to balance this with the need to cater for over 100 people.

Therefore, we split the 16 pilot groups into 2 groups of 8. These were then given 2 different coloured 'passports', each indicating which activity to part take in and when (see examples in the Appendix). We also ensured every stakeholder had a certain colour lanyard, making it quick and easy to identify who should be where.

We also split the sessions in the following way to maximise impact:

1. Presentation (for all stakeholders)

These included introductory and inspirational presentations, SME Club and City Forum presentation, Citizen engagement and Admin presentation.

2. Expo (8 pilot groups took part in this at a time)

This session comprised of 7 'stalls' surrounding different elements the pilots would have to understand during the project. After each table, the pilot would come away with materials they needed with stamps in their passport to demonstrate they had visited each stall. These stalls were:

- GDPR
- Communications
- Technical Validation
- Stakeholder Validation & Performance-In-Use Impact Evaluation
- Technical Framework
- KPIs & Sustainability
- Illustrations

3. Workshop (the other 8 pilots attended this session)

We ran a workshop in which each city had a large printed timeline that they could complete as each pilot group talked with them to create a high-level project plan. This way, the cities and pilots were all aware of the next steps needed to start their solutions.

An example of the agenda for the event can be found in Appendix

Outputs

Each pilot left the event with:

- Information and material surrounding expectations and recommendations for the pilot period
- A high-level project plan co-created with the city
- Contacts for their pilot city and their mentors
- Materials and content for their comms channels.

Each city left the event with:

- Contacts for each of their pilots
- A high-level project plan co-created with their pilots
- Information and the understanding of what was expected from them
- A video interview for communication channels.

The partners left with:

- Continued relationship developed
- Material and content for communication
- A better understanding of the pilot groups and their solutions.

The event was received very positively by attendees. Samples of event feedback can be found in Appendix.

Lessons learnt & recommendations:

1. Running a physical kick-off meeting is invaluable in terms of developing relationships and creating excitement around the event
2. In hindsight, it would have been worthwhile to have more time scoped out for cities to work with each of their pilots to produce a timeline and action points of what needed to be done.

Recommendations:

- *Project developers may consider holding a slightly longer pre-pilot period kick-off event for future projects, with a longer designated time for cities and pilot groups to meet.*

3.1.2 Mentorship program

The support structure surrounding the pilots and the cities was carefully considered. As the 6-month pilot period was relatively short it was crucial that each SME was assigned a Synchronicity representative they could contact to help them navigate the different stakeholders and escalate issues to the necessary parties.

The Journey Mentors were representatives of organisations that are part of the Synchronicity consortium and provided support to the pilot during the pilot phase. Mentors were the main point of contact for any issue the pilot may have had during the pilot project (e.g. general technical issues, reporting and admin issues, generic issues with the cities, etc.) and needed to be informed of any communication the pilot may have related to a pilot project.

We recommended that the pilot maintained bi-weekly calls with their Journey Mentor which, as well as being informative, also streamlined communication and helped prevent potential issues. This was an important activity that ensured a healthy implementation of the pilots. For example, with certain pilot groups, some questions arose regarding the changes of timeline. When this happened, they would inform their mentors who were then able to contact the appropriate people, whether cities or technical team, to ensure a smoother continuation of workflow.

The Mentors were then invited to attend the bi-weekly calls (which alternated with the core work packages calls 3.1.3). During these calls, the Synchronicity Consortium, cities and mentors ran through the pilots highlighting any outstanding issues, successes or updates. Mentors were then able to provide any necessary context around the issue and could liaise as the connection point between the Cities and the pilots, thereby ensuring smooth communications and maintaining crucial relationships.

Lessons learnt

- Selecting the correct mentors is crucial. It worked well to have a mentor in the same country as their pilot, so face-to-face meetings could be held, and the risks of language barriers were minimised
- Stating clearly the mentor's obligations and responsibilities to all parties ensured no misunderstanding of responsibilities
- Depending on the scale of the project it may be useful for pilots to have 1 technical mentor and 1 journey mentor. Some mentors were stronger administratively and others technically, which worked well overall as skills were pooled but it might be worth considering whether dedicated administrative mentors should be appointed to each pilot, whilst technical mentors could be appointed to pilots as a group.

Recommendations:

- *Project managers should consider having a journey mentor program in place with a list of clear mentor responsibilities alongside a clear explanation to other partners of these responsibilities. Managers should also consider whether it is appropriate to appoint an additional technical mentor to specifically handle technical enquiries.*

3.1.3 Bi-weekly Core team meetings

A core team was set up across different organisations and work packages. The core team consisted of people from technical validation, technical architecture, the overall project coordination team, and the team at FCC. From time to time, others from communications to other technical partners were also included in core meetings.

Bi-weekly meetings were held by tele-conference where teams were updated, progress was reviewed and timeframes and deadlines discussed, agreed and communicated.

3.1.4 Bi-weekly pilot updates

On the alternate week to the Core team meetings, a wider tele-conference, Partner-wide pilot update meeting, was held which included:

- Core Team members
- Mentors
- City Leads.

At each meeting the core team would give a general update and overview of upcoming deadlines, (for example when reporting was due) and answer any other questions.

A pilot-by-pilot update would then be given, grouped by mentors. Each mentor would give an update of progress and highlight any significant issues or raise questions. Each city of deployment would then be given the opportunity to update from their side and raise any questions.

A pilot progress update table was included in the live meeting minutes document, which proved helpful for mentors and city leads to update ahead of or during the meeting with their main updates or concerns. The previous week's updates would be retained for quick access. An example table is below:

Pilot Progress Update Table			
Pilot name	Organisations involved	Pilot Cities	Mentor's name
Date: Mentor update: City 1 update: City 2 update: City 3 update:			

Figure 7: Example template of Pilot Progress Update Table Used

This progress update table allowed all meeting attendees to follow the meeting agenda and recorded essential information every second week. It allowed the Core team quick access to the latest updates from the project side. It also allowed those who were not able to attend meetings to update the live document.

3.1.5 Pilot Journals

We asked each pilot to keep a journal during their deployment. The Journal was a diary that the SME Pilot Lead and the rest of the Pilot Partners contributed to by providing insights on the progress of the pilot. The pilot was advised to keep notes of their experiences, interactions, drawbacks they faced, decisions that changed the course of their pilot, what worked well and not so well, reflections, and general updates. We set the expectation to the pilots that this be contributed to every 2 weeks.

The aim of this was so pilots could track their progress, and to help their reporting and communication strategy. It was also a great tool for pilots to keep track of their achievements and development.

SYNCHRONICITY

Journal of a Pilot

Pilot Title: XXX
SME Pilot Lead Name and Organisation: XX
SME Pilot Group Partners: XX
Pilot Cities: XX
Name of the Journey Mentor: XX
This is a diary about your pilot experience and progress. In here you may keep notes of your experiences, interactions, drawbacks you faced, decisions that changed the course of your pilot, what worked well and what did not work that well, reflections, pictures, etc. All partners and your Journey Mentor can contribute to it. While we do not expect you to fill in this journal every day, we do expect to get input every two weeks. Even if this may seem tedious, it will help you feel a sense of accomplishment when you need it the most and it will be a priceless source of information when you will need to create your pilot reports.

Figure 8: Example template of Journal of a Pilot

Lessons learnt:

- This was a useful tool for the mentors and partners to view a pilot's process
- Despite its value, as it was an optional, additional task there was a variation between each pilot's commitment to keeping them up to date.

Recommendations:

- *Pilot period managers should consider using the journal system and whether to make it mandatory rather than optional. If mandatory it could contribute even more effectively in communications between different partners and the SMEs.*

3.1.6 Helpdesk

The helpdesk was set up as a point of contact for piloting organisations to contact the Synchronicity Consortia with any queries their mentor had been unable to resolve. It was communicated to pilots that the helpdesk should only be used to address general (administrative, finance, legal, ethics) or technical queries that could not be solved by Journey Mentors and the City Lead support scheme. It was also used as the platform by which reports from the pilots were collected.

We aimed to check the helpdesk every other day (when reports were not due). In the busier period (surrounding the reporting deadline and feedback), we checked the helpdesk at least once a day. This ensured prompt responses to queries from the correct party or signposting of them to the appropriate parties. As this was a short pilot period, it was important to ensure that all queries were dealt with quickly to avoid further delays. At times, this meant taking a query raised on the helpdesk and discussing it in one of the weekly consortia calls to get an answer promptly to the pilot. For example, one issue raised was whether there would be an allowance for an extension to the deployment timeline. This issue was then discussed in both bi-weekly calls and it was established that generally pilots and city stakeholders were questioning the possibility of continuation of deployment beyond the end date. It was then agreed that pilots could continue beyond the end date if they reached separate agreements with each of their city partners. This was further communicated in the FAQ document and an email from the helpdesk to the pilot groups.

Lessons learnt

- It was helpful to clarify the helpdesk's role from the outset to ensure we did not get too many queries through this channel
- It proved to be a very useful platform for ensuring all sensitive communication was recorded in a traceable, centralised way
- It was important to ensure at least two people knew how to check the helpdesk. In this way, someone was always available to check enquiries.

Recommendations:

- *Large scale IoT project developers should consider using a tool such as a helpdesk that balances user-friendliness and functionality.*

3.1.7 Frequently Asked Questions (FAQs)

An FAQ document was collated through questions raised on the helpdesk and from input from the Synchronicity Consortium. This document was added to over the pilot phase as more questions were raised.

This document acted as the first step for pilots to access when they have a query. Equally, it acted as a document that mentors could use to ensure they were giving the correct advice to their pilots. It covered questions on topics such as administration, reporting, technical, citizen engagement and communications.

Recommendations:

- *Project coordination teams should consider using a continuously updated Frequently Asked Questions document or online forum. Even if all pilots do not consult it, it is still a useful document to keep records over time and consistency in communication among internal teams.*

3.2 Communications

The SynchroniCity Communication Strategy as part of the Pilots in Year 3

The pilot process for the validation of the SynchroniCity architecture was arguably the single most important vehicle to ensure the widespread dissemination of the project, its activities, and its partners. During Years 1 and 2 of the project, the core activity centred on the creation of the technical architecture. As such, the 'natural' audience of the project during this period was one focused on the technical and policy aspects of IoT solutions in city-based digital markets. However, in Year 3, through the pilot activity, the possibility to disseminate the project to a broader non-technical, non-policy audience presented itself. Taking advantage of this opportunity required a reconsideration of the strategy so far.

Year 3 was all about allowing pilots, cities and business to take 'ownership' of the community built through SynchroniCity. This meant:

- 1. Ensuring the communication strategy of the project was aligned with the long-term broader strategy of all participating partners and communities.***

This objective related to the long-term sustainability of the activities executed within SynchroniCity beyond the timescale of the project. It reflected the ambitions of the project in terms of scalability (i.e. global market-place) and replicability of the impact generated (i.e. standard setting through practice as well as formal standards development) and potential policy impact (i.e. providing adequate evidence on service implementation on a common technical ground and validated at scale in practice).

- 2. Increasing the interaction with the general public, particularly looking at citizens of SynchroniCity partner cities and tech-savvy non-expert audiences.***

The objective was to provide the general public with concrete and accessible examples of what SynchroniCity is and what IoT- and AI- enabled solutions can do, and in so doing promoting the activities and results of the project in collaboration with the cities, SMEs and large businesses involved across pilots.

- 3. Supporting the marketing activities of pilot businesses with an emphasis on cross-project and cross-sector collaboration.***

This objective focused in particular on the promotion of the pilot businesses themselves through the broader networks generated from collaborative action with other IoT LSPs, and further across innovation hubs as well as national initiatives. Whilst the activity for this objective was no different than the previous two objectives, the actors involved were different thus making it worth distinguishing as a separate objective.

In line with the SynchroniCity activities for Year 3 and Objectives B and C of the Communication Strategy², dissemination material throughout the pilot implementation period was delivered in line with, and in support of, the pilots' own activity and appeal to a broad user audience. In order to fulfil these objectives, it became clear early on that dissemination work needed to adapt to the reality of each pilot, rather than the other way around. Forcing the 16 pilots to follow strict communication guidelines and channels would have placed unnecessary burdens on pilot groups already engaged in complex and time-sensitive obligations.

Operationalising the Strategy for the Pilots: London Boot Camp

The London Bootcamp made possible personalised meetings with all pilot groups to help understand their communications approach and capabilities, provide basic guidelines to seamlessly incorporate communication work into their core activities; and establish a personal link with each pilot group for the work ahead. Video interviews were also conducted with each pilot leader with any subsequent material then added to each pilot's dedicated webpage on the SynchroniCity website.

During these 15 to 30 minutes conversations, each pilot group was introduced to the project's dissemination-related structure of work. They also received a one-page "cheat sheet" on how to incorporate a communication strategy into their daily work. In turn, the pilots also described their existing approach. Conversations with each pilot varied significantly depending on available resources (personnel, tools, etc.), their current activity, and their expected level of priority for communication work. Conversations with pilots with little communications experience that might not have considered or prioritised communications in the workflow focused on how to incorporate dissemination activities and the advantages this would have. Conversations with those pilots with a more advanced understanding of communication activity explored how best to organise collaboration between the SynchroniCity channels and their own.

The table below covers these first exchanges. The idea was, rather than providing a comprehensive assessment of the pilots, to simply provide a snapshot for future comparison and to manage expectations moving forward.

Table 2: Communication Booth: Impression Table³

	Dissemination is already part of their workflow	Dissemination is not a part of their current workflow
Group has the experience and tools to effectively engage	Autonomous Hub for Cyclists; Blue Alpaca; Kimap; KissMyBike; NoiseAbility; Smart Impact,	ASAP VALUE; Clean Air School District; QUAMTRA; Rain Brain
Group does not have the experience and tools to effectively engage	Active Travel Insights; See-Sense; LINC; Neighbourly;	Autonomous Air Quality; Real Time Traffic Data

Communication Related Materials provided during or relating to the Bootcamp:

- *Guiding your Communication strategy in SynchroniCity and beyond.* One Pager "cheat sheet"
- Chapter on Communication in the Pilot Manual
- Online access to SynchroniCity's:
 - i. Visual Identity Design Manual

² https://synchronicity-iot.eu/wp-content/uploads/2019/02/SynchroniCity_D6.11.pdf

³ This table is formed on the basis of the conversations between each pilot team and the SynchroniCity team. They do not represent an assessment of their activity.

- ii. Ready to print flyer
- iii. PowerPoint and Word Template
- iv. 3 PowerPoint presentations on the pilots overall, on the technical aspects, and on the project as a whole

4 Interim Period

As the intensive launch phase of stakeholder engagement – including workshops and face-to-face meetings – drew to a close, the SMEs started ramping up for the deployments. As well as installing sensors and other hardware, they got to work configuring the backends of their IoT solutions ensuring the minimal interoperability mechanisms (MIMs) standard framework for each of their deployment cities were met. Cities meanwhile were able to report upon achievements to-date and identify issues that needed problem solving with our core teams. All of which meant cities and pilot groups were in a position to showcase the beginnings of their solutions and network with key industry stakeholders at the world-renowned event IoT Week – held this year in Aarhus, Denmark.

This interim period covers the main activities, including reporting and communications, which took place between months 2 and 4.

4.1 Reporting process

Month 2 – The first technical report

After the first two months, an initial technical-only report covering the integration of the pilot's solutions with the SynchroniCity framework was requested. It included information about expected or in-progress data sets consumed and created in each pilot city, as well as the deployment of new SynchroniCity instances in new cities.

After reports were collected, the technical validation team reviewed each one and provided feedback reports to piloters. This included feedback about the different issues detected and identifying missing information, so that pilots could improve their solutions and their subsequent reports.

The purpose of this report was purely informative, so issues could be detected in the early stages, allowing enough time for pilots to react in their working plan with minimal delays.

Month 3 – The Interim report

The interim reporting process involved each pilot group completing a report covering general aspects, their technical environment, standards, impact evaluation and KPIs, and lessons learnt. This was also accompanied by a financial claim allowing pilot groups to make interim claims for their work. The interim report template can be found in the appendix.

The financial claim for the interim period was created as an excel file for piloters to fill in, reporting costs for that initial interim period. The file used a template so piloters could detail costs of their pilot at the time of the bid. The interim financial claim report was organised over several tabs, a 'Project Summary' tab and up to 6 tabs to be filled in by piloters allowing the reporting for each pilot partner, and two tabs of 'Guidance Notes' and 'Funding Scenarios' providing additional information to piloters. Piloters were requested to fill in their individual tabs, while the 'Project Summary' tab was automatically populated according to the inputs in the other individual tabs. The interim financial report template can be found in the appendix.

Once reports were collected, the WP5 core team shared them and reviewed their relevant sections. A review meeting was then held to evaluate all the pilots and their progress on three main aspects:

- General – including actual delivery against planned activities and other co-creation and communication activities
- Technical – including a section to include data used and data created for each city of deployment
- Financial – including comparing actual against budgeted expenditure

We reviewed each section based on risk and progress assessment, using Red, Amber, Green statuses.

For the general section we used the following criteria to assess the pilot groups:

Green	Answered with comprehensive detail, with no issues identified in quality of deliverables, or scheduling, OR where there had been issues or delays, they were already worked through with an appropriate solution and robust recovery plan. No major risks reported, they are on track to deliver on time (6 September).
Amber	Answered with sufficient detail, the plan identifies some issues in quality of deliverables and/or scheduling, which are currently being worked through.
Red	Answered with little detail, the plan identifies issues in quality of deliverables and/or scheduling, that have not been worked through a solution or recovery plan. Significant risks highlighted with no mitigation in place.

The technical and financial teams followed a similar criteria method.

In the review meetings we decided which pilots were to be approved and which were on-hold pending additional work or information. Following this we sent out feedback reports to the pilot groups with a review of each section, and clear outstanding actions required by each – see the appendix for an example Feedback template.

Piloters then responded to these requests and the process was repeated, with any issues raised in our Core and Partner-wide pilot update meetings highlighted for resolution.

Once all outstanding issues had been resolved satisfactorily, as determined by the WP5 Core team and in discussion with other partners, interim payments to the pilot groups were made.

Month 4 – The third technical report

After four months, a second technical-only report asked pilots to describe the technical development of their solution, and its deployment in all or some of the concerned cities.

As with the M2 technical report, the purpose of this M4 report was purely informative and focused on detecting issues with enough time for pilots to respond before the final report in M6.

After the evaluation of each report, pilots were provided feedback reports detailing the different issues detected and highlighting any missing information. This helped pilots improve their solutions and the information for the final report.

Diversions from original plans

A few pilot groups needed a slight diversion from the original plans. In these instances, they were required to come to a mutual agreement within their pilot consortium and with the cities effected, as well as our Open Call Core Team. This was a process of tele-meetings, emails and face-to-face meetings, all facilitated by the Open Call team lead and the respective pilot group's mentor. Once a decision was reached between parties, the pilot group and Open Call team were required to complete a Change Request form. One example of this was a pilot group undertaking the Data

Protection Impact Assessment process with one city: the length of time required to complete this process would not have availed enough time to complete the pilot's deployment. It was therefore decided to re-focus efforts and resources on the other cities and count the lessons learnt from the process.

4.2 Lessons learnt by pilots from M3 report

Within the M3 Interim report pilots needed to detail three main lessons learnt in the process. The following table details the different lessons pilots learnt. Some of the points below are direct comments, but most have been summarised and edited to ensure anonymity. They have been grouped by themes common across the pilot groups.

Tech / Installation

- Assembly of sensor kits, both hardware and software take more time than expected with many minor issues arising
- Tech readiness varies across the cities necessitating a slightly different approach with each city both in terms of accessing contextual datasets to use in our solution and, more generally speaking, regarding the development of project use cases. This resulted in an agile approach to management of the individual projects and placed further importance on the decision to carry out early stage project development/investigation. This required the teasing out of specific and achievable deliverables for the cities to ensure useful data was generated for each partner
- The main technical lesson learnt to date is how difficult it can be to set up the Technical Framework within a managed service.
- When third party suppliers are involved there is the need to perform an early risk assessment that should include delivery delays that could compromise the installation of the solution
- The concept of MIM (Minimal Interoperability Mechanisms) proved to be a very powerful tool and should be further promoted to cities.

Recommendations:

- *Cities should consider creating tech/hardware installation manuals*
- *Cities need to create a checklist for SMEs to complete to understand their own requirements – from technical to physical installation – early in the process*

City/pilot

- The cities and pilots were in different stages of their own technical developments. Where pilots needed to do extra work they faced delays in cities without a stable or mature technology platform
- Identification early in the project of the time needed to help each city better understand (the) solution in the context of the issues (the city) wished to address necessitated the formation of Advisory groups to tease out specific use cases and problems. This in turn allowed for a more specific deployment of the technology

- Meeting face-to-face with stakeholders allows all parties a clearer picture of the project, and helps identify current and upcoming criticalities thereby ensure solutions are fully in compliance with existing stakeholders' needs and preferences
- City administrations are passionately committed to accessibility policies and much attention is devoted to them
- Cities are not generally geared up to work in a fast-paced agile environment where decision-making occurs as part of an agile process. Reaching across city department silos can also be very challenging. Ways to help cities work differently for these 14 SynchroniCity Interim report type projects could be explored. Bringing together a cross-cutting 'challenge team' in-house to demonstrate how and why agile delivery is so important might be beneficial
- Whilst cities are serious about the role of open standards and open source for procurement and deployments, not all market offers are standards-based.

Recommendations:

- *Cities and SMEs may wish to consider an 'agile working training' session, with different people across city teams, led by the SME, along with a face-to-face kick-off meeting*
- *SMEs may also wish to consider convening 'advisory groups' for agile partners across the project*

Data Protection Impact Assessment (DPIA)

- DPIA requirements vary significantly from city to city. This can lead to large variations in timeframes and required security adaptations
- End-user engagement in a piloting phase demands creativity in order to meet GDPR requirements.

Engagement

- Contacting citizens directly to participate in the project was not a success, even though it was free and without obligation. However, working together with the local community created lots of opportunities
- We will incorporate this 'engagement-led' experience approach into projects at the project inception phase in future to enable quick and impactful roll-out of the technology. We believe establishing this at the outset will improve overall the long-term quality and impact of the project
- Working with local processes is crucial for the integrity of citizen engagement. When piloting solutions, a good match between locally driven issues and the piloted solution is needed for these processes to engage citizens. This can be challenging when including a new city (such as a core city), if the issues are unknown to the project team when defining the pilot proposal.
- Engaged end-users showed interest to participate as the problem directly influenced them (their health).

Recommendations:

- *Cities should consider creating their own city-led engagement processes, or processes that help SMEs engage citizens (e.g. using the platform to distribute information across social media and email to other workshops and events).*

Time/resource

- We have created a strong foundation for future projects
- With a relatively short delivery timeframe for SynchroniCity we adopted dual tech development and deployment/delivery work streams. Whilst resource intensive, we have in only a matter of months created a robust technological foundation from which to further scale and replicate our solution
- Time is scarce and things change continuously. It is therefore fundamental to remain flexible and adapt quickly to new circumstances – and to always have a plan B (and even C, just in case)
- 6 months is very tight for a pilot project with these characteristics, and subsequently further developments are needed, whilst the interaction between public and private entities sometimes includes several delays in the execution of the pilot
- A well-defined pre-pilot period would help start piloting solution from the outset
- More time is needed for negotiation the terms of the Sharing Agreements and Pilot Agreements with the cities. For some Municipalities the use of English proved problematic when signing official documents already agreed by the technical team. A pre-pilot covered by the project, and funds for legal translation of the official documents, would help prepare this documentation.

Recommendations:

- *Project developers should either consider moving the pilot period from the summer holiday period or take into account the holiday period could present significant delays/work stoppages. Potentially, a pre-pilot period could begin in June-July ahead of a pilot launch from August.*

Other comments:

- Piloting is a great opportunity to fine-tune and improve technical aspects of a product/service
- Piloting provides new customer insights and helps define their needs.

4.3 Communications

A Common Launchpad for All Pilots: Video Interviews, a Dedicated Webpage, and Support Across Activities.

To quick-start pilot visibility and ensure a central reference point from the outset, the SynchroniCity webpage was redesigned around pilot activity, with each pilot and core city receiving their own webpage. For the pilots, this included a central visual (i.e. an image provided by them or jointly selected), a brief outline of the pilot and its components, and a video interview. Except for the video, all content was derived from their application. For the video interview, a set of questions and preparation guidelines were sent in advance of the London Bootcamp, where they were filmed. The videos were then posted after the event, on their dedicated SynchroniCity webpages, and cited as references/links when mentioned in blogs.

SynchroniCity also supported the pilots throughout via its own social media channels. SynchroniCity was already active on Twitter and Facebook, and added LinkedIn following requests from several pilots to have a presence on that platform⁴

Help creating and editing content was also offered – and welcomed by – several of the pilot groups. 11 pilots invited the SynchroniCity Comms team to:

- Edit and approve press releases after the London Bootcamp (Autonomous Hub for Cyclists, NoiseAbility; Neighbourly)
- Edit their own website content (NoiseAbility, BlueAlpaca, Kimap, Quamtra, SeeSense)
- Assist with content translation (Autonomous Hub for Cyclists; NoiseAbility)
- Assist with email engagement of citizens (NoiseAbility; KissMyBike; RainBrain)
- Submit content for the SynchroniCity website (BlueAlpaca, Kimap, KissMyBike; NoiseAbility, Neighbourly, SeeSense, Active Travel Insights, Quamtra, RainBrain, Clean Air School Districts)
- Advise on dissemination approaches (NoiseAbility, Autonomous Hub for Cyclists)

Building up to IoT Week

IoT Week is a one-of-a-kind conference where leaders from the worlds of business, tech, and science explore the future of technology. IoT Week 2019 took place in Aarhus, Denmark during the week of 17th June and, as one of SynchroniCity's key annual events, provided the opportunity to curate a dedicated 10 session Smart Cities workstream. As such participation from pilots was strongly encouraged, with 5 pilots presenting their solutions in the Expo Area (KissMyBike; Smart Impact; Clean Air School Districts; Quamtra; and NoiseAbility). 3 further pilots (ASAP Value, Blue Alpaca and Neighbourly) attended as part of the SynchroniCity booth, with Neighbourly going on to win €10,000 in the Start-Up competition⁵. Our own coverage of pilots' activities included a special newsletter for IoT Week (500 subscribers), a series of blogposts, and consistent coverage on Twitter on the run up to the event.

⁴SynchroniCity had initially created a LinkedIn group to encourage dialogue between policy makers, technical experts, and the organisations and individual working in SynchroniCity. The forum was not particularly successful and it was finally incorporated into the Slack channels used for internal communication.

The project also underwent a strategic transformation during this time in the use of its main social media platform, twitter. On one hand by raising the standard on the quality of content of each individual tweet or RT. On the other hand, focusing all of that content into the results of the pilots. This significant change was achieved while maintaining a strong rate of growth in its follower base. A thorough analysis of these trends is available on D6.12

⁵ <https://synchronicity-iot.eu/iot-week-our-pilots-and-start-up-winners-at-the-public-expo/>

5 Final Period

This last sprint saw the pilot groups working intensely on rolling out their final hardware and collecting data. Final iterations were made, and beta applications prepared for showcasing to city stakeholders. A punishing deadline with so many critical deliverables wasn't helped by the European-wide downtime of the holiday season – and yet nonetheless, all 16 pilot groups crossed the finish line to deliver the minimum project requirements, with many of them exceeding both the project (and even their own) expectations.

This period covers the main activities, including reporting and communications, between months 5 and 6, and the months after the end of the pilot period.

5.1 Reporting process – M6 reports

Final reporting involved each pilot group completing a report covering general aspects, their technical environment, Standards, impact evaluation and KPIs, communication, sustainability and beyond, as well as an extensive 'lessons learnt' section. This was accompanied by a financial claim allowing pilot groups to make their final claim work done. The final report template can be found in the appendix.

The final period financial claim, as with the interim period, was to be submitted as an excel file. There were some changes from the interim financial claim report that aimed to improve reporting for both piloters and reviewers. As with the interim template, the file featured several tabs: a 'Project Summary' tab that was automatically populated, up to 6 tabs completed by the piloters allowing for individual claims, and two additional tabs providing 'Guidance Notes' and 'Funding Scenarios'. For this final report, piloters were required to fill in reporting their costs for the whole pilot period of six months.

This final file was reviewed thoroughly, crosschecking statements and declarations from piloters not only with the narrative in the interim reports, but also directly with cities and piloters where necessary. This validation ensured the approval of all eligible pilot costs.

The final financial report template can be found in the appendix.

Once the reports were collected, they were shared, as were the interim reports, with the Core WP5 team who shared responsibility to review relevant sections with us. A review meeting to evaluate all the pilots and their progress on three main aspects followed:

- General – including actual delivery against planned activities and other co-creation and communication activities
- Technical – including a section to include data used and data created for each city of deployment
- Financial – including comparing actual against budgeted expenditure

We reviewed each section based on risk and progress assessment, using the Red, Amber, Green status.

For the general section we used the following criteria to assess the pilot groups in the final stage:

Green	When checked against their workplan, they have delivered as planned or justified any changes. Answered with sufficient detail, there are no issues identified in quality of deliverables, or scheduling, OR if there were issues or delays, they executed an appropriate solution. They have delivered on time on 6 September.
Amber	When checked against their workplan, they delivered almost as planned and changes have been justified. Answered with sufficient detail, plan shows there have been some issues identified in quality of deliverables and/or scheduling, but they were identified as largely due to city and/or technical partner delays that were unforeseeable or unavoidable. They have delivered a different end solution to what was planned.
Red	When checked against their workplan, they have not delivered as planned and not provided any justification for changes. Answered with little detail, the plan shows there have been issues identified in quality of deliverables and/or scheduling, and they did not work through a solution. Additional information will be required from other partners (cities) and the pilot group before payment released.

The technical and financial teams followed a similar criteria and method.

In the consensus review meeting we decided which pilots could be approved and which were on-hold pending additional work or information. We then sent out feedback reports to the pilot groups with a review of each section, and clearly defined outstanding actions required by the pilot group – see appendix for Feedback template.

Piloters then responded to these requests and the process was repeated, and issues raised as appropriate with mentors and cities. A final city perspective on pilot deliverables was sought, as discussed below, before making any final payments.

After everything was clear and relevant teams and partners had approved the pilot groups, final payments were made.

5.2 City-perspective on pilot deliverables

Following the pilot period, an official email was sent to each core city requesting a report on any outstanding deliverables from each of the pilot groups. In order not to over-burden cities with a time-intensive approach, we asked three short questions about outstanding deliverables:

1. Is there any deliverable outstanding from the pilot group side that you believe has not been delivered as agreed? If so, what is it?
2. Have you communicated this outstanding deliverable to the pilot group? Has the pilot group responded with a promise to complete this, and if so by when?
3. Do you have any other comments to make concerning the pilot groups deliverables which we should be aware of, when reviewing their final report and financial claim?

Where issues were raised, they were included in the pilot feedback reports or communicated to pilot groups in order to develop solutions as quickly as possible.

This process ensured an accountability quality control check on pilot groups. It provided official means for core cities to raise concerns with specific pilot groups and for our mentors and Core WP5 to work through any final issues.

5.3 Lessons learnt by pilots from M6 report

In the M6 final report piloters detailed three main lessons learnt over the whole 6-month pilot period. The following section details those different lessons. Some of the points below are direct comments but most have been summarised and edited to ensure anonymity. They have been grouped by themes common across the pilot groups.

Tech / Installation

- Start the technical framework work with plenty of time, as some components are complex and require significant support to set up and understand.
- A well-defined pre-pilot period helps to start piloting the solution from month 1 of the project.
- It is advisable early in the installation phase to ask cities to conduct site surveys to source suitable locations for your technology's requirements.
- Ensure the available collected data is the starting point, as collecting data on the ground is often challenging.
- Integration with on-site WiFi can be complex and unreliable – you may need to find your own communication solution.
- An installation process standardised based on a pre-installation survey checklist allows installations to be completed by third parties quickly and accurately.
- Local ESCOs or electricians must be involved in the installation process to ensure rapid scalability and ongoing maintenance/support. This also opens up economic opportunities for local businesses supplying products/services based on data collected.
- With multiple equipment suppliers involved in the process, the project duration must be carefully thought through, as suppliers can unexpectedly add weeks to the deployment, potentially jeopardizing a short-time duration project such as this.
- Network connectivity is a significant barrier in schools and should be better resolved
- Variation of API integrations in each city could slow down scalability prospects.

Recommendations:

- *Cities should consider developing a list of available communication technologies for both new and restricted deployments*
- *Cities should consider developing a Common Troubleshooting Document. This could provide common solutions to common problems. Successful solutions from other pilots previously should be made readily available to SMEs. For example, using SIM cards to work around wi-fi issues could be a common way to overcome connectivity issues.*

Recommendations:

Legal / Privacy

- Address privacy concerns and define steps to address them at project scoping stage.

- Cities must have solid and clear data strategies that also focus on security and privacy protection. The ability to anticipate and articulate a vision, and to stick to it, is key to success. Standards can help in certain cases.
- Accessibility policies are important to city administrations with a lot of attention is dedicated to them.
- Piloting allows organisations to solve potential privacy issues and meet GDPR requirements.
- More time is needed for negotiating Sharing Agreements and Pilot Agreements with the cities. For some Municipalities, the use of English proved problematic when signing official documents already agreed by the technical team. A pre-pilot period covered by the project and funds for legal translation of the official documents would help prepare this documentation.

Recommendations:

- *Project managers should consider more resourcing for legal teams devoted to data and privacy issues.*
- *Cities should consider developing their own data security and privacy guide documents.*

Delivery

- Set clear outcome (i.e. the dashboard) deliverable expectations to ensure smooth delivery.
- Data alone creates no value, but analysis and integration into real business processes can create significant value. After almost 20 workshops and other interactions with relevant stakeholders helped illuminate value created and real achievable benefits.
- Piloting is a great opportunity to fine-tune and improve technical characteristics of products/services.

Recommendations:

- *SMEs and Cities should meet and consider re-defining delivery items at key points of the project to ensure expectations are met, particularly if timeframes or delivery plans change due to unforeseen factors.*
- *Data utilisation plans should be created by SMEs and cities.*

City / pilot

- There remains scope for cities (the demand side) and providers to further refine strategies for sustainable business models. Experiments help from this perspective, with start-ups in particular benefiting from finding 'sweet spots' to establish themselves and grow their business.
- Every city is different creating relationships with every relevant stakeholder is critical as projects can only succeed with all stakeholders supporting it.
- As all cities are different, each requires a slightly different approach to both accessing contextual datasets to use in our solution as well as more generally in developing project use cases. An agile approach to the management of the individual projects was therefore adopted, which placed further importance on early stage project development/investigation teasing out specific and achievable deliverables for cities to ensure useful data generation.
- A close interaction with Pilot Cities and their respective technical teams is key to success.

Recommendations:

- *SMEs should establish technical team contact points early on and meet with teams where possible. Cities should anticipate this and coordinate when multiple SMEs are working on similar IoT projects.*

Standards

- Despite some progress, further data modelling and API convergence would increasingly help smart city interoperability to develop and would also benefit the market.
- The importance of practical standards was crucial when expanding our business in Europe.
- Pilots are often at the cutting edge of emerging standards and frameworks, with SMEs often pushing development in the real world, ahead of formal standards. Closer collaboration between standards bodies and SMEs would help the development of such important standards.

Recommendations:

- *SMEs should engage with national standards bodies and regional standards sectors (CEN/CENELEC/ETSI sector forum) for smart and sustainable cities at an early stage, to identify relevant standards, raise issues where there is a lack of convergence or new standards needed.*
- *Standards Development Organisations need to improve engagement and support processes to ensure SME's are well represented in standards development.*

Stakeholder Engagement / Marketing

- Meeting face-to-face with stakeholders allows all parties a clearer picture of the project and identifies all current and upcoming criticalities needed to ensure solutions are fully in compliance with existing stakeholders' needs and preferences.
- To provide better value with the data to cities at scale, municipality stakeholders that own or have access to the data should be involved/aligned as early as possible.
- Engage with cities early and find the right stakeholders for data, for using the solution and for giving the necessary feedback.
- People are still unfamiliar with interacting with chatbots. Marketing efforts should be address building a new digital culture that includes chatbot usage.
- IoT projects are also social projects – bringing citizens into the project and thinking from their perspective at all times is crucial: how might this make life better?

- Running user validation from the start and during the process is key to developing a service that serves the needs of the client and identifies business opportunities.
- Engaged end-users showed interest to use or be a part of the service as the problem directly influenced them. This is clear indicator that we found a solvable problem and that the service is viable.

Recommendations:

- *SMEs should commence engagement with city stakeholders very early in the process. Cities should consider organising engagement activities across multiple SMEs to streamline access to strategic and operations departments.*

Time / resource / approach

- Time is a scarce and things constantly change. It is therefore fundamental to always be flexible, to adapt quickly to new circumstances, and to always have a plan B (and C, just in case).
- Our original work plan set out a relatively tight programme for working with multiple pilot cities and deploying the lights, with the emphasis on the quick deployment of the technology. In practice, we identified at an early stage that time needed to be spent helping each city better understand our solution in the context of the issues they wished to address. Thus, we convened Advisory groups in the cities enabling us to tease out specific use cases and problems. This in turn allowed for a more specific deployment of the technology. Based on our experience this 'engagement-led' approach at the project inception phase enables a quick and impactful technology roll-out. Time spent at the beginning of the project improves the overall quality and impact of the project in the longer term.
- With SynchroniCity's relatively short delivery timeframe dual tech development and deployment/delivery work streams for the deliverables (app upgrades/backend architecture/creation of dashboard tool etc) was adopted. Whilst resource-intensive, we have now, in only a matter of months, created a robust technological foundation from which to further scale and replicate our solution.
- Keep the pressure on your team and partners to always get the best from them.
- There can be conflicts between agile, rapid deployment pilots/innovation and formal public sector, short-run pilot processes, making collaboration, flexibility and innovation (particularly from SMEs) essential to success. Flexibility – across approach, technical solutions, resourcing and, critically, flex in the funding structure – is key to success as contingency will always be required to manage unexpected issues. Regular face-to-face meetings with SMEs and Cities are also crucial for cut-through on issues and buy-in across city teams.
- Six months is very short timeframe for a pilot project of these characteristics, making delays in development and interaction between public and private entities particularly impactful.
- The administrative process and necessary formalities to authorize a disruptive installation of an IoT solution must not be underestimated.
- If a project falls under the umbrella of a much larger project with a much larger consortium (like SynchroniCity), then an advisor from that consortium is a must.
- One needs the right competencies to implement and link with the SynchroniCity framework.

Recommendations:

- *SMEs should consider multiple communication methods to engage city stakeholders and pitch their product. They may wish to consider short videos and infographics as supplements to face-to-face meetings.*

Scale

- To scale up we needed to team up with a third-party developer of solid hardware to produce more devices.
- The potential of the impact assessment is justifiable and can be used to convince more stakeholders to take a part in the scenario. We need more discussion with relevant institutions to adapt regulations and to ensure the full benefit of the service.

5.4 Communications**Self-Review by Individual Pilots based on their Pilot Period Final Report**

Table 2 provides a first glance at what the Pilot Period Final Report details in relation to the description of their communication activities. As expected, there are consistencies between those pilots that had identified communications as an intrinsic and relevant part of their activity (e.g. Autonomous Hub for Cyclists, NoiseAbility, KissMyBike, etc.) and those that did not. (e.g. Real Time Traffic Data, Autonomous Air Quality). Nonetheless these conclusions should not be taken as definitive. New data will likely become available and be incorporated into the analysis done on D6.12. This new data may provide further details to either validate or debunk the trends highlighted in Table 2.

Reviewing the use of London Bootcamp videos

A total of 19 video interviews and 1 highlights video were generated during the London Bootcamp in February. At the time of writing the videos were watched a total of 1157 times⁶ (954 views for pilots) equating to an average 58 views per video (50 views per video for pilots only). The table below shows a detailed count for each video. Two pilots have more than one video interview based on their own requests during the Bootcamp. Videos marked in yellow and orange deviate from the expected results.

In the case of Autonomous AirQuality – the only case with a negative deviation – it is likely this relates to the extremely localized approach of their campaign with almost the entirety of their content done in Finland/Finnish. The third video of Autonomous Hub for Cyclist was not directly accessible on the webpage – only directly through YouTube – as agreed with the pilot upon discussion with SynchroniCity's communications team.

⁶ As of 07 November 2019

Kimap and KissMyBike were fast in establishing their pilots and were often highlighted early on as successes. Active Travel Insight is an interesting case in that it lacked its own channels – for the pilots, not each pilot partner – and relied on the dedicated webpage as a landing page, which could explain the uniquely high numbers.

Table 3: Number of Views for London Bootcamp interview videos

Pilot	Number of Views - Youtube Channel
Active Travel Insight	139
ASAP VALUE	21
Autonomous AirQuality	6
Autonomous Hub for Cyclist	54
Autonomous Hub for Cyclist	11
Autonomous Hub for Cyclist	53
BlueAlpaca	31
Clean Air School District	53
Kimap	93
KissMyBike	90
LINC	55
Neighbourly	38
NoiseAbility	58
Quamtra	45
Rain Brain	67
Real Life Traffic Data	29
See.Sense	34
See.Sense	46
Smart Impact	31
Highlights Video	203
Total Views	1157
Average	57,9
Only pilot average	50,2
Standard Deviation (only pilot)	30,5

Whilst it might have been productive to understand the amount of views each dedicated pilot webpage accrued during the pilot period, the format of presentation used made it impossible to do so. It is worth noting however that the page with all the profiles was the most visited page⁷ with over 3700 unique views and the lowest exit and bounce rate of the website for that type of page (16% and 35% respectively).

Forward-looking content

As both the pilots and SynchroniCity come to an end, the main task ahead is to secure the creation of relevant content that can help cities, SMEs, and other organisations that will continue or join the work after the project. To achieve this, a series of publications will be prepared concerning the pilots: a factsheet on pilot results and a playbook of the overall project that will share lessons learned from this experience. Both publications will be ready by completion of the project.

Table 4: Review of Pilots based on Pilot Period Final Report

Pilot Name	Traditional Media		Online Presence		Events	
Active Travel Insights	1	No mention	2	Limited to partner channels. Sporadic.	2	Only mention to participation after end of pilot.
ASAP VALUE	1	No mention	4	Creation of website. Use of partners channels.	3	Relevant events.
Autonomous AirQuality	1	No mention	2	Limited mention	4	Relevant events.
Autonomous Hub for Cyclist	5	Engagement with local media on all cities	4	Consistent use of all available channels	4	Relevant events.
BlueAlpaca	1	No mention	5	Consistent use of all available channels. Visual identity	3	Relevant events.
Clean Air School District	1	No mention	4	Consistent use of all available channels	4	Relevant events.
Kimap	1	No mention	5	Consistent use of all available channels. Visual identity	5	Broad engagement.
KissMyBike	1	No mention	5	Consistent use of all available channels. Visual identity	5	Broad engagement.
LINC	1	No mention	2	Limited mention	4	Relevant events.
Neighbourly	3	Engagement with local media	2	Limited mention	3	Engagement during IoT Week. Mention of others

⁷ After the landing page with over 8000 unique views.

NoiseAbility	4	Engagement with city media team and outlets	5	Consistent use of all available channels. Visual identity	4	Relevant events.
Quamtra	3	Engagement with local media	4	Consistent use of all available channels	4	Relevant events.
Rain Brain	4	Engagement with city media team and outlets	5	Creation of website. Use of partners channels.	5	Broad engagement.
Real Time Traffic Data	1	No mention	3	Limited to partner channels.	2	Limited implementation meetings to
See.Sense	1	No mention	3	Limited mention.	4	Relevant events.
Smart Impact	5	Engagement with local media on all cities	4	Consistent use of all available channels	4	Relevant events.

Note: 1 is lowest, 5 is highest degree of activity

5.5 Scale-up Workshop in Milan

After the pilot deployment period ended, the SynchroniCity partners met with the pilots and other stakeholders in Milan for a Scale-Up event and workshop.



Figure 9: Scale-Up Workshop, La Fabbrica del Vapore, Milan

5.5.1 Recommendations from the workshop

At Milan's scale-up workshop a short session with pilots and city stakeholders discussed main challenges and potential recommendations. Below is a list of main challenges, learnings and recommendations gathered from all the groups on the marked activity posters.

Main challenges:

- Failing sensors
- Issues with data access
- Dealing with non-mature platforms
- Access to federation of data
- Wrong format of data model
- 6 months is short / summer period difficult
- Cities need to conform to NGSI-Standard
- Lack of communication
- End-to-end integrations
- GDPR
- Installation
- Third-party provider issues
- City agility
- Expectations management
- Technical standards still evolving
- Installs on infrastructure
- Ramp-up phase with cities

Learnings

- Local partner needed
- Different steps of administration process required
- Single point of contact in the Council needs to be someone with overarching view of stakeholders
- Co-creation takes time
- Face-to-face meetings are crucial
- Engagement of stakeholders
- Timeline too short

Recommendations

- Involve interested stakeholders
- Provide hardware support (i.e. on sensors)
- Adhere to/implement standards
- Specification to be arranged pre-pilot period
- Ramp-up time needed with city partners
- Intelligent procurement in cities
- Lower the expectations of co-dependency on city side
- Create plan with enough agility
- Improve development documents with examples

The main recommendations presented by the groups at the end of the session were:

- More technology experts required particularly for a hardware test service for the framework
- More guidance for new cities allowing them to increase their agility to facilitate a smoother deployment
- Develop a better understanding of city strategic objectives and how the solution might respond to this earlier in the pilot period
- Make the pilot period longer – such as nine months – or move the period out of the Summer Holiday season.

These recommendations have been collated with the recommendations throughout this report in the Future Recommendations section.

6 Key results

The success of this open call is evident in that all 16 pilot groups managed to deploy their solutions across a minimum of two cities, ensuring integration and replicability, within the pilot period's ambitious time scale. The many teams working together in an agile way– from technical partners to city representatives – undoubtedly contributed to the pilot groups' success.

In total the pilot groups deployed 50 solutions using the SynchroniCity framework. There were 8 core cities, also known as reference zones, within the SynchroniCity consortium, whilst 13 new cities were introduced into the project (most of them by the pilot groups) to adopt the SynchroniCity framework. This brought the total number of cities of deployment to 21 cities.

The pilot groups engaged a wide group of stakeholders – from city departments, to citizens, schools and third-party service providers – ensuring many areas of society were involved in the deployment of the IoT solutions.

In Table 4 below, the number of solutions deployed counted as an instance each time the SynchroniCity framework is adopted, and the solution integrated. 37 instances were deployed in the core cities and 13 in the new cities.

Table 5: Number of IoT Solutions deployed in the SynchroniCity pilot period

Pilot Name	Core Cities	New Cities	Total
Active Travel Insights	3	0	3
ASAP-Value	1	2	3
Autonomous Hub	1	4	5
AAQM	2	1	3
BlueAlpaca	4	0	4
CASD	3	0	3
Encouraging Cycling	2	1	3
Kimap City	3	0	3
Kissmybike	3	0	3
LINC	3	0	3
Neighbourly	3	1	4
NoiseAbility	1	2	3
Quamtra	2	1	3
RainBrain	2	0	2
Real Time Traffic Data	2	0	2
SmartImpact	2	1	3
TOTAL	37	13	50

According to the Pilot's Final Reports, there were a total of 1,694 IoT devices deployed. This includes different hardware devices, from sensors to lights.

Figure 8 shows a word cloud of the different data sets used by the pilots. With further detail below.

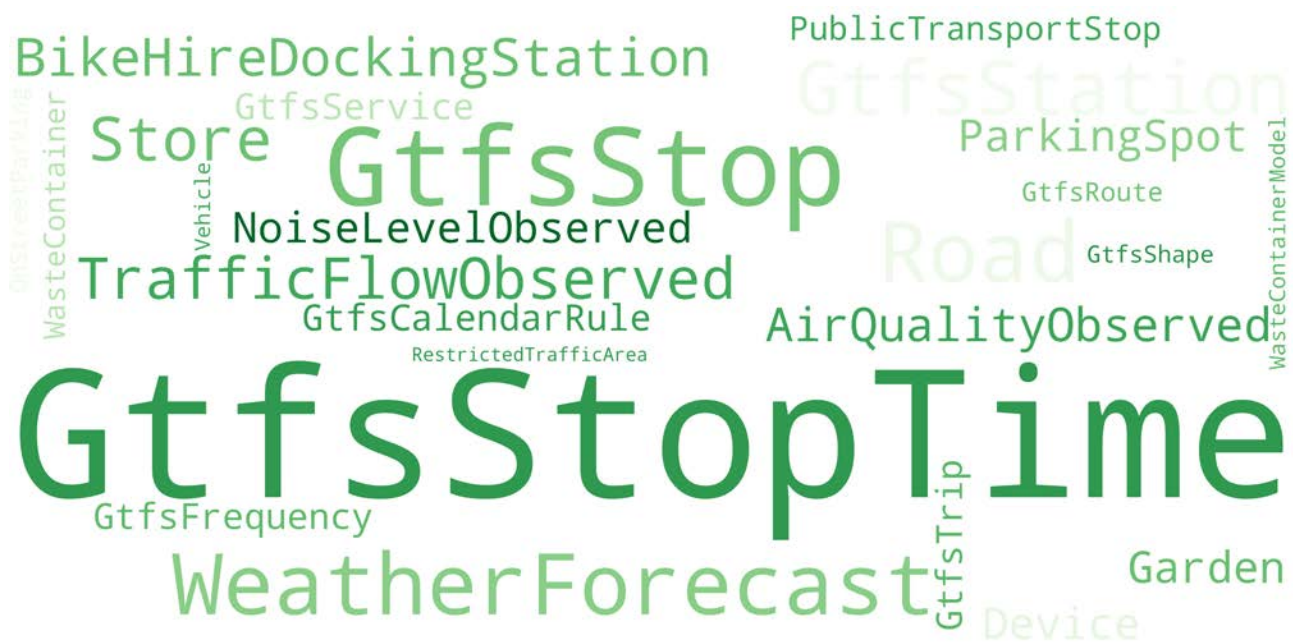


Figure 10: Datasets used by the pilots

Engagement of stakeholders and co-creation activities

The pilots engaged to different degrees with stakeholder groups. The pilot groups were presented a toolkit of activities ahead of the pilot period at the London kick-off event in February. Nine of the pilot groups reported undertaking formal tasks as requested by the SynchroniCity User, Stakeholder and Market Validation team. Six of these pilot groups exceeded the percentage of minimum accomplishment tasks requested to be undertaken. This demonstrated a high level of stakeholder engagement activity considering participation was not strictly mandatory. Further details can be found in the report *D4.4 Assessment on the user, stakeholder, replication and market validation*.

In the final reports, pilots reported on the different types of engagement with stakeholders. The bar graph below shows that all pilot groups engaged their city stakeholders, five pilot groups reported direct engagement of citizens and 11 reported engaging other SynchroniCity pilot groups or other large-scale pilot projects.

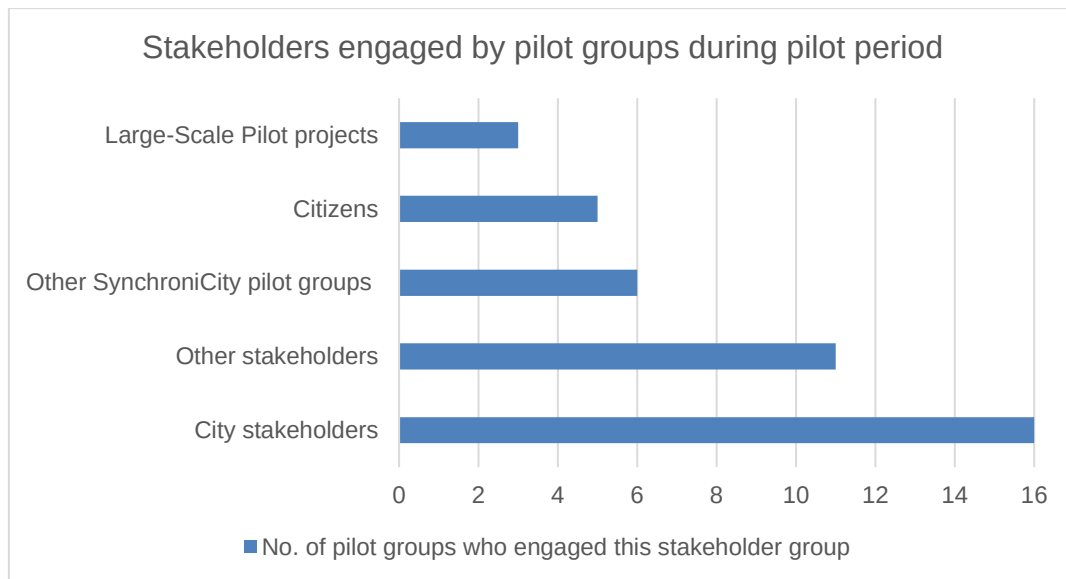


Figure 11: Stakeholders engaged by pilot groups during pilot period

11 pilot groups reported other stakeholders engaged. The examples of additional stakeholder groups beyond cities included:

- Standards bodies
- Universities
- Health care professionals
- Building maintenance officers
- Schools
- Cleaners
- Sector Groups
- Investor groups
- Third party service providers

Overall, many different types of engagement were reported. Some of these included:

- Workshops
- Demonstrations
- Feedback from demos
- Advisory groups
- Seminars
- Surveys
- Dashboard and app testing
- Showcase at events

Technical Integration and Datasets used

All 16 pilots achieved the minimum level of technology integration required. This included integration of the SynchroniCity framework being used within their solution, as well as datasets being created and/or consumed using the SynchroniCity framework.

Table 5 shows over 12,000 entities were consumed and over 5,000 entities⁸ were created.

Table 6: Total Entities Consumed and Created by Pilot Groups

Pilot Name	Entities Consumed	Entities Created
Active Travel Insights	111	607
ASAP Value	246	466
Autonomous Hub	21	21
AAQM	14	42
BlueAlpaca	645	0
CASD	212	59
Encouraging Cycling	0	931
Kimap City	3090	250
Kissmybike	4630	44
LINC	0	27
Neighbourly	0	17
NoiseAbility	0	19
Quamtra	768	768
RainBrain	1360	1536
Real Time Traffic	0	11
Smart Impact	963	571
Total	12060	5369

Figure 10 represents (in logarithmic scale) the number of entities consumed and created by each of the pilot groups. On the 'Y' axis, pilots that only create entities are represented, while on the 'X' axis are pilots that only consume data. Most of the pilots represented in the high-right area of the graph both consume and create data sets.

⁸ An entity is a broad term used by NGSi denoting the point of the context information of a certain thing, and could include a device, physical phenomenon, connected pieces of furniture or any other thing with a point of context information.

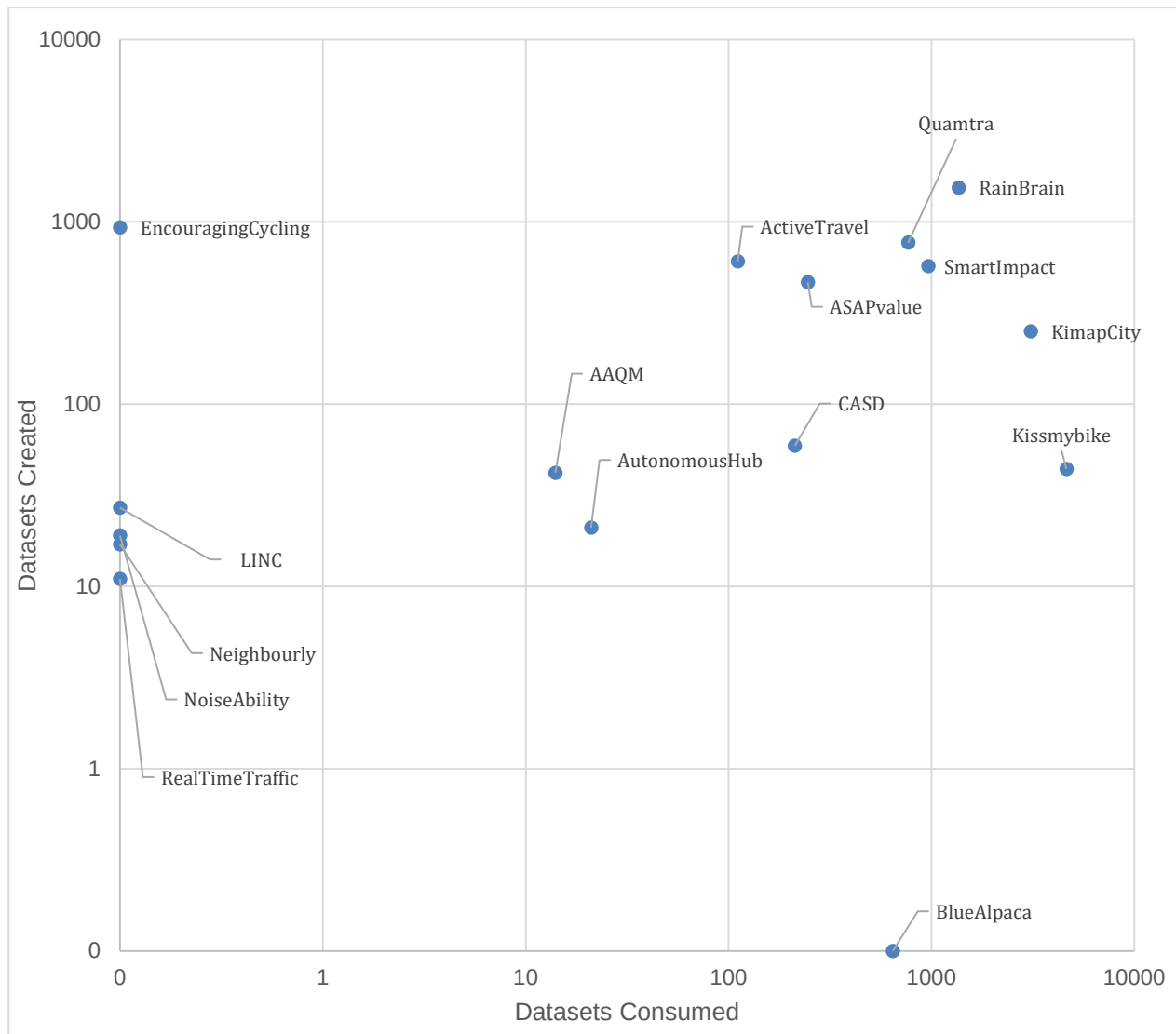


Figure 12: Datasets Consumed and Created by the Pilots

Pilot groups achieved differing degrees of integration:

- Three pilots achieved a high level of integration with SynchroniCity, with strong dependencies on the framework, consuming and creating data sets, and creating SynchroniCity instances for new cities.
- Eight pilots reached a medium integration level, with also strong dependencies on the framework, generating and consuming data.
- Five pilots had minimum integration, generating new data sets following SynchroniCity data models in at least two piloting cities.

There were 43 different types of data sets used by the pilots. Five new data set models were created throughout the pilot period. In total there were 159 data set models used, including duplications in several core cities, which was an increase of 79 throughout the pilot period. The full list of different types of data set models is listed below:

- GreenspaceRecord
- GtfsRoute

- WeatherObserved
- PointOfInterest
- GtfsStopTime⁹
- GtfsStop
- WeatherForecast
- Road
- GtfsStation
- Store
- TrafficFlowObserved
- BikeHireDockingStation
- AirQualityObserved
- ParkingSpot
- Garden
- Device
- NoiseLevelObserved
- GtfsCalendarRule
- GtfsService
- GtfsFrequency
- GtfsTrip
- PublicTransportStop
- WasteContainer
- GtfsShape
- OnStreetParking
- WasteContainerModel
- Vehicle
- RestrictedTrafficArea
- OffStreetParking
- CrowdFlowObserved
- CarSharingStation
- QueueMonitor
- EVChargingStation
- Beach
- PublicTransportRoute
- Museum
- GtfsCalendarDateRule
- ArrivalEstimation
- ThreePhaseMultiCircuitAcMeasurement
- GtfsTransitFeedFile
- GtfsAgency
- GreenEnergyGenerator
- GreenEnergyMeasurement

Further detailed analysis of the technical validation and data consumed and created by the pilot groups can be found in report *D4.5 Technical Validation of the SME Projects*.

Knowledge Exchange and the City Perspective

As stated above, 21 cities were involved in the pilot groups' deployments. The eight core cities (also known as reference zones) reported an overall positive interaction and experience with the pilot groups.

The cities were largely very complimentary of the pilot groups and in the final stages following the pilot period end, most cities made positive comments about the pilot groups. The concerns which arose were largely due to time-management that required cities to fulfil final obligations (such as demonstrations) at a date suitable to city stakeholders and pilot teams.

The knowledge exchange task assembled the experiences of each reference zone (core city) with regard to the governance and expansion of the ecosystem itself. Each of the reference zones completed one or more case studies which described their experiences and lessons learned.

These insights were exchanged and discussed during two consortium meetings, in Santander and Milan, and were documented in an online, public knowledge repository. The two rounds focussed on individual themes relevant at that stage of the project.

The workshop during IoT week in Bilbao focused on baseline best practice. Each reference zone had been asked to bring one or two good practices that they wanted to share. Ideally these would be around broad issues e.g. governance, platforms, ecosystem, which had worked for them in their city.

The scale-up workshop for SynchroniCity in Milan focused on expanding the ecosystem. During a workshop setting, the different cities were asked to reflect on the open call process. They discussed what had worked, what had not worked, what they had learnt and how they would see the process improved.

⁹ GTFS stands for General Transit Feed Specification and is a common format used in public transport schedules and is widely consumed by software applications.

For further details on the Knowledge Exchange activities, please refer to deliverable *D1.2 Knowledge exchange hub & repository*.

For further details on the overall pilot deployment period and the interaction with the cities, see *D3.8 Report on reference zones IoT service deployment and operations*.

Impacts

Economic, Social and Environmental Impact

Table 6 provides a summary of piloters' self-reported immediate and long-term/scaled-up impacts of their IoT solutions. They were asked which following impacts the solution had started to achieve during the pilot period, or aimed to achieve in the longer term, including scaled-up effects¹⁰.

The economic impacts improving service efficiency, creating a market-ready solution and reducing operating costs were most commonly cited as initial or expected impacts. Nine pilot groups reported that their solutions either in the long run or if scaled-up would increase tourist attractiveness and spend.

The environmental impacts improved air quality, reduced carbon emissions and energy demand were the most commonly cited. Nine pilot groups reported that their solutions either in the long run or if scaled-up would help reducing noise pollution.

The social impacts improving mental and physical health and improving citizen participation in government were most commonly cited as initial or expected impacts. Improved physical and mental health were mainly cited as scaled-up or longer-term impacts.

Table 7: Summary of Self-Reported Pilot Solution Impacts, Immediate and longer term or scaled-up

Economic impacts	Percentage of pilot groups
Reduced operating costs for the municipality	88%
Improved service efficiency for municipality	88%
New market-ready solution created	88%
Increased competition in your market	69%
Travel time savings	63%
Reduced congestion	56%
Increased local spend in the economy	56%
Increased tourist attractiveness and spend	56%
Other	19%
Environmental impacts	Percentage of pilot groups

¹⁰ Scaled-Up Effects are the estimated effects of multiplying the outcomes of a deployment with the associated users (extrapolating the findings), in the hypothetical case that the solution is deployed at a wider scale, whether across a city, multiple cities or nationwide.

Reduced carbon emissions	75%
Reduced energy demand	56%
Reduced waste production	38%
Improved air quality	81%
Improved noise pollution	56%
Improved access to green space	38%
Other	25%
Social impacts	Percentage of pilot groups
Improved education	31%
Improved mental health	31%
Improved physical health	50%
Improved citizen participation in government	50%
Improved inclusivity for marginalised groups	19%
Improved accessibility for lesser abled people	25%
Reduced crime or improved legal compliance	13%
Other	13%

Figure 13 visualises the self-reported immediate and expected future impacts as outlined show in Table 6. It shows that economic and environmental outcomes were widely targeted across the pilots, which also reflects the higher response by the pilots to the challenges surrounding sustainable

mobility and environmental concerns. The wide range of economic outcomes targeted also highlights the importance most pilots placed on a number of the economic impacts to be achieved.

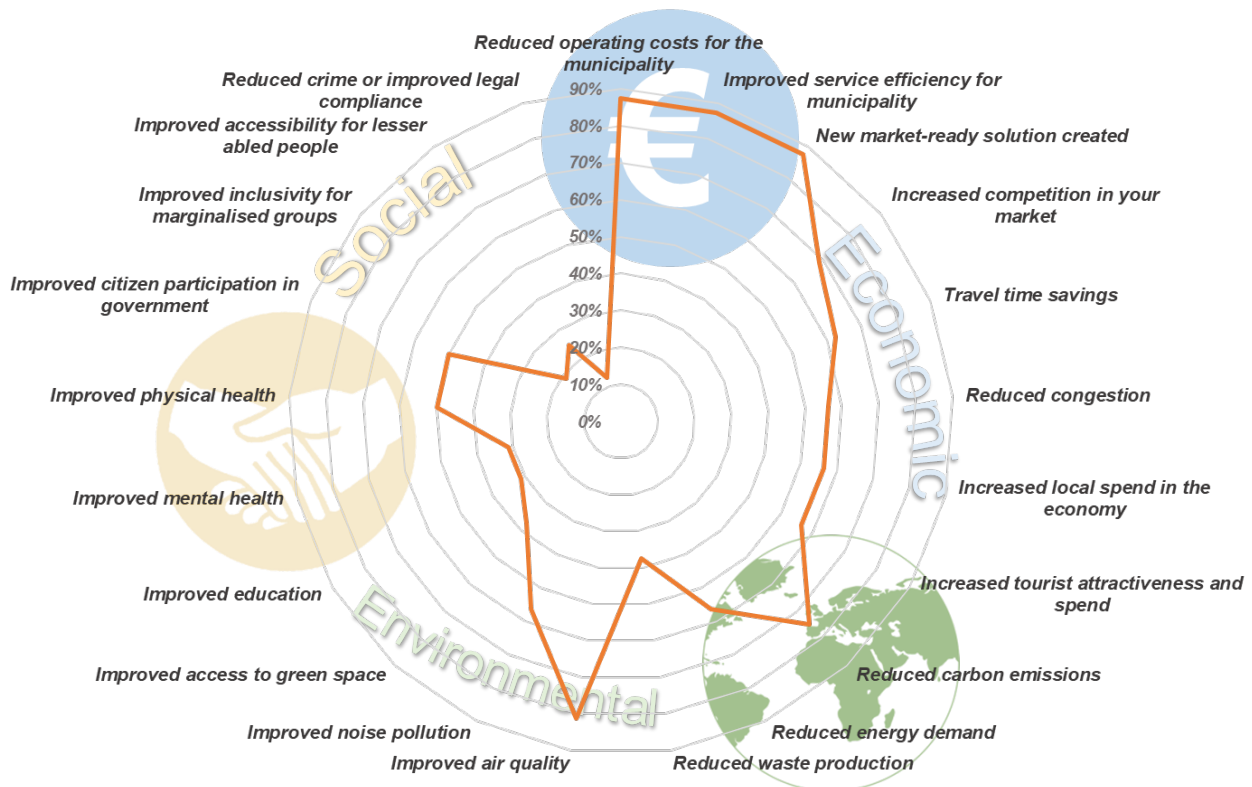


Figure 13: Percentage of pilots that self-reported specific immediate and expected long term scaled-up impacts

Technology adoption impact

The pilots were also asked how the minimal interoperable mechanisms impacted both the quality and the timeframe of their deployed solution. All pilots stated the SynchroniCity technical framework improved the quality of their solution, with half of them stating it significantly improved the quality of their solution. Most pilots stated that deployment occurred within the timeframe expected, one faster than expected and four slower than expected.

For further information on the impacts refer to *D6.5 Final Impact Assessment Report*.

Communications

The awareness and reach of the pilot groups has been impressive. From reports across major TV news outlets to coverage in local city news sites, the pilot groups have been (and continue to be) promoted across Europe and beyond.

As can be seen from the communications' parts of this report, a de-centralised plan worked well allowing the pilots to disseminate their own communications whilst being supported by our Communications team in the Open Call Team. With over 1,100 views of pilot group videos, presence at events such as IoT Week and various other communication efforts, pilots successfully showcased the SynchroniCity project and the framework benefits.

At the time of writing the main results from the communications have not yet been published but will be in report *D6.12 3rd report on communication, dissemination and marketing activities*

Future relationships & sustainability

In their final report the pilots positively reported future business plans and ambitions for their pilot solution and the SynchroniCity framework. Five pilots reported ongoing discussions with other public administrations or cities about their solution. Four pilots were showcasing or planning to showcase their solution at events and to other private partners. Two pilots stated they already had agreements in place to sell with other cities. Four pilots stated they planned to continue working with existing SynchroniCity compliant or OASC member cities. Two pilots stated they are planning to showcase the SynchroniCity framework and their solution to other cities.

We also know at the time of reporting that many pilots were or had been in discussions on how to continue their solution beyond the end of the project deployment timeframe. From discussions that took place at the event in Milan meeting we knew in fact that the numbers reported in their final report were likely much higher. Further information about the future relationships and sustainability of the pilot solutions and the use of the SynchroniCity framework will be reported in *D6.7 Sustainability Plan – Final: Scenarios on IoT usage*.

7 Future recommendations

Having considered the open call team's work, the interim reporting period, the final reporting period and the scale-up meeting, the main recommendations have been summarised below. They have been summarised by the different stakeholder groups which would consider the implementation of these recommendations. The future recommendations of this report provide insightful ways in which SMEs, cities and project management teams can maximise the value and impact of similar open calls. They also provide insight into how cities could improve municipality procurement processes for IoT-enabled solutions.

The recommendations are categorised by three main audiences: businesses, city administrators and project management teams.

SMEs and businesses may consider:

1. Convening 'advisory groups' for partners who would be agile across the project.
2. Beginning engagement with city stakeholders very early in the process. Cities should consider organising engagement activities across multiple SMEs to streamline access to strategic and operations departments.
3. Establishing technical team contact points early in the process and meet with teams where possible. Cities should anticipate this and coordinate where multiple SMEs are working on similar IoT projects.
4. Multiple communication methods to engage city stakeholders and pitch products. They may wish to consider short videos and infographics as supplements to face-to-face meetings.
5. Meeting cities throughout project and considering re-defining their delivery items to ensure expectations are met, particularly if timeframes or delivery plans change due to unforeseen factors.
6. Data utilisation plans should be created in conjunction with cities and partners.
7. Developing a better understanding of city strategic objectives and how the solution can respond to this earlier in the pilot.

Cities may consider:

1. Creating tech/hardware installation manuals for SMEs and installation companies to follow.
2. Creating a checklist they can ask SMEs to complete to understand requirements – from technical to physical installation – from their side early in the process.
3. Having an 'agile working training' session, with different people across city teams, led by the SME, along with a face-to-face kick-off meeting.
4. Establishing technical team contact points early in the process and meet with teams wherever possible. Cities may wish to anticipate this and coordinate when there are multiple SMEs working on similar IoT projects
5. Creating their own city-led engagement processes, or processes which facilitate SMEs engaging with citizens e.g. using a platform to distribute information from social media to email to other workshops and events.

6. Developing a Common Troubleshooting Document as a guide of common solutions to common problems. Every city has different constraints surrounding installation but may have similar issues across different pilot groups piloting in their city. Solutions which have worked for other pilots previously should be readily available to SMEs as a common ground to work upon. For example, using SIM cards to work around wi-fi issues could be a common way to overcome connectivity issues.
7. Developing city data security and privacy guides.
8. Meeting SMEs throughout the project and consider re-defining their delivery items to ensure expectations are met, particularly if timeframes or delivery plans change unexpectedly.
9. Ensure that a clearly defined city coordinator role is created explaining their responsibility to know the businesses and their people, to centralise contact for the pilot groups but also in order to get things expediated in the case of unexpected delays or problems
10. Data utilisation plans to be created in conjunction with cities and partners

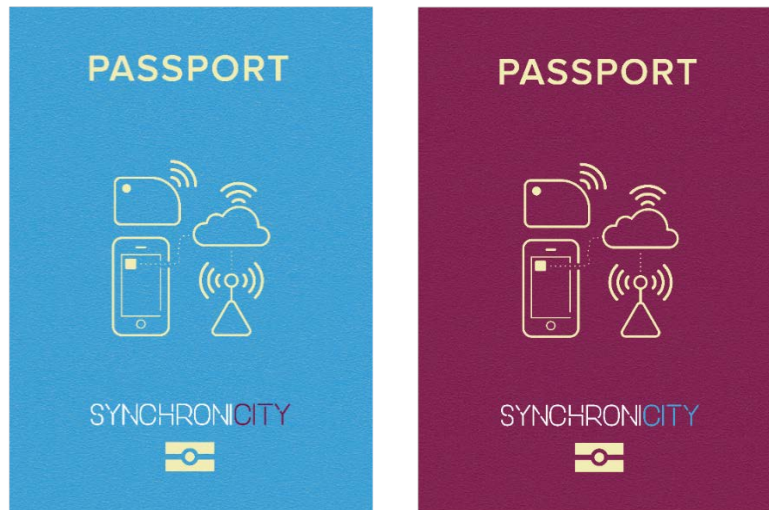
The Project Management Team may consider:

1. Planning a longer pre-pilot period kick-off event for future projects, with a longer designated time for cities and pilot groups to meet.
2. Ensuring strong communication channels across project teams, the city and the SMEs. This could be done through a journey mentor program and may include both technical and administrative mentors.
3. Using the journal of a pilot approach. They may consider whether to make it mandatory rather than an optional activity. If mandatory it could take on greater prominence in communications between different partners and the SMEs.
4. Using an effective tool such as an email helpdesk and selecting the best software based on balancing user-friendliness and functionality.
5. Specific resourcing for legal teams devoted to data and privacy issues.
6. More technology experts required particularly for a hardware test service for the framework.
7. More guidance for new cities allowing them to increase their agility to facilitate a smoother deployment
8. Developing a better understanding of city strategic objectives and how the solution would respond to this earlier in the pilot period.

For further information detailing SynchroniCity and how you can be involved as a city or as a business, see the SynchroniCity Guide to be released early in 2020.

8 Appendices

Appendix A: Examples of the passports used in the bootcamp



Appendix B: Bootcamp's agenda

6th FEBRUARY

8.15 - 9.00	Registration & Breakfast	Reception
9.00 - 9.10	Welcome	Auditorium
9.10 - 9.30	Inspirational talk	Auditorium
9.30 - 10.30	SynchroniCity's Context	Auditorium
10.30 - 10.50	Speed Introductions	Auditorium
10.50 - 10.55	Ice breaker	Auditorium
11.00 - 11.20	Break	Break out Space
11.20 - 12.20	Getting to know each other	Auditorium
12.20 - 12.40	Speed Introductions	Auditorium
12.40 - 13.40	Lunch	Break out Space
13.40 - 13.55	Atomic Services talk	Auditorium
14.05 - 16.05	● Expo	Workspace
16.10 - 18.00	IoT Next club	Auditorium
18.00 - 20.00	Networking drinks	Cafe
20.00	End of day 1	

7th FEBRUARY

8.15 - 9.00	Registration & Breakfast	Reception
9.00 - 9.10	Welcome	Auditorium
09.10 - 09.30	Admin talk	Auditorium
9.40 - 11.55	● Workshop	Break out Space
12.00 - 13.15	Citizen Engagement Tools	Auditorium
13.15 - 13.30	Closing remarks	Auditorium
13.30 - 14.15	Lunch	Breakout space
14.15 - 15.45	Optional: Stakeholder Workshop	Workspace
14.00 - 16.00	Attendees self-organised meetings	Auditorium
16.00	Event Ends	

Appendix C: Example of feedback from bootcamp

Overall, how much did you enjoy the bootcamp? (out of 100).	Do you feel ready to start your pilot?	Are you confident with the reporting process for SynchroniCity?	Are you confident with how to project will be governed?	Please give us a short quote if you think the event was a success.
90	Yes	Yes	Yes	The event was very well-organized and we enjoyed it!
85	Yes	Yes	Yes	Great event and loved having the chance to get everyone in the same room together.
85	Yes	Yes	Yes	All in all, this was an amazing event with great information sharing, and positive energy. I hope that we can continue this onward in the post Synchronicity era
86	Yes	Yes	Yes	This will be a hell of a ride and I like it.
89	Yes	Yes	Yes	great organisation and usefull networking
75	Yes	Yes	Yes	Out of all the smart city events I have been, this one was very professional, well-organised, and very relevant to solve the usual challenges of rolling-out smart city projects.
100	Yes	Yes	Yes	SynchroniCity Bootcamp was a fantastic introduction to the Large Scale Pilot programme. It was great to have the opportunity to meet other pilot groups and cities, as well as spend time together as a Pilot Group. The talks and expo sessions were invaluable for helping us to prepare our pilots and the SynchroniCity team created a very constructive, collaborative and energetic environment for us all. Thanks to
80	Yes	Yes	Yes	Thanks for running an engaging and interesting event!
90	Yes	Yes	Yes	Cities as a platform is powerful idea. The bootcamp was a big step towards aligning the many elements of this
80	Yes	Yes	Yes	The event clarified all the remaining issues on the table
90	Yes	Yes	Yes	The bootcamp was a great start for a promising pilot phase
90	Yes	Yes	Yes	Great organization, and scope understood to the necessary detail. Good atmosphere, and veru useful networking.
79	Yes	No	Yes	The bootcamp was very practical and useful
77	Yes	Yes	Yes	The bootcamp has been a first step, and I think that it is very important, because you meet all people, and you may solved doubts. And you also may share with them: ideas, project,
100	Yes	Yes	Yes	Excellent organisation and very motivating
80	Yes	Yes	Yes	SynchroniCity is the fuel to enhancing city value through federation, data sharing and interoperability.

Appendix D: Excerpts from the SynchroniCity Pilot Handbook



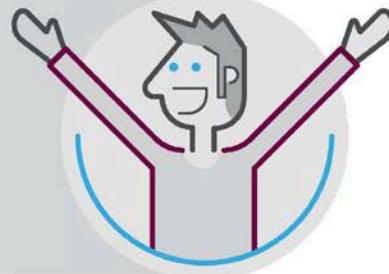
SYNCHRONICITY PILOT HANDBOOK

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1.

WELCOME



Dear Pilot,

**We are thrilled to congratulate you
on your success in the SynchroniCity Open Call.**

Thank you for your application. The response of the Open Call was near-diluvian, with more than 130 proposals received from SMEs and Pilot Groups from all over Europe and beyond.

Given this breadth, the selection was difficult, therefore the 16 selected pilot proposals are of outstanding quality.

This handbook is intended as your 'one stop' reference to get you started. This booklet will talk you through the 6-month timeline of the pilots and the support ecosystem of your pilot. It will also help you deal with the necessary financial and technical reporting and provide communication advice. Keep it close, and of course, let us know if anything is not clear.

We look forward to working with you all and wish you the best of luck in this exciting next step towards a single global digital market of services for cities and their communities.

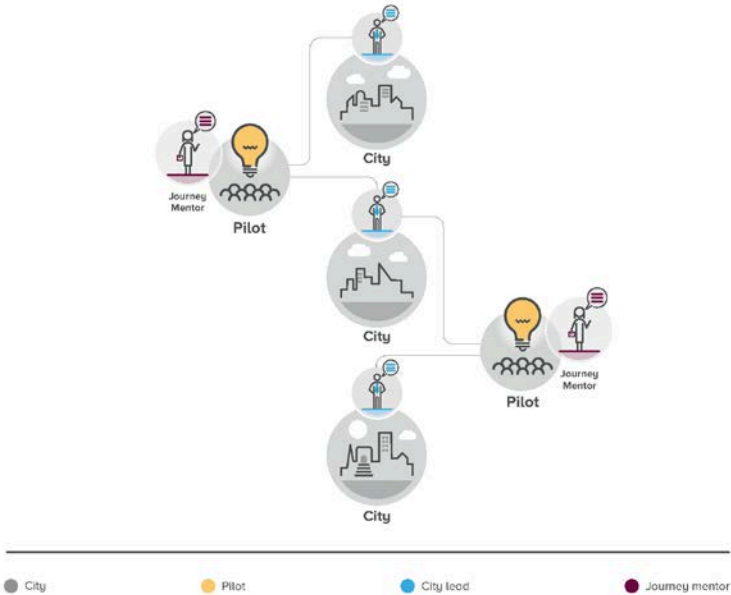
The Synchronicity Team



SYNCHRONICITY PILOT HANDBOOK

7

PILOT COMMUNICATION STRUCTURE IN SYNCHRONICITY



OVERVIEW OF THE COMMUNICATION CHANNELS WITH THE SYNCHRONICITY PARTNERS

ACTIVITY	WHO	CHANNEL
 REPORTING	 Sme Pilot Lead	 Helpdesk
 COMMUNICATION & JOURNEY DIARY	 All Pilot Partners  Journey Mentor	 Google Drive Folder
 PILOT IMPLEMENTATION DOUBTS	 Sme Pilot Lead  All Pilot Partners	 Journey Mentor  City Lead  Journey Mentor (CC in email)  Helpdesk  Journey Mentor

Appendix E: Bootcamp video

Video of the bootcamp can be found [here](#).

Appendix F: Interim Report Template

SYNCHRONICITY

Interim report

Note that this report could be subject to minor modifications. The final template will be provided to the SME pilot leads before the submission deadline.

Pilot Title

Date Submitted:

SME Pilot Lead Name and Organisation:

SME Pilot Group Partners:

Pilot Cities:

Name of the Journey Mentor:

TRL of your solution at the beginning of the pilot:

This report will cover:

- General aspects
- Technical environment
- Standards
- Impact evaluation/KPIs
- Lessons learnt

Remember:

Submit by emailing helpdesk@synchronicity-iot.eu stating that you have finalised the document. Include the following attachments:

- Financial Claim Form. A payment of a maximum of 35% of the funding will be released within 30 days from approval of all documents via email.
- Any other additional documentation that you consider important.

If you have any questions please contact your journey mentor or the helpdesk.

SynchroniCity Interim report

GENERAL ASPECTS OF THE PILOT

1. Short summary of your pilot for publication by SynchroniCity and/or European Commission.
2. Provide an overview of the progress towards the objectives of the pilot according to your workplan, including any milestones and achievements identified. Explain and justify what has changed in your experimentation process compared to your initial plans. Consider general, technical and ethics & privacy activities.
3. Describe the co-creation activities that you have performed until now. Mention the stakeholders you have engaged with and explain what you have learnt from engaging with them.
4. Describe if your pilot has had fruitful interactions with other SynchroniCity pilot projects or with the other Large-Scale Pilot projects. What was the nature of this interaction?
5. Provide an overview of the main communication activities that your pilot has carried out (presentations at events, conferences, press releases, blogs, publications, etc.).
6. Next steps, risks and mitigations of your pilot project
7. What are the steps your pilot team has taken or planned to ensure that your solution can continue after the SynchroniCity project has ended?

TECHNICAL ENVIRONMENT

This is just a general overview of the scope and the technical contents of this section. A more concrete structure will be provided before submission deadline, based on SME deployments and M2 reports results. Please, don't take this as the final template.

8. Data used in each Pilot City

CITY	Data	Data type
City 1:		
City 2:		

SynchroniCity Interim report

9. Data created in each Pilot City

CITY	Data	Users of data
City 1:		
City 2:		
City X:		

10. Explain the experience of integrating your solution into the SynchroniCity framework, indicating barriers and problems found and solutions adopted, if any.

11. Explain if you have used any existing Atomic Services in your pilot project or if your pilot project has created new Atomic Services. Which ones?

12. If in your pilot there is a New Pilot City, please provide the following information:

- a. What are the actions that the city has taken to implement the SynchroniCity framework and your solution?
- b.

STANDARDS

13. Which of the following standards have you and/or your city been using?

ETSI ISG CIM	
ETSI NGSI-LD	
ITU-T SG20/FG-DPM	
OAUTH2 industry standard protocol for authorization	
DCAT-AP	

14. For each standard you used/are using, please provide a summary of how you worked/ are working with your city to implement the requirements of the standard and a summary of

SynchroniCity Interim report

the lessons learnt (e.g. what worked well, what worked not so well and tips you have for others looking to use the standard)

15. Were there any other standards that your pilot uses that would benefit from more widescale adoption? If so, please provide details.

16. Do you think there are any gaps where additional standards would help deployment of your project e.g. interoperability, process standards, common good practice guidelines for deployment etc.

IMPACT EVALUATION and KPIs

1. What is the number of users of your solution? Indicate the number per pilot city.		# of users				
	City 1:					
	City 2:					
	City 3:					
	City 4:					
2. Who are the users of your solutions?		% of users				
	Citizen					
	Start-up or SME (<250 employees)					
	Large company (>250 employees)					
	Public sector organization Other, which? _____					
3. How satisfied are the users of your solutions? (1=not satisfied, 5= very satisfied)?	1	2	3	4	5	
4. What is the number of IoT devices that you connected with your solution?	172					
5. What is the number of Open Data sets you used and produced?		# of Open Data sets				
	Used					
	Produced					
6. How would you rate the quality of Open Data used (1=low -5=high)?	1	2	3	4	5	
7. How would you rate the quality of Open Data produced (1=low-5=high)?	1	2	3	4	5	
8. To what extent has the project improved interoperability (1=low -5=high)?	1	2	3	4	5	

SynchroniCity Interim report

9. What is the number of local ecosystem partners involved (indicate the number per city) e.g. companies, creative hubs, citizen organisations, etc.?		# of partners (type of partners)
	City 1: Bordeaux	
	City 2: Carouge	
	City 3: Seongnam	
	City 4:	
10. Of the partners involved, what is the number of SMEs?		
11. What is the number of jobs created as direct outcome of your pilot?		

Provide open comments on the above impact evaluation and KPIs that you consider worth mentioning.

- a. Please, enumerate also other KPIs that you may have considered to track the progress of your project.
- b.
- c. Which effects do you (or other institutions relevant for your pilot) foresee that your solution will have in technical, economic and societal terms?

LESSONS LEARNT

THREE MAIN LESSONS LEARNT	
1	
2	
3	

SYNCHRONICITY

(Enter information in green cells only)

Project Title	
Partner Name	
Partner Type	
Funding awarded	

Claim summary
Personnel Costs
Other Direct Costs
Total Direct Costs
Subcontractor and G&S Costs
Indirect Costs (@ 25%)
Total Costs

Technology	Management	Other	Actual Total	Budget Total
		-	-	
	-	-	-	
	-	-	-	
-	-	-	-	-
-	-	-	-	
-	-	-	-	

[illegible][illegible][illegible]

Appendix H: Interim Feedback Template

SYNCHRONICITY

SynchroniCity: Feedback to the Interim Report (month 3)

Project Title	
Lead Applicant	
Cities	

1. Summary and Actions

What do you need to do?
•

2. Feedback

The feedback to the pilot is divided by sections, accordingly to the Interim Report.

General aspects of the pilot

Technical Environment

SYNCHRONICITY

Financial

Interim payment information

Funding status - Interim Report	€
Budgeted costs	
Funding awarded	
Total costs incurred in interim reporting period	
Match funding % applied	
Pre-financing payment (50%)	
Interim payment due*	0

* The interim payment due relates to costs incurred in the reporting period in excess of the pre-financing payment, after the match funding % per the pilot budget has been applied. This is capped at 35% of the total funding awarded. Reference document: Pilot Financial Claim form, 'Funding Scenarios' tab.

Appendix I: Final Report Template

SYNCHRONICITY

Pilot Period Final Report (M6)

Pilot Title:

Date Submitted:

SME Pilot Lead Name and Organisation:

SME Pilot Group Partners:

Pilot Cities:

Name of the Journey Mentor:

TRL of your solution at the beginning of the pilot:

This report will cover:

- General aspects
- Technical environment
- Standards
- Impact evaluation/KPIs
- Lessons learnt

Remember:

Submit by emailing helpdesk@synchronicity-iot.eu stating that you have finalised the document. Include the following attachments:

- Financial Claim Form. The payment of the balance of the actual costs will be released within 30 days from approval of all documents via email. More details can be found in the final [Financial claim form](#).
- Any other additional documentation that you consider important.

If you have any questions, please contact your journey mentor or the helpdesk. Word counts below are for your guidance.

GENERAL ASPECTS OF THE PILOT

- 1. Provide a short summary of your pilot to be ready for publication by SynchroniCity and/or European Commission. (150 words)**

Include in this section:

- What does your pilot do? In simple and understandable words understandable by a non-tech audience)
What is unique about your pilot?
- What city challenge does it aim to solve?
- Which cities was it deployed in?

- 2. Provide a detailed overview of how your pilot has progressed towards the objectives of the pilot compared with the original work plan including any milestones and achievements. Explain and provide justification of any changes to your deployment compared with your initial plan. Please use the questions below to guide your overview. (500 words)**

Workplan

- Were you able to undertake the deliverables and activities, according to your work plan?
- In the cases where you were unable to deliver, what were the deviations, what changes did you make and what impact whether positive or negative did this have? Explain your process and detail the lessons learned.
- List the achievements against the description of your pilot as per Schedule 2 in the Pilot Agreement, including possible deliverables/outputs or outcomes
- Has the pilot been deployed, and did it achieve what was expected? If not, please give the reasons and what lessons have been learned?
- Which services did you replicate in more than one city? List here the details (services & cities)?

Budget

- Were you on budget, or were you over or under budget by the end of the deployment period?
Provide information and details to explain any potential deviations from the initial pilot budget provided that might have occurred in this second part of the pilot

Quality

- Did the work achieve the quality thresholds you set? If not, explain the deviations and highlight any impact on achieving the Synchronicity goals.

Risk log

- What could be improved upon next time? (Note there is a detailed lessons learnt section below).

3. Describe the co-creation activities you have undertaken to date. Which stakeholders have you engaged with and what have you learned from engaging with them? (500 words)
4. Describe if your pilot has had positive interactions with other SynchroniCity pilot projects or with the other [Large-Scale Pilot projects](#). What was the nature of this interaction? (250 words)
Here, you should include any activity (datasets provided/consumed, service/s played, application, synergies, etc.) involving other projects within SynchroniCity's scope or belonging to any of the other existing Large-Scale Pilots.
5. Provide an overview of the main communication activities that your pilot has carried out (presentations at events, conferences, press releases, blogs, publications, etc.). (250 words)
6. Highlight which number is most correct for you and provide further comments if appropriate:

'In our pilot, each company...

	Strongly disagree	Disagree	Do not agree or disagree	Agree	Strongly agree	Further comments
Knows exactly how to generate value for the users.	1	2	3	4	5	
Has a clear view on its market position	1	2	3	4	5	
Knows exactly the competences and resources needed for value creation	1	2	3	4	5	
Has partners with clear roles for value creation.	1	2	3	4	5	
Knows exactly how to make money	1	2	3	4	5	

SUSTAINABILITY & BEYOND SYNCHRONICITY

7. **What are the steps your pilot team has taken or planned to ensure that your solution can continue after the SynchroniCity project has ended?**
For example, you can explain the reviewing of your business models based on your pilot experience. It might be that the city you pilot in would like to take over either fully or in part, the service you have deployed.
8. **What plans do you have beyond this pilot project to implement your solution in other cities?**
9. **If you applied in a joint consortium – do you plan to continue working together?**
10. **Has your pilot developed working relationships with new partners in your collaboration efforts, who you will continue working with?**
11. **Has the Technology Readiness Level of your solution changed over the pilot period? How quickly do you see it progressing to the next level and why?**
12. **What are your plans of action to use the SynchroniCity framework in the future?**
13. **What are the expected future barriers preventing you from using the SynchroniCity framework?**
14. **What enablers do you see for future use of the SynchroniCity framework?**
15. **How would you describe the current commercial situation surrounding the services you have provided and what is the outlook for the coming 12 months?**

Future communication beyond the project

SynchroniCity partner [Open & Agile Smart Cities](#) (OASC) will further work towards connecting cities and solution providers. If you would like to be contacted by OASC about future opportunities, please provide the contact details of the piloters, who would like to be included in the OASC contact database.

The information provided below will be used solely by OASC to inform you about upcoming opportunities for cooperation. To receive the regular OASC newsletter, please sign up [here](#).

Name:

Email:

Name

Email:

TECHNICAL ENVIRONMENT**16. Hardware IoT deployments**

Create a new table for each deployment.

City of deployment	
Type of device	
Number of deployed devices	
Synchronicity instance used to store generated data	
Data type (s)/Data model(s)	
Communication technology (e.g. SigFox, LoRa, 3G, wired, etc.)	

17. Data consumed and created in each Pilot City (fill in one table per city).

Create a new table for each city or instance. Add rows where necessary to indicate more than one dataset.

SynchroniCity instance (name)	
Endpoints (indicate URLs used/deployed)	
NGSI API	
Historical API	
Oauth 2.0 API	
Marketplace (where your offers are)	
Context Data sets consumed (NGSI)	
Type/Data Model	
ID pattern	
Context Data sets created (NGSI)	

Type/Data Model	
ID Pattern	
Context Data sets consumed (historical)	
Type/Data Model	
ID Pattern	
Context Data sets consumed (historical)	
Type/Data Model	
ID Pattern	

- 18. Answer the following if your pilot involved a hardware deployment. Explain the experiences of deploying the hardware devices in the different cities.**
- 19. Explain the experience of integrating your solution into the SynchroniCity framework, indicating barriers and problems found and solutions adopted, if any.**
At least the following points should be covered: access to data, integration with APIs.
- 20. Answer the following if your pilot involved New Pilot Cities. What are the actions that the city has taken to implement the SynchroniCity framework and your solution?**
Describe also the experience of integrating the SynchroniCity framework from the city perspective (thoughts, barriers, advantages).
- 21. Did you use any existing Atomic Services in your pilot project, or if your pilot project has created new Atomic Services. Which ones?**

STANDARDS

- 22. Explain how you have been using the following standards, giving detail to standards and specifications you have been using.**

For each standard you used/are using, provide a summary of how you worked/ are working with your city to implement the requirements of the standard and a summary of the lessons learnt (e.g. what worked well, what worked not so well and tips you have for others looking to use the standard).

Standard	Using Yes/No	Explain with details to standards and specifications
OASC MIM 1 (Context Information Management)		
OASC MIM 2 (Common Data Models)		
OASC MIM 3 (Ecosystem Transaction Management)		
ISO/IEC		
ITU		
National/Industry specifications (BSI, DIN, TM Forum etc.)		
Other		

- 23. Are there any other standards that your pilot uses that would benefit from more wide-scale adoption? If so, provide details.**
- 24. Do you think there are any gaps where additional standards would help deployment of your project? E.g. interoperability, process standards, common or good practice guidelines for deployment.**

IMPACT EVALUATION and KPIs

25. What is the number of users of your solution? Indicate the number per pilot city.		# of users			
	City 1:				
	City 2:				
	City 3:				
	City 4:				
26. Who are the users of your solutions?		% of users			
	Citizen				
	Start-up or SME (<250 employees)				
	Large company (>250 employees)				
	Public sector organization Other, which? _____				
27. How satisfied are the users of your solutions? (1=not satisfied, 5= very satisfied)?	1	2	3	4	5
28. What is the number of IoT devices that you connected with your solution?					
29. What is the number of Open Data sets you used and produced?		# of Open Data sets			
	Used				
	Produced				
30. How would you rate the quality of Open Data used (1=low -5=high)?	1	2	3	4	5
31. How would you rate the quality of Open Data produced (1=low-5=high)?	1	2	3	4	5
32. To what extent has the project improved interoperability (1=low - 5=high)?	1	2	3	4	5

33. What is the number of local ecosystem partners involved (indicate the number per city) e.g. companies, creative hubs, citizen organisations, etc.?		# of partners (type of partners)
	City 1:	
	City 2:	
	City 3:	
	City 4:	
34. Of the partners involved, what is the number of SMEs?		
35. What is the number of jobs created as direct outcome of your pilot?		

36. Provide comments on the above impact evaluation and KPIs that you consider worth mentioning. Ensure to list other KPIs that you may have considered to track the progress of your project.

Economic, social and environmental impact

37. Indicate which of the following impacts your solution has started to achieve during the pilot period and / or aims to achieve in the longer term (check all that apply):

	Starting to make an impact during the pilot period	Will make an impact either in the longer term and/or once scaled-up ¹
<u>Economic</u>		
Reduced operating costs for the municipality	☐	☐
Improved service efficiency for municipality	☐	☐
New market-ready solution created	☐	☐
Increased competition in your market	☐	☐
Travel time savings	☐	☐
Reduced congestion	☐	☐

¹ This includes wide-scale adoption within a city and across multiple cities.

Increased local spend in the economy	☐	☐
Increased tourist attractiveness and spend	☐	☐
Other (Complete):	☐	☐
<u>Environmental</u>		
Reduced carbon emissions	☐	☐
Reduced energy demand	☐	☐
Reduced waste production	☐	☐
Improved air quality	☐	☐
Improved noise pollution	☐	☐
Improved access to green space	☐	☐
Other (Complete):	☐	☐
<u>Social</u>		
Improved education	☐	☐
Improved mental health	☐	☐
Improved physical health	☐	☐
Improved citizen participation in government	☐	☐
Improved inclusivity for marginalised groups	☐	☐
Improved accessibility for lesser abled people	☐	☐
Reduced crime or improved legal compliance	☐	☐
Other (Complete):	☐	☐

Other impacts

38. Consider the quality of your deployed solution, which of the following best applies to your pilot solution: (check ONLY ONE)

- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) has NOT IMPROVED our service offer
- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) has SLIGHTLY IMPROVED our service offer
- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) has SIGNIFICANTLY IMPROVED our service offer

39. Consider the time taken to develop and deploy your solution, which of the following best applies to your pilot solution: (Check ONLY ONE)

- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) has meant our solution developed SLOWER THAN EXPECTED
- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) has meant our solution developed IN THE TIMEFRAME EXPECTED
- ☐ The SynchroniCity technical framework (Minimal Interoperability Mechanisms) meant our solution developed FASTER THAN EXPECTED

40. During your pilot, did you experience any issues with the privacy of data? Please describe, what kind of issues they were and what was the effect on the pilot implementation? How did you resolve the issues? (50 words)

LESSONS LEARNT

41. The purpose of these questions is to gain meaningful insight to improve upon the process into the future. If required, we will remove any identifiable personal details to ensure sufficient ambiguity will remain in our official reporting and focus upon the issues identified rather than specific people or organisations concerned. (500 words)

- a) What worked well for your pilot in this project?
- b) What worked well for you as a team? And if a part of a consortium pilot group what worked well?
- c) What could have been done differently? What could be improved upon for next time?
- d) What were the main surprises in the events, or unforeseen activities, which took place?
- e) What ideas do you have that could have prevented or alleviated the pressures of the surprise problems?

- f) Even with the best planning possible, what could not be anticipated?
- g) Was there any information you were lacking?
- h) Were there any skills you were lacking as the project progressed, either internally within the pilot or externally from one of the SynchroniCity partners?
- i) Was there any training that could have benefited your individual staff prior to the pilot?

42. What are your main lessons learned when dealing with the following stakeholders?

1. Open Call Team
2. Technical validation team
3. City administrations
4. Technical partners of cities
5. Other

SUMMARY OF THREE TOP LESSONS LEARNT (100 words)	
1	
2	
3	

You are welcome to include other documentation that you have produced and is relevant for your experiment; such as videos, pictures, interviews, reports of focus groups or workshops, links to website, social media.

Appendix J: Final Financial report template

Project Finance Form

(Enter information in green cells only)



SYNCHRONICITY

Project Title	
Lead Partner Name	
Number of Partners	
Total funding awarded	

Claim summary	Technology Deployment	Management	Other	Total Cost (€)	Budget Total (€)	Justification for variance:
Personnel Costs	-	-	-	-	-	
Other Direct Costs	-	-	-	-	-	
Total Direct Costs	-	-	-	-	-	
Subcontractor and G&S Costs	-	-	-	-	-	
Indirect Costs (@25%)	-	-	-	-	-	
Total Costs	-	-	-	-	-	

Funding awarded - -
Funding awarded % 0% 0%

	Partner Name	Partner Type	Technology Deployment	Management	Other	Total Cost (€)	Budget Total (€)
Lead Partner	-	SME	-	-	-	-	-
Partner 2	-	-	-	-	-	-	-
Partner 3	-	-	-	-	-	-	-
Partner 4	-	-	-	-	-	-	-
Partner 5	-	-	-	-	-	-	-

Appendix K: Final Financial feedback Template

SYNCHRONICITY

Feedback to the Final Financial Report (Month 6)

Project Title	[Pilot name]
Lead Applicant	[Pilot lead name]
Cities	[to copy from the final feedback report]

Summary

Your M6 final financial report status is **'approved'/'pending'** the following requirements.

Questions, comments and outstanding requirements:

Financial: No action [delete the box below 'Financial']/**Outstanding Action**

The costs claimed are eligible and approved./Further clarifications are needed. Please see below the 'Financial' section for details and send clarification to the helpdesk@synchronicity-iot.eu.

Financial

Approval of your costs claimed is pending the below action point:

- Lead partner – [cost category],
- Partner 2 – [cost category],
- Partner n – [cost category],

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V.1

Appendix L Final report feedback template

SYNCHRONICITY

Feedback to the Final Report (Month 6)

Project Title	[Pilot name]
Lead Applicant	[Pilot lead name]
Cities	[to copy from the final feedback report]

Summary

Your M6 final report status is 'approved'/'pending' the following requirements.

Questions, comments and outstanding requirements:

General: No action /Outstanding Action

City: No action /Outstanding Action

Financial: No action /Outstanding Action

Financial

Approval of your costs claimed is pending the below action point:

- Lead partner – [cost category],

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