SYNCHRONICITY

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Executive Summary

As one of the EU IoT Large Scale Pilot-projects, SynchroniCity-project represents the first attempt to deliver a Single Digital City Market for Europe by piloting its foundations at scale in reference zones across 8 European cities, involving also other cities globally. It addresses how to incentivise and build trust for companies and citizens to actively participate, in finding common co-created IoT solutions for cities that meet citizen needs and to create an environment of evidence-based solutions that can easily be replicated in other regions. Further, SynchroniCity aims to synchronize existing IoT-enabled smart city ecosystems in Europe by removing barriers of fragmentation and misalignment that currently sets them apart. It will pilot the necessary building blocks and drivers for change to foster an environment that will contribute towards technical, legal and socio-economic harmonization of the European smart city market.

In order to evaluate the outcomes and the impact of the project, its activities have to be evaluated from different perspectives. Whether the project has influenced the emerging industry standards of the Single Digital City market, supported the development of new, scalable urban services and/or, whether the developed services are perceived useful from citizens' perspectives, or whether the project has an impact on involving new companies or creating new jobs, are, among others, crucial for evaluating the project outcomes. This will be done through the KPI Framework presented in this deliverable. The presented KPI framework can also be used for assessing other smart city IoT ecosystem development and evaluation activities.

The present deliverable

● *Outlines the KPI framework for the SynchroniCity project and describes the background and relevance of the specific KPIs*

● *Defines the individual KPIs and their characteristics*

● *Describes the process and timeline of KPI monitoring for the project*

The SynchroniCity impact monitoring is conducted with sixteen (16) individual indicators: Citizen centred, Awareness impact, Perceived value from the citizens (Social Innovation); Service implementation (Access to services); Perceived value from the decision makers (Governance), IoT connected devices, Open data sets, Quality of open data, Improved interoperability (Innovation); Participatory governance, SME involved, Partners' engagement, Local job creation (Local ecosystem); Data privacy (Safety), Replication potential, New follower city members/interested(Replication and Scalability).

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Abbreviations

D	Deliverable
DSM	Digital Single Market
DoA	Description of Action
EC	European Commission
GDP	Gross Domestic Product
IoT	Internet of Things
KPI	Key Performance Indicator.
MF	Monitoring Framework
SME	Small and Medium Sized Enterprise
RZ	Reference zone
RZL	Reference zone leader
WP	Work Package
WT	Work Task
MF	Monitoring Framework

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1 Introduction

1.1 Scope

The objective of Work Package 6 (WP6) – Impact and Sustainability is to build upon the technological and socio-economic breakthroughs established in the Reference Zones and smart city standards created through the project and to demonstrate how, together, they will form a successful European eco-system for smart city solutions.

This deliverable concerns two of the work package's objectives:

O6.2: extending and, where appropriate, developing an impact assessment framework for cities to more accurately capture the merits of Internet of Things (IoT)-enabled smart city solutions,

O6.4: utilising the developed impact assessment framework to validate the merits of the pilot technologies and the proposed business models,

SynchroniCity project aims to create a long-term impact with all its activities. By contributing to the standardization processes related to smart city IoT market, the project will generate long-term results in the overall implementation of the digital single market. This impact will not be the primary focus of the KPI framework described in this deliverable. The key focus of the Key Performance Indicator (KPI) framework is to monitor the activities related to SynchroniCity reference zones and the related output and outcome indicators, which can be associated with eventual impact.

The first subtask here is to define the KPI's for the project. Many Smart City and IoT-related KPI's already exist and both past and ongoing efforts are learned from, exploited and are built upon to generate the SynchroniCity KPI framework. As every project is unique, the exact meanings and suitability of elements and individual KPIs for SynchroniCity need to be negotiated and defined amongst the stakeholders. Processes, data gathering techniques, and timing will be planned.

In the beginning of the SynchroniCity project, a set of projected KPIs were outlined. During the first year of SynchoniCity project, a KPI taskforce was created to evaluate, work and refine the relevant measures for monitoring the project. The taskforce represented different consortium partners and proceeded with its work both through monthly meetings and individual work between the meetings. The resulting list of the KPIs differs slightly from those envisaged at the outset of the project; this underlines the dynamic nature of KPI assessment.

During its work, the KPI taskforce determined that three KPIs that were originally described were not suitable to continue to be developed. These were Quality of Life (as part of the Social innovation element), Involvement of the city administration (as part of the Governance element) and Beyond the sector (as part of the Replication and Scalability element). These KPIs are considered important for the overall impact monitoring of IoT smart city activities and projects. However, in the context of monitoring activities of a single project, these KPIs faced some challenges. The reason for omitting Quality of Life was the difficulty in assessing the contribution of the project to this indicator. It is almost impossible to isolate the effect of SynchroniCity from all other variables affecting Quality of Life. The magnitude of effect would probably be negligible due to how broad a concept Quality of Life is. The reason for omitting Involvement of the city administration was that it was difficult to establish a useful key indicator that would be informative as to the eventual outcomes and impacts in this area. Beyond the sector was omitted because the evaluation of the additional industry sectors making use of SynchroniCity services was not considered as providing value to the project at this stage.

After the internal review, two indicators (Apps developed and Beyond the zone) were omitted. The internal reviewers raised relevant points for removing the indicator of Apps developed. First, the number of apps was considered an insufficient indicator, since after a certain time period, a plateau will be reached. Second, this indicator was actually considered as duplicate of 4.2.1., Service implementation. Following these suggestions, this indicator was removed from the KPIs. In order to

avoid double-counting and too much positive correlation between the indicators on Replication and Scalability, one of them, Beyond the zone, was omitted.

This document builds on the previous work on smart city indicators and identifies the SynchroniCity KPIs' links with these indicators. In addition, it describes the elements as well as the KPIs and their characteristics. This document does not contain data on these KPIs. Results of the data gathering rounds will be reported in later deliverables.

2 Background

2.1 Building on Previous Knowledge on Smart City Indicators

SynchroniCity project continues the work conducted by earlier smart city projects, thus building on the learnings by earlier projects. One of the important earlier projects is CITYKeys, which made on inventory of 43 existing frameworks for sustainable cities and projects. As a result of the project, the CITYKeys selected 99 project indicators and 76 city indicators to be used for monitoring the smart city projects. As the CITYKeys report concludes, despite the large amount of common indicators available, each project need to select and build the relevant indicators for their specific purposes. Their framework is structured under the five themes of People, Planet, Prosperity, Governance and Propagation (Figure1). [1].

Figure 1. CITYKeys performance measurement framework

The themes are defined as follows:

People is defined as "the long term attractiveness of cities for a wider range of inhabitants and users" [1].

Planet refers to "contributing to a 'cleaner' city with a higher resource efficiency and biodiversity and being better adapted to impacts of future climate change such as (in Europe) increased flooding risk, more frequent heat waves and droughts" [1].

Prosperity can be defined as "contributing to a prosperous and equal society and supporting affordable, green and smart solutions" [1].

Governance refers to contributing "to a successful process of project implementation as well as to a city with an efficient administration and a well-developed local democracy, thereby engaging citizens proactively in innovative ways" [1].

Propagation refers to "Improving the replicability and scalability of smart city project solutions at wider city scale. Propagation is about the potential for dissemination to other locations, other contexts and other cities. Propagation (both transfer to other locations and countries, and up-scaling from small single projects) depends in the first place on inherent characteristics of the (innovative) smart city project. In practice propagation also depends on external factors such as market conditions" [1].

As Figure 2. below indicates, the SynchroniCity project aligns with the majority of policy goals identified by the CITYKeys project. The policy goals that are in direct focus of SynchroniCity are marked in red. To create impact on social sustainability (People), environmental sustainability (Planet) and economic sustainability (Prosperity) forms the basis also in SynchroniCity project. The aspects of how projects have been realized (Governance) and what is their replication potential (Propagation) are also of great concern in SynchroniCity. The Planet theme is indirectly a major focus area of the SynchroniCity project, as the themes of the project touch upon e.g. increasing sustainable solutions such as decreasing pollution.
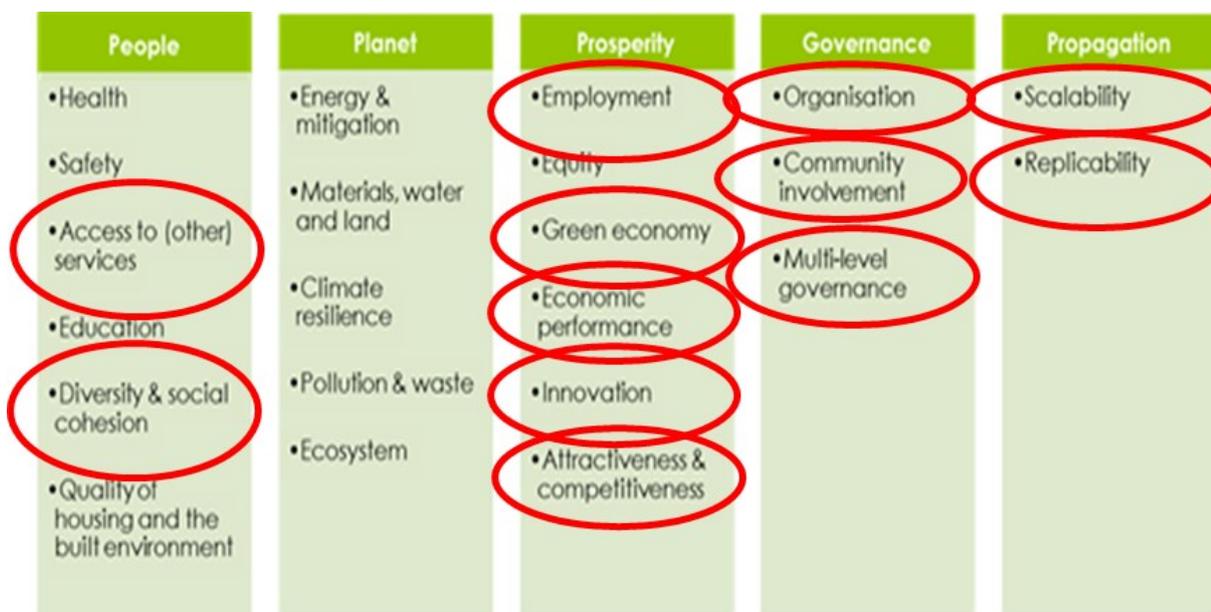
Figure 2. SynchroniCity's focuses with links to the CITYKeys Performance Measurement Framework

SynchroniCity has eighteen KPIs. The 16 indicators are: Citizen centred, Awareness impact, Perceived value from the citizens, Service implementation; Perceived value from the decision makers, IoT connected devices, Open data sets, Quality of open data, Improved interoperability; Participatory governance, SME involved, Partners' engagement, Local job creation; Data privacy, Replication potential, New follower city members/interested. Their definitions and details are described in chapter 4.

The CITYKeys' identified policy goals are touched upon with the SynchroniCity KPI's as illustrated in the table below (Table 1).

Table 1. The links between the SynchroniCity KPIs and the policy goals related to smart sustainable cities

SynchroniCity KPI	Policy goals identified by CITYKeys				
	People	Planet	Prosperity	Governance	Propagation
Citizen Centred	x				
Awareness impact	x				
Perceived value from the citizens					x
Service implementation	x		x	x	x
Perceived value from the local government and decision makers involved					x
IoT connected devices			x		
Open data sets			x		
Quality of open data			x		
Improved interoperability			x		
Participatory governance				x	
SME involved			x		
Partners' engagement					x
Local Job creation			x		
Data privacy	x				
Replication potential					x
New follower city members/interested					x

A further point for reflection following this are the key performance indicators for Smart Sustainable Cities, created by the "United for Smart Sustainable Cities" Initiative [5]. These indicators are grouped under three areas: 1. Economy, 2. Environment and 3. Society & Culture. SyncroniCity project draws from the area of Economy and further, the indicators under the headings of Public Sector and Innovation. The red circles in Figure 3 illustrate these links.

Figure 3. SynchroniCity's links with the U4SCC key performance indicators for Smart Sustainable Cities

A deeper look into SynchroniCity indicators shows that fourteen (14) of the eighteen (18) indicators are aligned with the CITYKeys indicators [1] and two are aligned with U4SCC indicators [5]). These linkages are illustrated in Table 2.

Table 2. SynchroniCity indicators' links with CITYKeys indicators

SynchroniCity KPI	Description	Reference to similarity with either CITYkeys or U4SCC indicator, (indicator identifiers in brackets)
Citizen Centred	Number of users of the services (in all the pilots)	(CITYKeys 3.2.5.) People reached
Awareness impact	Percentage of people in the target group that have been reached by the project	(CITYKeys 3.2.5.) Increased consciousness of citizenship
Perceived value from the citizens	Perceived value for the end users and citizens involved	(CITYKeys 3.6.1.) Advantages for end users
Perceived value from the local government and decision makers involved	Perceived value for the local government and decision makers involved	(CITYKeys 3.6.1.) Advantages for stakeholders
Open data sets	Number open data sets in use	(U4SCC/EC:ICT:PS:1A) Percentage and number of open datasets that are published (CITYKeys 4.4.5) Open datasets
Quality of open data	The extent to which the quality of the open data produced by the project was increased	(CITYKeys 3.4.5.) Quality of open data
Improved interoperability	The extent to which the project has increased interoperability between infrastructures,	(CITYKeys 3.4.5.) Improved interoperability

Participatory governance	Share of population participating in the service definition	(CITYKeys 3.5.2.) Local community involvement in planning phase
SME involved	Number of SMEs involved in all the process in all the pilots	(U4SCC/EC:P:IN:3A) Percentage of small and medium-sized enterprises
Local Job creation	Jobs created by the project	(CITYKeys 3.4.1.) Local job creation
Data privacy	The level of data protection by the city - users perception on security levels. Alternatively - PIA approach – privacy by design.	(CITYKeys 4.2.2) Data privacy
Replication potential	Number of replicated services during the project lifecycle.	(CITYKeys 3.6.2.) Diffusion to other locations
New follower city members/interested	Number of new follower cities or interested decision makers	(CITYKeys 3.6.2.) Diffusion to other locations

2.2 New Indicators

In addition to the indicators derived from earlier work on evaluating smart city impact, namely CITYKeys and U4SCC, SynchroniCity adds some new indicators. These indicators focus on service implementation, IoT connected devices and partners' engagement (Table 3). Adding these indicators allows for the monitoring of the specific focus of SynchroniCity, which is building an Internet of Things (IoT) ecosystem. These new indicators can be driven from the elements of 1) creating new services, 2) that require more connected IoT devices 3) in interaction among the ecosystem actors.

Table 3. New indicators in SynchroniCity project

SynchroniCity KPI	Description
Service implementation	Number of services implemented during the project lifecycle.
IoT connected devices	Number of IoT connected devices implemented during the project lifecycle in all the pilots/ Total number of IoT connected devices by the end of the project, injcluding previously installed
Partners' engagement	Number of local ecosystem partners involved in the project during its lifecycle, in all the pilots (SMEs, creative hubs, citizen organisations, etc.)

3 SynchroniCity KPIs

The SynchroniCity KPIs aim to monitor whether the project creates services with and for the citizens and enables IoT innovation. These two themes cover the elements and individual indicators of the KPI framework (Figure 4).

Services for and with citizens

The theme "Services for and with citizens" captures a main characteristics in the SynchroniCity project: the user-centric approach. The aim of monitoring this theme is to underline that IoT services in smart city need to make the cities more attractive for citizens to live in and increase their quality of life. When these services are built on the real needs of the citizens and co-created with them then this goal can be reached. A well-functioning IoT market can provide the citizens with a better access to services. The co-creative approach also takes into account the decion makers involved in the service development and deployment process.

Social Innovation is a relevant indicator for SynchroniCity, as one of the objectives is to have a positive social impact from the project on the potential interested communities, especially on citizens. Social innovation represents both product and service innovation and aims to investigate the value perceived by the users with reference to the applications developed by SynchroniCity, as well as the results achieved in terms of involving the final stakeholders in the creation of such innovative services.

According to the project objectives, Synchronicity should provide a set of IoT-enabled services that directly address citizen needs and enable breakthroughs in high-impact areas, starting with human-centric traffic management, multimodal mobility and community-based policy making.

The implementation of a set of generic services within SynchroniCity provides a common framework that facilitates the replication and scalability of IoT based applications. This services can also be tailored to the singularities of the reference zones, providing customized solutions.

Successful smart city projects are perceived valuable not only by the citizens, but also by the local government and decision makers involved. Thus, monitoring the perceived value by the civil cervants and policy makers is relevant.

IoT Innovation

To enable sustainable IoT innovation requires synchronizing the digital architecture and the different ecosystem actors for value co-creation. Therefore, a set of building blocks for IoT infrastructure are needed. These include enough connected devices in the IoT ecosystem, available and high-quality data and interoperability, as well as data privacy. Working IoT ecosystems enable the connecting of different service systems, where the different actors can participate in the co-creation of the services [2]. From this perspective, the actors in different roles become crucial in enactment of the service system. Therefore, a look at the participation of SME's and other ecosystem actors, as well as local governance are of importance.

One of the key challenges to reach the Digital Single Market (DSM), and therefore for SynchroniCity, is to provide a homogeneous and scalable environment which can be easily replicated across different cities. This common framework increases the portability of IoT-enabled citizen-centric services around the SynchroniCity marketplace, bringing opportunities to service developers that comes from the economy of scale. For this reason, the measurement of parameters such as the number of replication of a service or the number of cities that have adopted the SynchroniCity framework provides an index of the impact of the project.

- Citizen centred
- Awareness impact
- Perceived value from the citizens
- Service implementation
- Perceived value from the decision makers

Services for and with citizens

Iot Innovation
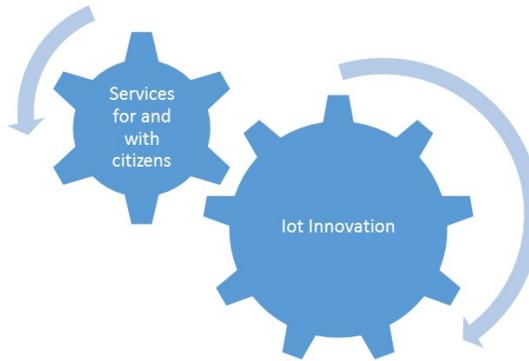
- IoT connected devices
- Open data sets
- Quality of open data
- Improved interoperability
- Data privacy
- Participatory governance
- SME involved
- Partners' engagement
- Local job creation
- Replication potential
- New followers

Figure 4. SynchroniCity KPIs

All the individual indicators are further described in the following paragraphs 4.1.-4.5. Each KPI is described with the following characteristics (see the box below):

Description: What is the definition of the KPI?

Indicator Unit: What is the unit of this KPI?

Expectations: What are the goals of the SynchroniCity in terms of this KPI? What are we expecting to reach?

Measure for the Monitoring Framework: With what kind of question this KPI Is measured in the Monitoring Framework?

Data requests and/or needs for synchronizing: Are there any specific data requests concerning this KPI? Is there a need of synchronizing some of the data and how can we take it into consideration?

Aggregation strategy: Is there a need for aggregation concerning the data gathered?

3.1 Social Innovation

3.1.1 Citizen Centred

Description: This KPI refers to the number of users of the services in all the pilots

Indicator Unit: Number of

Expectations: 350000

Measure for the Monitoring Framework: What is the number of users the services in the pilots?

Data requests and/or needs for synchronizing: WP1 focuses on citizen centred approach and provides a methodology for supporting the reference zones in engaging users, and should be incorporating into assessing this KPI. The qualitative data from the Monitoring Framework concerning co-creation will create a more comprehensive understanding of the citizen-

centredness in the RZs. This refers to the data concerning the participation options for the citizens, the measures-in-use to evaluate the success of co-creation in the cities, as well as the tools and methods in use (MF section 17.5-17.9). These data may be valuable in explaining the low or high numbers of users of the services.

Aggregation strategy: Aggregation is needed in order to avoid duplication.

3.1.2 Awareness Impact

Description: This KPI refers to the percentage of people in the target group that have been reached and/or are activated by the project. The main target group includes: SMEs, cities, local municipalities, large businesses, citizes. The secondary target group includes: start-ups, universities, policy makers.

Indicator Unit: % of people

Expectations: 75%

Measure for the Monitoring Framework: n/a

Data requests and/or needs for synchronizing: The data for monitoring the awareness impact of SynchroniCity project are gathered mainly from SynchroniCity partners involved in task 6.3, Marketing and Communication. These data will include the visitors at the SynchroniCity webpage, people reached by newsletters and social media channels.

Aggregation strategy: n/a

3.1.3 Perceived Value from the Citizens

Description: This KPI refers to the perceived value for the end users and citizens involved. The objective of this indicator is to monitor how the end users and citizens involved perceive the value of the services and products developed by the cities participating in Synchronicity.

Indicator Unit: Likert scale

Expectations: >= 70% satisfied

Measure for the Monitoring Framework: How do the end users and citizens perceive the value of the services and products developed in SynchroniCity project? (for RZLs),

Data requests and/or needs for synchronizing: These questions are included in the monitoring framework, but additional data gathering, e.g. via the pilot partners is to be considered.

Aggregation strategy: n/a

3.2 Access to Services

3.2.1 Service Implementation

Description: This KPI refers to the number of services implemented during the project lifecycle. Following the SyncrhoniCity approach and framework, the different types of services will be monitored, following the definitions of the project. A baseline service is a single functional block using data input to return any kind of feature, either managing, enriching, joining or filtering the input data from SynchroniCity infrastructure, and/or data coming from other sources. city services are applications built for citizen targeting citizens' needs with the aim of "smartify" the life within urban area. As support for the city services,

baseline services are offering facilities for the one hand easing their development and reduce the time-to-market and on the other hand share efforts among city services teams for a co-creation approach. (Deliverable 3.2., Suite of baseline implementations –basic. All the publicly available deliverables can be found on the project wesite, https://synchronicity-iot.eu/docs/)

Indicator Unit: Number of

Expectations: 20

Measure for the Monitoring Framework: What new services with thematic connection to Synchronicity have been launched in the RZ during the project? Please list them here

Data requests and/or needs for synchronizing: Each participant can provide the information on their part by naming the services. The partners of WP3 and WP4 provide the information about the situation and the developments concerning the baseline serives and city serices /initial applications. The partners in WP5 are to provide more data and understanding of the open call pilots and their services. The RZs, through the monitoring framework as well as the Cities Forum, provide their input on this..

Aggregation strategy: Deduplication is needed here, that is, two partners naming the same service should be counted as one only. This data need to be linked with the previous KPIs on users and perceived value.

3.3 Governance

3.3.1 Perceived Value from the Local Government and Decision Makers

Description: This KPI refers to the perceived value for the local government and decision makers involved

Indicator Unit: Likert scale

Expectations: >=70%

Measure for the Monitoring Framework: Section 17 (Co-creation)

Data requests and/or needs for synchronizing: In SynchroniCity, the first data gathering concerning the perceived value by the local governance and decision makers involved concerns the perceived effectiveness of the co-creation methodology provided by SynchroniCity (MF, Section 17.22,). The Monitoring Framework (MF, Section 16) also gathers data on stakeholders' interest and SynchroniCity consortium's influence on them. These stakeholders may include also governmental/policy actors. These data have to be synchronized for a more comprehensive understanding on the value of the project. Additional measures are to be added to the Monitoring Framework in T3 and T4, evaluating the perceived value for the local government and decision makers involved (e.g. perceived value of further co-creation activities taking place)

Aggregation strategy: to aim at objectivity in the scoring, cf. [1]

3.4 Innovation

3.4.1 IoT Connected Devices

Description: This KPI refers to the number of IoT connected devices during the project lifecycle in all the pilots. Under this KPI there are two values: devices connected during the project and devices at the end of the project including previously installed. The objective of

this indicator is to capture how much more 'has been connected'. It is acknowledged that this is a challenging and potentially risky indicator, in terms of reaching the expected values, as Synchronicity is not about installing new hardware,

Indicator Unit: Number of

Expectations: 10000 (during the project) / 100000 (total)

Measure for the Monitoring Framework: What is the number of IoT connected devices?

Data requests: In addition to the absolute counts of connected devices, this question will be looked from the services' perspective, asking the question: How many new devices were installed to enable the service?

Aggregation strategy:.

3.4.2 Open Data Sets

Description: Number open data sets in use, in all the pilots

Indicator Unit: Number of

Expectations: 70

Measure in the Monitoring Framework: Data available

Data requests and/or needs for synchronizing: The additional qualitative data concerning these datasets (Owned by / Relevant legal conditions) will increase the understanding of this indicator. Observing the growth during the project is relevant

Aggregation strategy: n/a

3.4.3 Quality of Open Data

Description: The extent to which the quality of the open data produced by the project was increased

Indicator Unit: qualitative

Expectations: >=65%

*Measure for Monitoring Framework:*Data available

Data requests and/or needs for synchronizing:

Aggregation strategy: In analysing the data, the first round of monitoring (MF, T2) will create a description of basic quality indicators (e.g. static vs realtime) and the further rounds (T3, T4) will be needed to monitor wheter the quality was increased during the project. If possible, the 5 star deployment scheme[1] suggested by [1] will be used.

3.4.4 Improved Interoperability

Description: The extent to which the project has increased interoperability between infrastructures, in all the pilots. Interoperability refers to "the ability of a system (or product) to work with other systems (or products) by providing services to and accepting services from other systems and to use the services so exchanged to enable them to operate effectively together " [1], [3].

Indicator Unit: Likert scale (1-Not at all: the project does not increase interoperability – 5-Excellent:the project increases interoperability extensively, [1]

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[1] http://5stardata.info/en/

Expectations: 10% increase

Data requests and/or needs for synchronizing: synchronizing with the work conducted in WP4 is required. The question is targeted especially to the technical experts who are able to evaluate the increase in interoperability.

Aggregation strategy:

3.5 Local Ecosystem

3.5.1 Participatory Governance

Description: This KPI refers to the share of population participating in the service definition. Here it is the aim to calculate growth rate % change Here, the population refers to the population of the RZ.

Indicator Unit: % of people

Expectations: >= 0.3%

Measure for the Monitoring Framework: What is the share of population participating in the service definition?

Data requests: In addition to the data collected with the Monitoring Framework, it is possible that some extra data sources are needed (survey or open data sources available). Collaboration with RZ leads is needed to get the information of the potential available data sources.

Aggregation strategy: n/a

3.5.2 SME Involved

Description: This KPI refers to the number of SMEs[2] involved in all the process in all the pilots.

Indicator Unit: Number of

Expectations: 100

Measure for the Monitoring Framework: What is the number of SMEs involved?

Data requests: In addition to the data gathered with the Monitoring Framework, the open call procedure will also contribute to monitoring the number of SMEs involved.

Aggregation strategy: n/a

3.5.3 Partners' Engagement

Description: This KPI refers to the number of local ecosystem partners involved in the project during its lifecycle, in all the pilots (SMEs, creative hubs, citizen organisations, etc.)..

Indicator Unit: Number of

Expectations: 200

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[2] Following the EU recommendation 2003/361, small and medium-sized enterprises (SMEs) are defined as firms as 1. Staff headcount <250 and 2. Turnover ≤ € 50 m or Balance sheet total ≤ € 43 m (http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition).

Measure for the Monitoring Framework: What is the number of local ecosystem partners involved? Please list the partners.

Data requests: n/a

Aggregation strategy: In addition to the number of local ecosystem partners involved, the Monitoring Framework's stakeholder analysis (MF/Section 16) provides input for understanding the ecosystem participation. To analyse what kind of partners have been involved and whose involvement has increased, previous frameworks, such as the Smart City Growth Map (Figure 5 below) may be used.
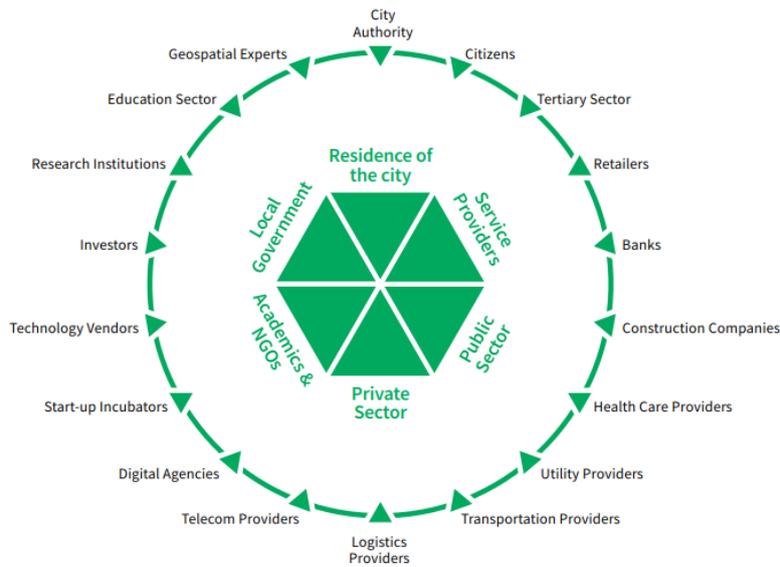

Figure 5. A list of potential partners engaging in local ecosystems (Espresso-project, Smart City Strategic Growth Map)

3.5.4 Local Job Creation

Description: This KPI refers to the jobs created by the project. Creating new jobs is a long-term goal and this is rather difficult to measure during the lifecycle of the project. However, the aim is that evaluations by the RZLs and by the open call participants create data for this measure. The aim is to capture their evaluation of all the jobs created, that is, within the ecosystem as a whole.

Indicator Unit: Number of

Expectations: 60

Measure for the Monitoring Framework: How many new jobs have been created during the project?

Data requests: n/a

Aggregation strategy: deduplication needed.

3.6 Safety

3.6.1 Data Privacy

Description: This KPI refers to the level of data protection by the city.

Indicator Unit:%

Expectations: >=90%

Measure for the Monitoring Framework: n/a

Data requests and/or needs for synchronizing: The aim is to measure whether the RZs have performed the PIA by the end of the first year of the project.The main indicator unit (%) reflects this. That is, the percentage of the RZs performed the PIA. In addition, other data can be synchronized to evaluate data privacy. The Monitoring Framework gathers data on security, privacy and reliability requirement of the IoT platforms of RFs (Section 9) and also relevant legal conditions (storage, access rights, availability limits) as well as data ownership concerning the data available (Section 11). Further, remarks concerning requests for improvements (Section 12) as well as regulation, data protection and data compliance (Section 14) add to the understanding of data privacy.

*Aggregation strategy:*n/a

3.7 Replication and Scalability

3.7.1 Replication Potential

Description: This KPI refers to the number of replicated services during the project lifecycle. Here, the same notion of the definition service (see 4.2.1) applies and has to be taken into account when collecting the data and making interpretations.

Indicator Unit: Number of

Expectations: 4

Measure for the Monitoring Framework: Please evaluate the number of replicated services

Data requests: In addition to the data gathered with Monitoring Framework, technical consortium members who are developing the services are to be asked for evaluation of the replication potential.

Aggregation strategy: No need -- each instance of replication should be counted separately as one. E.g. smart parking solution developed in Eindhoven and replicated in Seoul and Carouge would count as +2.

3.7.2 New follower city members/interested

Description: This KPI refers to the number of new follower cities or interested decision makers. Here, it is the aim to count follower cities (new since project application phase) and interested cities, where at least 1 decision maker is sufficiently interested.

Indicator Unit: Number of

Expectations: 8

Measure for the Monitoring Framework: How many new follower cities (=cities that are interested in Synchronicity activities) can you identify? (for T3&T4)

Data requests Data for this indicator comes primarily from those partners involved in communications actitvities. These consortium partners involved in communication are asked for their evaluation of the new follower cities. In addition, in the later data gathering of the Monitoring Framework (T3 & T4), this question will be asked from the city representatives, as well.

Aggregation strategy: n/a

4 The Process and Timeline of KPI Monitoring in SynchroniCity Project

The process of KPI monitoring consists of data gathering and analysis at three steps during the project. The main time slots for data gathering are M24 and M32. In addition, the first monitoring point is in M14, with a limited set of KPIs' that can be monitored at this point. Table 5 summarizes the measures and their monitoring points.

For the most part, the data gathering will be done through the monitoring framework template included in WP1 in Task 1.3. The Monitoring Framework has gathered information from the Reference Zones on an ongoing basis in order to support the delivery of the project. Four templates for the Monitoring Framework are planned for delivery through the course of the project (M4, M14, M24, M33). These templates will change based on the needs of the project. The framework provides data across the categories in the table below.

Table 4. Monitoring Framework template

Basic data on the Reference Zones	
Themes	Base application themes the RZs will focus on
Project Record	Related projects that RZs have done or are doing
Geography	Geographical profile of the RZ
Impact	Basic indicators to support future impact measurement
Core technology review	
Connectivity	Network connectivity in RZ, e.g. Sigfox
IoT Devices	Profile of IoT devices in the RZ
Other Systems	Other systems connected to IoT platforms

Data Models	Description of IoT data models
Platforms	Description of relevant IoT platforms and data platforms
Requirements	Log of platform compliance with WP2 requirements
Data Available	Coverage of key data types dependent on themes
Feedback	Metrics on use, demand and quality experience of IoT / data platforms
Ecosystem	
Policy	Info on IoT policy and strategy for the RZ
Governance	Details of the governance, regulation and evaluation for IoT in the RZ
Applications	Info on existing IoT applications in the RZ
Stakeholders	Key stakeholder analysis for the RZ
Co-creation	Existing co-creation processes in the RZ

How it works

The input process will work as follows:

1) Each Reference Zone will be given their own version of the input template, with any pre-existing data from other work packages filled in already and the new sections clearly marked.

2) Future Cities Catapult (FCC) will distribute the framework, and provide on-going on-demand support to the RZs. FCC and each RZ will agree a timeline and plan for completion, with relevant stakeholders identified.

3) Each RZ will have c. 1 month to complete the input exercise. After the first 2 weeks, FCC will ask for an update and follow-up questions from the RZs as they work through the template

4) After 1 month, FCC will contact the RZLs to arrange one-to-one calls to allow the RZs to go through answers, and examine areas where answers are not available.

5) Cities will have a further 2 weeks to address comments and complete the template following this call.

6) FCC will download the input file and log completion status for this round of monitoring from the RZ.

7) FCC will compile results and provide initial analysis.

The process suggests that analysis will be produced 2.5 months after distribution of the input template to the cities.

In subsequent monitoring exercises, data from the previous template will be used to prefill the latest template. Hence, RZs will not need to repeat data entry and can focus on new queries and new developments.

However, input files from the RZs will be available to project partners as they are filled in by the RZs, by virtue of the shared drive. This will provide inputs to project partners that require data on an earlier timetable.

Table 5. KPI's and their monitoring frequency

Dimension	KPI	Description	Cadence
Social innovation	Citizen Centred	Number of users of the services (in all the pilots)	M24, M32
	Awareness impact	Percentage of people in the target group that have been reached and/or are activated by the project	M14, 24, 32
	Perceived value from the citizens	Perceived value for the end users and citizens involved	M24, M32
Access to services	Service implementation	Number of services implemented during the project lifecycle.	M24, M32
Governance	Perceived value from the local government and decision makers involved	Perceived value for the local government and decision makers involved	M14, 24, 32
Innovation	IoT connected devices	Number of IoT connected devices implemented during the project lifecycle in all the pilots/ Total number of IoT connected devices by the end of the project, injcluding previously installed	M24, M32
	Open data sets	Number open data sets in use	M14, M24, M32
	Quality of open data	The extent to which the quality of the open data produced by the project was increased	M14, M24, M32
	Improved interoperability	The extent to which the project has increased interoperability between infrastructures,	M24,32
Local ecosystem	Participatory governance	Share of population participating in the service definition	M24, M32

	SME involved	Number of SMEs involved in all the process in all the pilots	M24, M32
	Partners' engagement	Number of local ecosystem partners involved in the project during its lifecycle, in all the pilots (SMEs, creative hubs, citizen organisations, etc.)	M24, M32
	Local Job creation	Jobs created by the project	M14, M32
Safety	Data privacy	The level of data protection by the city	M14, M24, M32
Replication and Scalability	Replication potential	Number of replicated services during the project lifecycle.	M24, M32
	New follower city members/interested	Number of new follower cities or interested decision makers	M14, M24, M32

5 Reference:

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