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Acronyms

BZK	Ministry of the Interior and Kingdom Relations of Netherlands
CS	Citizen Science
CoP	Community of Practice
D	Deliverable
ECSA	European Citizen Science Association
EIE	Empowerment, Inclusiveness and Equity
EU	European Union
WG	Working Group

1. Executive Summary

Following a co-creation approach, members of each CitiMeasure working group discussed and agreed on key elements of an implementation plan to develop the three instruments, namely an implementation timeline, interaction moments (milestones), main activities, roles of working group members, and means of communication. The current report describes the approach for developing the CitiMeasure instruments. Different elements of this approach were co-created and validated by the Members of the CitiMeasure working groups.

2. Introduction

2.1 ABOUT CITIMEASURE

Citizen measurement (or citizen science) initiatives contribute to a sustainable transition in European cities. By using an array of tools and instruments, citizens can play a role in the measurement and monitoring indicators on air quality, temperature, soil moisture, biodiversity, or risk management, among other environmental areas. Citizen measurement initiatives also can foster communications and interactions among stakeholders and contribute to the democratisation of science and policy. The CitiMeasure project (2021-2023) aims to bring together the experiences and expertise of European cities, organisations and networks in implementing citizen science initiatives (in the form of guidelines, toolbox, web-platform, Apps, etc.). The project builds upon the lessons learned from the Dutch City Deal Working Groups, a network of stakeholders working on the broader area of smart cities, including citizen measurement initiatives. The City Deal partners have been working closely with the Dutch Ministry of Interior and Kingdom Relations for over a year.

CitiMeasure builds upon these experiences and will use those to develop and pilot three ‘instruments’, namely:

1. An instrument that allows the outputs of different city measurement initiatives to be compared.
2. An instrument that safeguards the digital inclusivity of city measurement initiatives (maximising the opportunities for participation of interested individuals and communities).
3. An instrument that connects information to behaviour and policy change.

A 4th (Strategy and Oversight) working group focuses on providing strategic direction and ensuring cohesion of activities across the three Instrument Sub-Groups and the project in general. CitiMeasure will also raise awareness of the importance of citizen measurement initiatives and capitalise on the results and tools of similar citizen science projects by creating an online European Knowledge Centre with a repository of good practices.

2.2. PURPOSE OF THIS REPORT

The primary purpose of this report is to present the approach for developing the CitiMeasure instruments, and the critical elements, milestones, main activities, roles, and responsibilities for the successful development of the three CitiMeasure instruments.

2.3 STRUCTURE OF THIS REPORT

Sections 3 to 5 form the draft Implementation Plan. Specifically, Section 3 introduces the implementation timeline and key milestones. Section 4 describes the main tasks and roles in each of the three instrument working groups. Finally, section 5 includes the governance and decision-making processes for development of the CitiMeasure instruments.

3. Implementation timeline and milestones

Given the fact that the overall timeframe for the development phase of the CitiMeasure instruments is shared across all instrument groups, and because all CitiMeasure working groups meet monthly, a standard timeline with key milestones (e.g., interaction moments) was suggested for the development phase of the instruments (see Figure 1). As represented in Figure 1, the instrument development phase starts in October 2021 and ends in April 2022.

Throughout the instrument development phase, the working groups will meet monthly in co-design/co-creation sessions (seven in total) for a maximum of two hours. Annex 1 presents key tools that are used to support communication, interactions and information exchange among the members of the CitiMeasure working groups. The instrument development phase is divided into three main sub-phases: share, analyse and develop.

- In the 'share' sub-phase, participants will provide critical documents and sources that will be the basis for developing the instruments. The CitiMeasure team designed draft structures for information gathering in a tabular format that the working group members validated during the second meetings of the working groups in November 2021.
- In the 'analyse' sub-phase, participants will analyse together crucial documents and other sources with the guidance of the CitiMeasure team to extract key learnings, best practices, and relevant knowledge for the instrument development. For that, the CitiMeasure team will design a draft structure for the analysis of these resources and validate that structure with the working group members during the upcoming meetings.
- In the 'develop' phase, participants will co-design the structure of the instrument and provide inputs for its content development. Guidelines for the use of the instruments by the pilots will also be co-designed.

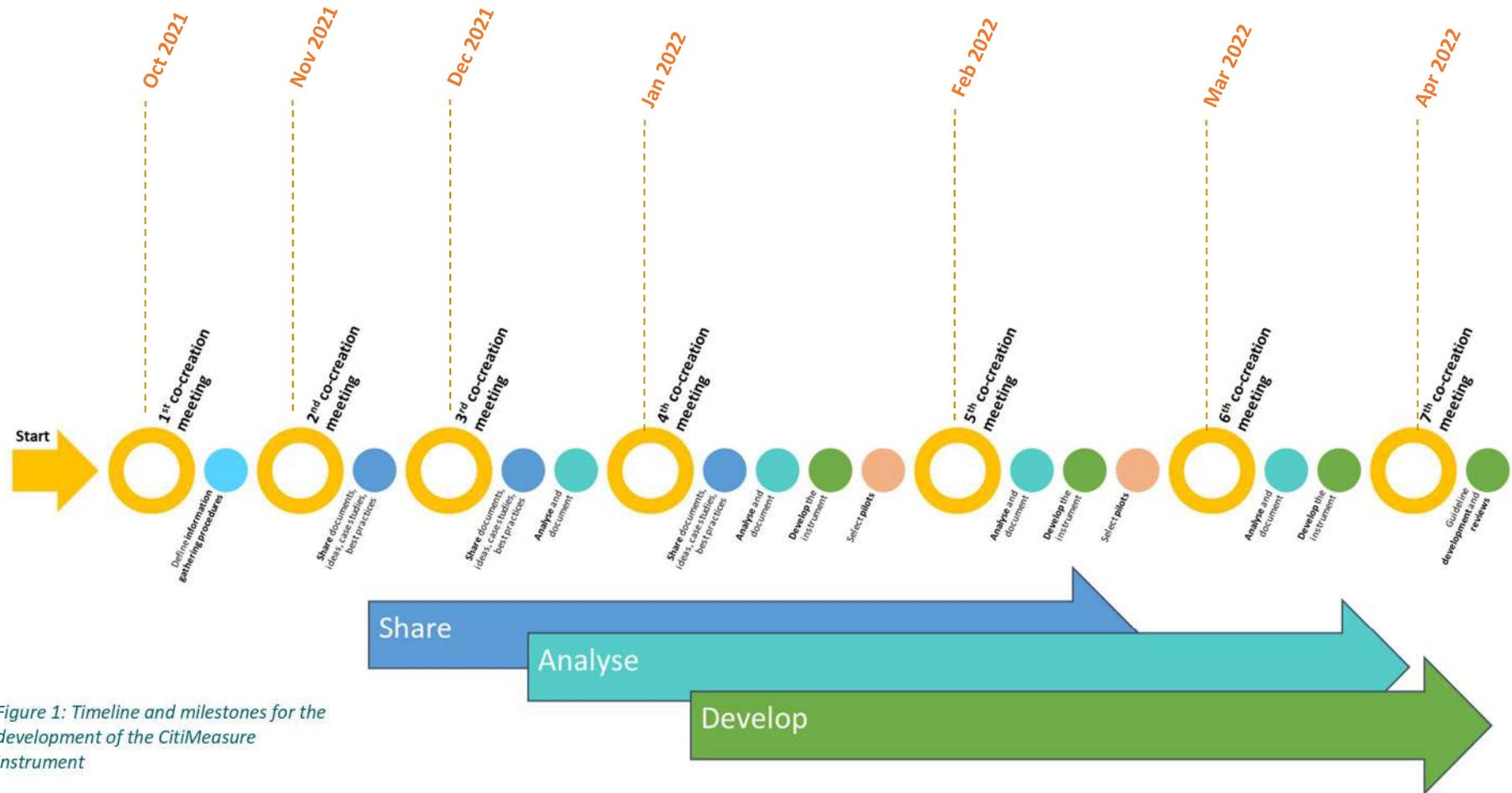


Figure 1: Timeline and milestones for the development of the CitiMeasure instrument

4. Roles and responsibilities of the instrument WG members

The development of the CitiMeasure instruments is a collaborative effort that is led by Eurocities. While the Eurocities team designs and moderates the co-creation process, provides guidance, technical support, and content inputs, members of the instrument working groups contribute to the development of the instruments by participating and providing inputs in the three sub-phases presented in Figure 1; namely, information gathering in the 'share' phase, examining the collected information in the 'analyse' phase, and contribute to the development of the structure and content of the instruments in the 'develop' phase. The specific tasks that the members of each CitiMeasure working group are involved in are closely linked to the co-created objectives of that group (for more details see CitiMeasure deliverable 1.4). Tables 1, 2 and 3 provide a summary of the objectives and main tasks for the instrument development of the CitiMeasure working groups. Since membership and participation in CitiMeasure working groups are completely voluntary, the level of engagement and inputs from the working group members in the main tasks for development of the instruments can vary greatly. Nevertheless, the specific roles, responsibilities, and approaches such as creating smaller groups or task forces will be discussed and decided in consultation with the members of each working group.

3.1 COMPARABILITY WORKING GROUP

Table 1 provides an overview of the objectives and tasks for the Comparability working group. Achieving objectives 1 to 4 is linked to a combination of information gathering and analysis tasks that are going to be conducted in a collaboration with the members of this working group. The main methods of information gathering include collection of resources as a part of desk research; a potential survey for collecting information about existing air quality sensor standards from cities, relevant organisations and experts in the field; and potential collaborations with existing working groups and communities of practice that are working on the topics of comparability and interoperability of sensors, e.g., the Citizen Science Association Data and Metadata working group, and potentially the Interop CoP of the WeObserve project. Achieving objectives 1 to 4 also requires analysis of the gathered information via desk research, survey and collaboration with other working groups that is defined as the Desk research (analysis phase).

Drafting guidelines (objective 5) is the next task that includes both discussing and agreeing on a format and structure for the guidelines and their content. During the pilot phase (objective 6), the main task of the instrument working groups will be to help capture the lessons learned from the pilots. In order to do so, a structure and procedure for systematic capturing and reporting of lessons learned will be co-created with the working group members and pilots. Finally, the instruments will be consolidated with lessons learned from the pilot phase (objective 7). The main task for the members of the working groups in this phase is to help update and improve the instruments using the lessons learned in the pilot phase.

Objectives	Tasks
1: Identify and compare air quality sensor standards at different levels (regional, national, and municipal) across Europe.	Desk research (resource collection phase) Survey (TBC) Potential collaboration with relevant WGs Desk research (analysis phase)
2. Investigate and compare the sensors used in existing citizen science initiatives (Including DIY sensors) measuring air quality.	Desk research (resource collection phase) Survey Desk research (analysis phase) Potential collaboration with relevant WGs
3. Share best practices (incl. ideas and examples) for sensor guidelines in citizen science initiatives measuring air quality and possibly other domains to learn from.	Desk research (resource collection phase) Desk research (analysis phase)
4. Analyse the market of consumer-grade air quality sensors. (Optional)	Desk research (resource collection phase) Desk research (analysis phase)
5. Create user-friendly guidelines for city officials and citizens that help them select and calibrate sensors according to applicable data and interoperability standards for reference air quality sensors.	Drafting guidelines
6. Pilot the developed guidelines in at least one air quality citizen science initiative between April and December 2022.	Capture lessons learned from the pilot(s)
7. Consolidate the guidelines with lessons learned from the pilot phase and further analysis by March 2023.	Updating/improving guidelines

Table 1: Tasks and objectives of the comparability WG

3.2 DIGITAL INCLUSION WORKING GROUP

From the list of 6 objectives that were co-created for the Digital Inclusion working group, the first three relate to desk research activities (see Table 2). Information gathering based on objective 1 will be done by a combination of resource collection by the working group members, and possibly in collaboration with existing working groups such as the ECSA Empowerment, inclusiveness & equity (EIE) working group. Objectives 2 and 3 relate to analysis tasks that will be jointly conducted by the working group members.

Similar to the Comparability working group, the tasks related to drafting guidelines (objective 4) includes both discussing and agreeing on a format and structure for the guidelines and their content, the pilot phase (objective 5) focuses on tasks related to capturing the lessons learned from the pilots, and the consolidation phase (objective 6) consists of tasks related to updating and improving the instruments using the lessons learned in the pilot phase.

Objectives	Tasks
1: Share ideas, case studies, best practices of digital inclusion in citizen science initiatives.	Desk research (resource collection phase) Possible collaborations and information exchange with other working groups and CoPs
2: Jointly analyse and document competencies (knowledge, skills, attitudes) required by citizens to participate in citizen science initiatives, as well as those of policymakers, decision-makers and municipal employees to engage citizens in such initiatives.	Desk research (analysis phase)
3: Map the identified competencies against specific purposes/applications for citizens, policymakers, decision-makers, and municipal employees.	Desk research (analysis phase)
4. Develop guidelines that help cities and citizen science initiatives to understand, identify and enhance capacities and competencies required for digital inclusion of different actors.	Drafting guidelines
5. Pilot the developed guidelines in at least one real-life example of citizen science initiatives between April and December 2022.	Capture lessons learned from the pilot(s)
6. Consolidate the guidelines/principles with lessons learned from the pilot phase and further analysis by March 2023.	Updating/improving guidelines

Table 2: Tasks and objectives of the digital inclusion WG

3.3 BEHAVIOUR & POLICY WORKING GROUP

The agreed objectives for the Behaviour and Policy working group could be directly linked to specific tasks for this working group. More specifically, objectives 1 and 2 are directly linked with desk research exercises of resource collection and resource analysis that will be jointly done by the working group members.

Similar to the Comparability and Digital Inclusion working groups, the tasks related to objectives 3, 4 and 5 include discussing and agreeing on a format and structure for the guidelines and their content (linked to objective 3), capturing the lessons learned from the pilots (linked to objective 4), and updating and improving the instruments using the lessons learned in the pilot phase (linked to objective 5).

Objectives	Tasks
1: Share ideas, case studies, best practices related to behaviour and policy change in citizen science initiatives.	Desk research (resource collection phase)
2. Jointly analyse and document the lessons learned from (un-)successful initiatives in terms of catalysing changes in different stakeholders' behaviour and established decision and policy-making processes.	Desk research (analysis phase)
3. By March 2022, develop guidelines and principles on behaviour and policy change that help cities and citizen science initiatives foster such changes.	Drafting guidelines/principles Potential collaboration with relevant WGs
4. Pilot the developed best practice in at least one real-life example of citizen science initiatives between April and December 2022.	Capture lessons learned from the pilot(s)
5. Consolidate the guidelines/principles with lessons learned from the pilot phase and further analysis by March 2023.	Updating/improving guidelines/principles

Table 3: Tasks and objectives of the behaviour & policy WG

5. Governance and decision-making

The governance and decision-making approach of CitiMeasure includes two main building blocks that play a role in the implementation of the work by the CitiMeasure instrument groups, albeit at different levels. The project steering committee that defines and governs the overall direction of the work and the Strategy and Oversight working group that provides oversight and support for the instrument working groups at a finer level.

The CitiMeasure steering committee includes the EC project officer, representative of the Dutch Ministry of Interior and Kingdom relations, and the CitiMeasure team at Eurocities. The steering committee meet on a monthly basis and discuss the work progress (including the progress of the work done by the instrument working groups) and make decisions on the overall direction of the work. In addition, the CitiMeasure team at Eurocities and the representative of the Dutch Ministry of Interior and Kingdom relations meet with the programme manager of the Dutch City Deal every month to share the progress of the work and strengthen the link between CitiMeasure and the work that is being carried out by the Dutch City Deal working groups. Feedback and decisions from both meetings provide strategic direction for the instrument working groups.

The Strategy and Oversight working group has 5 specific objectives that help oversee and provide direction to all phases of the CitiMeasure project. The members of this working group also meet on a monthly basis to discuss the progress of the thematic instrument groups. Table 4 that was co-created during the 2nd co-design meeting of the Strategy and Oversight working group provides an overview of the objectives of this working group, how the members are planning to achieve each objective, and the support and resources needed from Eurocities during this process.

Objectives	How to achieve the Objectives?	Support/resources needed
1: Ensure strong oversight, support, and advice of the WGs and the instruments being developed, including thorough review of the outputs and periodic meetings (Ongoing)	<ul style="list-style-type: none"> • Inputs into the instrument and pilot related deliverables • Facilitating interconnections between different working groups • Define overall research questions • Check for cognitive biases • Monitoring & Evaluation (M&E) framework for the instrument development phase • Provide feedback outside Strategy and Oversight meetings 	<ul style="list-style-type: none"> • Eurocities to provide a progress summary during the monthly meetings • Collaboration space
2. Monitoring and supporting the pilots and ensuring the lessons learned are shared (Next session – TBC)	<ul style="list-style-type: none"> • Inputs on the design of the expression of interest pilots • Feedback on the progress of pilots during periodic meetings • Monitoring & Evaluation (M&E) framework for the pilots 	<ul style="list-style-type: none"> • The initial setup of the expression of interest by Eurocities • Eurocities to provide a progress summary during regular meetings • Eurocities to give a draft M&E framework
3. Developing foresight for citizen science and CitiMeasure (2022-2023)	<ul style="list-style-type: none"> • Ideas for long-term vision and upscaling • Possible CitiMeasure-led foresight session. E.g., role of cities in citizen science projects • Engage with ECSA WGs and members 	
4. Supporting the development of the Knowledge Centre and its long-term business plan (Early 2022)	<ul style="list-style-type: none"> • Inputs on the design of the Knowledge centre structure (good practices, guidelines, and criteria) • Inputs into the business plan of the knowledge centre • Exploring possible links with existing platforms, centres, repositories, etc. 	
5. Engage with external stakeholders and policymakers through events, presentations, and the development of policy briefs. (Ongoing)	<ul style="list-style-type: none"> • Help promote CitiMeasure and its results • Facilitating organisation of events 	<ul style="list-style-type: none"> • Promotional material • ASIC 2022¹ and other conferences

Table 4: Tasks and objectives of the Strategy & Oversight WG

¹ 2022 Air Sensors International Conference

6. Concluding remarks

This report presented the draft implementation plan for development of the CitiMeasure instruments that includes the main milestones and tasks to develop the three CitiMeasure instruments by the end of the first phase of the project. The tasks and milestones presented in this report have been validated by the working group members during the second round of co-design meetings in November 2021. In addition, this report presented the overall governance and decision-making process for the development of the CitiMeasure instruments. The Eurocities team will closely monitor this draft implementation plan and will provide key inputs and resources to facilitate the work of the WG members. The main of the final implementation plan (CitiMeasure Deliverable D1.11) is to capture and report on the actual steps taken for development of the CitiMeasure instruments, and relevant activities. The final implementation plan will therefore include the reflections and lessons learned from implementation of this draft plan. The final implementation plan will also include possible deviations from the draft plan, and the logic for those deviations.

Annex 1 – Tools to support the implementation

Throughout the implementation of the CitiMeasure project, three tools have been consistently used:

- Teams: Microsoft Teams has been used for organising all the co-creation meetings. At the inception meeting, we asked participants whether they wanted to continue using this platform, and most of them responded affirmatively.
- Mural: This programme has been used in all co-creation meetings. It provides a user-friendly way to work together, provide feedback, brainstorm, and share ideas.
- Collaboration space: All the CitiMeasure shared documents are stored in a collaboration space. It has a SharePoint format, and participants registered in our contact management system have access to it.