URBREATH [101139711]
Systemic Integration of Transformative Technical and Nature-based Solutions to Improve Climate Neutrality of European Cities and Regions and tackle Climate Change: the URBREATH Approach

D4.4 URBREATH Participatory tools - V1

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Disclaimer

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Executive Summary

Deliverable D4.4 “Participatory tools – V1” reports the progress of activities performed in the context of T4.2. “e-participation tools” until M12. In this sense, it reports the overview of the methodology approach and architecture and describes the initial versions of the toolset selected as suitable to foster engagement and collaboration among stakeholders in performing activities under the URBREATH project.

The architecture consists of two main components; a deployed version of the Decidim e-participation web application and tailor-made e-participation mobile app for the project needs. Both solutions are offering functionalities able to support co-creation and participation in decision-making processes and fulfil from their scope of capacity URBREATHs’ vision. This document includes a full description of each tool.

The tools are currently in their initial version to be further adapted and enriched according to each pilot city’s needs by the upcoming activities of T4.2. A potential integration between the tools is also foreseen to provide a holistic solution regarding e-participation.

Table of Contents

List of Tables

List of Figures

List of Terms and Abbreviations

Abbreviation	Definition
API	Application Programming Interface
AR	Augmented Reality
DoA	Description of Action
EU	European Union
FL	Follower
FLC	Follower Cities
FR	Front Runner
FRC	Front Runner Cities
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technology
NBS	Nature Based Solutions
ODMS	Open Data Management Systems
WP	Work Package
UI	User Interface
URL	Uniform Resource Locator

1 Introduction

E-participation is a term used to interpret the digital means that are utilised for stakeholder engagement and participation in co-creation and decision-making processes. Over the last decade, the concept of e-participation has raised a lot of interest from organizations, academics, experts, and many municipalities have already leveraged relevant tools to enhance collaborative activities with their community. Wide participation in co-creation and decision-making processes ensures the acceptance of society on the relevant interventions. Urban planning is a sector that could benefit from the positive effects of wide stakeholders' engagement, active co-design and co-decide activities. The URBREATH project underlines the importance of implementing interventions based on public acceptance and promoting inclusiveness and sustainability.

The performing activities of T4.2. aim to contribute to the WP4 "decision making framework" activities by realizing the most suitable toolset to facilitate collaboration and communication among the different stakeholders in co-creation and decision-making processes. Starting from the existing open-source solutions and considering the needs and vision of URBREATH, but also the heterogenous needs of each pilot city, the research concluded with the selection of the Decidim e-participation platform and the development of a fully customizable mobile application.

Decidim, is a popular and structured platform that enables users to engaging in specific participatory processes and contributing to co-creation activities through the different features it can include (e.g. surveys, blog posts, debates, etc. It also offers the assemblies feature in which users can form groups and collaborate for a specific cause. Furthermore, it offers a connection with Idra for users to search for documents, plans, regulations and other official documents and be informed.

The **e-participation mobile app** is a tailor-made application, currently in development progress, for the URBREATH project. It offers features designed to bridge the gap among authorities, experts and citizens by providing open channels of communication while offering geolocation capabilities. Users can submit a proposal on a map or report an issue on a map to promote awareness and notify competent authorities in a timely manner. Users can also explore the different activities happening close to their location and be redirected to relevant information and/or the other tools provided by the URBREATH toolbox to further engage in the activities of the project.

The tools provided by the task activities and reported here are currently in their initial version. More particularly, as the task progresses, the mobile application will be further developed and enrich its functionalities to adapt to the needs of each city. Moreover, an integration between the two tools is already being explored, while each tool separately will explore the feasibility and the integration potential with other tools of the URBREATH decision-making framework.

1.1 Purpose and Scope

This document is the accompanying report to Deliverable D4.4. URBREATH Participatory tools V1 and imprints the current results of the ongoing activities being performed under the Task 4.2 e-participation tools.

Deliverable D4.4. is the first of the deliverable series connected with Task 4.2. and presents the ICT tools chosen to enable broader stakeholder participation in decision-making processes. This deliverable focuses on the process of evaluation and customization of relevant existing open-sourced solutions to provide e-participation tools able to adapt to the needs of the FR and FL cities in order to meet URBREATHs objectives, but also able to grow further the concept of co-creation and active participation in decision-making processes to be a part of the urban everyday life on a macro-scale level.

1.2 Approach for Work Package and Relation to Other Work Packages and Deliverables

Deliverable 4.4., is the result of the ongoing activities performed under Task 4.2. and an integral part of Work Package 4 - URBREATH decision-making framework.

Activities being performed under Work Package 4 are inclined to provide end-users with suitable technical solutions to co-design and co-create Nature Based Solutions (NBS) that will be implemented in their urban surroundings.

The objective of Task 4.2. E-participation tools are to release user-friendly web and mobile tools facilitating diverse stakeholders' communication and co-creation activities while also serving as a means for promoting awareness and broadening the willingness to participate in commons. These tools are to be based on existing open-sourced solutions, which will be evaluated and further customized to meet the requirements as stated in the Description of Action, addressing the additional needs of FRC and FLC but also offering a generic replicable solution to other cities.

To this end, Task 4.2, is a core element of the Work Package's 4 objectives but also pivotal for the activities of Work Package 5 – Local Living Labs and Work Package 6 – Urban greening and renaturing actions. The tools provided by Task 4.2. are to be demonstrated, subsequently adapted to the specific needs of the FRC and FLC and used in the activities of these Work Packages as a means for multiple stakeholder engagement and active participation in co-creation activities.

Deliverable D4.4. is the first of a series of three in total linked with Task 4.2 and acts as the basis for:

- Deliverable D4.5. URBREATH Participatory tools V2 (M24): Adaptation of the tools to FR cities, adoption and demonstration support and suggestions for improvements.
- Deliverable D4.6. URBREATH Participatory tools V3 (M36): Revision to adapt the tools for FL cities and be ready for exploitation in other cities of the EU.

1.3 Structure of the Deliverable

This accompanying report of Deliverable 4.4. Participatory tools V1, is structured to provide a roadmap of the conceptual approach, the methodology followed for the selection of the solutions, the architecture scheme, the initial designs of the offered solutions, as well as their current development progress for a comprehensive overview. More specifically:

- **Chapter 2** includes a short introduction on the purpose of using e-participation tools in decision-making processes, their role in the URBREATH project and the methodology implemented leading to the final architecture scheme selected to respond to URBREATHs needs and objectives.
- **Chapter 3** focuses on Decidim, an open-source web application designed for e-participation purposes, presenting its features, characteristics and capabilities. Furthermore, this chapter introduces the potential integration of Decidim with other tools of the URBREATH Toolbox (see D2.5) that are currently under investigation.
- **Chapter 4** focuses on the development process of a unique e-participation mobile application designed to make Decidim accessible through a mobile device, and furthermore, tailored to incorporate additional features based on the needs of the cities providing a holistic URBREATH solution regarding e-participation.
- **Chapter 5** summarizes Deliverable 4.4. providing also, the next steps of the activities to be performed under Task 4.2.

2 E-participation tools to support urban planning

Active and broad participation in the commons has been an everlasting pursuit of governments and competent authorities across the globe. Government officials were interested in facilitating dialogue among the different stakeholders to sustain society's acceptance and efficiency in policymaking. That led mostly to open public meetings and debates aiming to involve society and the diverse interests of different stakeholders but often led to limited engagement [1], even in some cases, leading to a sense of social exclusion and a declining interest in participation in the commons.

Evolving to the digital era has led to the concept of leveraging technological tools that can support and enhance democracy into a new era of public governance. Meanwhile, addressing major multi-factor challenges (climate change, rising waves of migration, multicultural urban communities, geopolitical and economic crises, pandemics, etc.) multiplied the need for increased social awareness and participation in co-creating strategies to mitigate the risks and bringing forth sustainable solutions. Broad public empowerment and engagement in decision-making processes can lead to more inclusive, sustainable and resilient cities [2] while at the same time, digital solutions assist in increasing levels of transparency and openness in public administration procedures that improve the trust society needs to engage in commons.

E-participation is interpreted as the digital means offered for citizens' empowerment and involvement by promoting active participation in decision-making processes and, over the last decades, has raised the growing interest of government officials, academics, and experts in investigating ways to foster collaboration in decision-making processes [3]. As a result, many municipalities and organizations have been interested in incorporating e-participation methods to improve the dialogue among diverse stakeholders and promote co-creation activities.

Urban planning is a crucial element of public administration, mostly addressed by the decentralized administrations of the state. These public authorities have undertaken the task of conforming to the general state and EU narratives but also adapt and reharmonize urban planning to the specific needs of their regions. As the local community is highly affected by urban planning activities and modern geospatial-related technology offers unique opportunities, subsequently, introducing e-participation methods to support co-creation in urban planning is raising attention. However, it is of significance to note that there is a need to assess technical aspects and functionalities diligently by acknowledging the characteristics of the targeted audience and avoiding the risk of narrowing the audience rather than focusing on its expansion [1], [3].

2.1 The role of E-Participation tools in the URBREATH Decision-Making Framework

URBREATH project has recognized specific challenges that European regions and cities face due to heterogeneous and, in some cases, contradictory dynamics within the urban landscape. Urban areas present increased vulnerability to extreme weather events due to climate change while also facing multiple social challenges based on different socio-economic factors. Moreover, URBREATH highlights that conventional methods of re-greening and revitalizing urban areas in some cases fail to implement solutions acknowledging all the factors, local community's actual needs and promoting inclusiveness of vulnerable groups. Thus, URBREATHs' vision is to introduce an innovative "Mental Setup Change" process in the form of an interactions-based sustainable approach aiming to tackle multiple types of stresses within which NBS will be a key element.

To the context of implementing high-quality sustainable solutions based on NBS, URBREATH is adopting Urban greening Living Labs requiring careful planning and expert intervention but also vast and active participation in decision-making processes acknowledging that a wider local community's acceptance of the interventions is vital in the overall sustainability of the interventions, social cohesion and resiliency in unfavorable stresses, as already mentioned above.

2.2 Methodology Approach and Architecture

The methodology implemented by the activities of Task 4.2 started by deepening into the concept of using e-participation tools in decision-making processes and co-creating activities by organizations and governmental entities while exploring multiple different existing solutions to evaluate them.
The evaluation process was based on specific criteria as listed below:

- The concept, scope and the objectives of the URBREATH project,
- The functionalities offered by each tool to fulfil the specific requirements as stated by the Description of Action, but also, the additional needs that FRC and FLC indicated, and
- The capacity of each tool is to be optimized to meet these criteria.
- The adoption of open-source solutions.

The process resulted in an architectural scheme involving the open-sourced existing solution Decidim, while in parallel, an e-participation mobile application is under development, exploring potential integration with Decidim and designed to incorporate additional functionalities, based on FRC- and FLC-specific needs regarding e-participation. This approach offers a holistic solution that can address the multiple needs of the diverse stakeholders and the diverse needs of each city.

2.2.1 Existing tools facilitating e-participation

Exploring the different existing tools one can find tons of relevant applications, introducing a variety of different features aiming to promote stakeholders' engagement and participation. To identify the most suitable solutions a relevant tool was utilized, offered by the People Powered website – a global hub

for participatory democracy[1]. This tool provides the ranking of each platform based on different criteria. The criteria considered as highly significant for each tool were:

- The features score (aiming for a score >90%)
- Ethics & Transparency score (aiming for a score >90%)
- Accessibility Score (aiming for a score >90%)

The results were further distilled by inspecting their capabilities, environment, popularity and use cases to conclude on the most eligible options for the URBREATH project:

Consul for Democracy[2]: Consul for Democracy was created for the city of Madrid; the platform allows users to submit their ideas or proposals for public review. Users can support and provide comments on each other's ideas resulting in a constructive dialogue and co-creation. Furthermore, Consul offers a space for participatory budgeting purposes, where citizens can deliberate on the city's budget allocations and prioritize initiatives. Consul also offers a collaborative legislation feature in which users can comment and vote directly on the draft provided by the municipal authorities, leading to a bottom-up legislation co-creation.

Decidim[3]: Derived from the Consuls' conceptual framework [4], Decidim alternates the approach to a process-centric one. Decidim offers the creation of a thematic participatory process within which the administrators can include different components for users to engage, such as submitting proposals and idea sharing, surveys, participatory budgeting etc., as selected to better serve the purpose of the specific process. All processes conform to transparency standards providing elements for the public to track the process status. Additionally, the platform introduces the assembly's feature in which the users can create their own profiles but also can form a collaborative profile as a group user. This enables groups to collaborate further by conducting meetings, submitting collaborative proposals, etc.

Your Priorities[4]: Your Priorities platform offers a space where users can be informed by an action or a participatory budget and express their thoughts, suggestions, debate or create a new one. Your priorities platform includes specific customization abilities for the general structure of the content and for the submission of ideas and focuses on constructive dialogue among users. The latest version of the

[1] The rating tool used can be found in People Powered website – a global hub for participatory democracy can be found here: https://www.peoplepowered.org/platform-ratings

[2] The information about Consul was extracted from its website https://consuldemocracy.org/ and its Github dataset and documentation https://github.com/consuldemocracy/consuldemocracy.;

European Commissions' JoinUp Interoperable Europe Platform https://joinup.ec.europa.eu/collection/joinup/solution/joinup-archive/release/100-beta;

[3] The information about Decidim was extracted from its website https://decidim.org/ and its Github dataset and documentation https://github.com/decidim/decidim

[4] The information about YourPriorities was extracted from its website https://www.yrpri.org/domain/3, https://citizens.is/your-priorities-features-overview/ and its Github dataset and documentation https://github.com/CitizensFoundation/your-priorities-app

web application included the adoption of AI features and, furthermore, a 3D land use game created for Iceland's municipalities for consultation purposes.

It is necessary to note that popularity is another element that needs to be considered. Since the e-participation toolset is meant to be based on an open-source solution, popularity means that this tool has already a wider audience, therefore, acceptance of its usability and efficiency. Another benefit resulting from popularity is that a popular open-sourced solution will most likely have a populated community to support its deployment and resolve issues, while also exploring new features and potential capabilities. To this end, the supporting community each of these tools presents is also a variable to take into consideration.

2.2.2 Pilot-driven Requirements

These identified popular solutions, as mentioned above, offer many features for the users; however, for distilling into a final approach, it was mandatory to perform a "matchmaking" process by delving into the URBREATH project's vision and requirements, but also, the additional requirements responding to pilots' needs.

Description of Action Requirements: From the description of Task 4.2. as stated in DoA and based on the relevant list as reported in D2.5 "URBREATH platform requirements", the extracted requirements concerning e-participation tools are provided in Table 1:

Table 1: Participatory toolset - DoA requirements list

Requirement ID	Requirement Details.
DOA-T4.2-R01	Release of ICT tools to facilitate e-participation.
DOA-T4.2-R02	Provide user-friendly web and mobile, open-source based toolset.
DOA-T4.2-R03	Include discussion forums to support communication among stakeholders.
DOA-T4.2-R04	Involve interactive maps and geolocation features.
DOA-T4.2-R05	Offer social media integration for users to share on social media platforms.
DOA-T4.2-R06	Explore ways to enhance collaboration by linking outputs from other tools of the framework.
DOA-T4.2-R07	Explore ways to enhance stakeholder engagement by mobile interaction/visualisation capabilities.
DOA-T4.2-R08	Tools to include a mobile-based application available for both OS platforms (Android & iOS) as well as the web (web progressive app).
DOA-T4.2-R09	Facilitate e-participation using a friendly, easy to use, interface to support communication.
DOA-T4.2-R10	Embedded geolocation features.
DOA-T4.2-R11	Build on the outputs obtained by the other tools of the framework.

Additional Pilot Requirements: Pilot cities represent four different climatic zones, each of which presents unique characteristics and challenges. The heterogeneous needs of each climatic zone and, in some cases, the different needs of pilot cities within the same climatic zone, lead to an additional set of requirements diligently approached to provide each pilot with a suitable solution successfully. Table 2: below presents the initial list of requirements as extracted during the customer journeys and service

workshop with the cities reported in a relative file available in URBREATHs' repository[5] that could be addressed by e-participation tools:

Table 2: Participatory tools – Initial requirements from workshop with cities.

Requirement ID	Requirement Details.
WS2-BOR-UJ1-KAJAANI-STEP3-01-R01	The e-participation tool must allow the user to publish content such as text, images, documents, reports, and integrate or add references to external web pages (e.g. maps, KPI dashboards, etc.) to document results obtained from impact analysis and simulation.
WS2-CON-UJ1-CLUJNAPOCA-STEP2-02-R01	Possibility to implement awareness campaigns about the importance of NBS by creating a dedicated sections (in e-participation tool) with educational materials, infographics, videos, and webinars, encouraging users to learn and spread awareness within their communities.
WS2-CON-UJ1-CLUJNAPOCA-STEP2-02-R02	Citizens can navigate different sections and discover NBS related content.
WS2-CON-UJ1-CLUJNAPOCA-STEP2-03-R01	Launch participatory budgeting initiatives that allows citizens to submit proposals and initiatives for municipal consideration.
WS2-CON-UJ1-CLUJNAPOCA-STEP2-03-R02	Offer the possibility to set and manage participatory budget campaigns
WS2-CON-UJ1-CLUJNAPOCA-STEP2-03-R03	The "administrator" must be able to set the total budget of the participatory budget campaign and possible alternatives solutions (e.g. build a bike lane, deploy new benches, plant trees, etc.) with their related costs
WS2-CON-UJ1-CLUJNAPOCA-STEP2-03-R04	Citizens can choose among the proposed alternative solutions and their combination until the total cost does not exceed the total budget.
WS2-BOR-UJ1-KAJAANI-STEP4-02-R01	The "administrator" must be able to setup campaign to collect ideas (alternative solutions) from the local communities concerning a specific topic (e.g. changes in the plans defined by the municipality).
WS2-BOR-UJ1-KAJAANI-STEP4-02-R02	Citizens must be able to access the campaigns promoted by the Municipality, select a campaign and access its details.
WS2-BOR-UJ1-KAJAANI-STEP4-02-R03	Citizens must be able to submit a proposal for the selected campaign.
WS2-BOR-UJ1-KAJAANI-STEP4-03-R01	The e-participation tool should allow the user to access KPIs and impact evaluations related to topics of interest (e.g. promoted by the Municipality)
WS2-ATL-UJ1-LEUVEN-STEP1-01-R01	The e-participation tool offers the list/map of the NBS related initiatives/projects planned/under implementation/implemented by the Municipality
WS2-ATL-UJ1-LEUVEN-STEP1-01-R02	The user can select one the of available initiatives/projects and access its details (e.g. full description, location, expected impact, etc.)
WS2-ATL-UJ1-LEUVEN-STEP2-01-R01	Among the details of the selected NBS, the user must be able to access information such as ASIS state, Framework in which the redesign is made, possible scenario's already existing.
WS2-ATL-UJ1-LEUVEN-STEP2-01-R02	The user should be able to access report (e.g. documents and/or web pages that includes charts graph, may layers, etc.).
WS2-MED-UJ1-MADRID-STEP5-01-R01	e-Participation toll should allow the user to publish and integrate 3D visualisation of possible NBS (e.g. co-created) together with content such as text, images, documents, reports, etc.

[5] The indicated working file available on URBEATHs Sharepoint is: 2024-07-31-requirements-v3

WS2-MED-UJ1-MADRID-STEP5-02-R01	Stakeholders (e.g. citizens) can access published content.
WS2-MED-UJ1-MADRID-STEP5-02-R02	Stakeholders (e.g. citizens) can add comment, feedback, etc.to published content.
WS2-CON-UJ1-CLUJNAPOCA-STEP1-01-R01	Citizens can discover published content and interact (e.g. post comment, reply, etc.)
WS2-CON-UJ1-CLUJNAPOCA-STEP1-01-R02	Citizens can comment, provide feedback, debate and propose solutions to topics of intertest.
WS2-CON-UJ1-CLUJNAPOCA-STEP2-01-R02	Enable users to submit observations, track progress, and give feedback through dedicated feedback forms and real-time data dashboards.
WS2-ATL-UJ1-LEUVEN-STEP3-02-R01	Enable users to submit observations, track progress, and give feedback through a mobile app.
WS2-BOR-UJ1-KAJAANI-STEP3-02-R01	e-Participation tool should allow to make accessible content to summarise the results obtained from impact analysis and simulation also through a mobile app
WS2-ATL-UJ2-LEUVEN-STEP5-02-R01	The Municipality can publish informative material (e.g. reports including charts, graphs, images, etc.) explaining the proposed design of an NBS
WS2-ATL-UJ2-LEUVEN-STEP5-02-R02	Citizens can navigate the proposed NBSs and access the related informative material, also from a mobile application.
WS2-ATL-UJ2-LEUVEN-STEP5-02-R03	Citizens can provide feedback, comments about the proposed NBSs, also from a mobile application.
WS2-BOR-UJ1-KAJAANI-STEP3-02-R02	Citizens can access the list of published content
WS2-BOR-UJ1-KAJAANI-STEP3-02-R03	Citizens can select a content and access its details
WS2-BOR-UJ1-KAJAANI-STEP3-02-R04	Citizens can provide feedback to the access content through a text box and submit the feedback through a dedicated button
WS2-ATL-UJ1-LEUVEN-STEP1-02-R01	The e-Participation tool must offer a calendar reporting the events scheduled by the Municipality.
WS2-ATL-UJ1-LEUVEN-STEP1-02-R02	The administrator of the Municipality must be able to create a new event (e.g. by editing the title, description, date, time, location if physical event or link to online meeting) to be included in the calendar.
WS2-ATL-UJ1-LEUVEN-STEP1-02-R03	On his/her side, the user should be able to access the calendar and the planned events on the mobile app.
WS2-ATL-UJ1-LEUVEN-STEP1-02-R04	On the mobile app the user can select an event and access its details (e.g. by title, description, date, time, location if physical event or link to online meeting).
WS2-CON-UJ1-CLUJNAPOCA-STEP2-01-R01	e-Participation tool should offer user friendly tools to engage citizens in data collection and monitoring
WS2-BOR-UJ1-KAJAANI-STEP4-04-R01	The e-participation tool should offer metrics (such as number of participants, number of submitted, number of provided comments, etc.) to monitor engagement of citizens in the participatory process
WS2-ATL-UJ2-LEUVEN-STEP8-01-R01	The user can turn on notifications about the solutions (e.g. NBSs).
WS2-ATL-UJ2-LEUVEN-STEP8-01-R02	When the Municipality selects an agreed solution (e.g. the most voted) a notification is sent to the users.
WS2-ATL-UJ2-LEUVEN-STEP8-01-R03	The user receives the notification about the agreed solution.

Whilst the adaptation of the e-participations tools for FRC and FLC is subject to the subsequent activities of the task and deliverables, assessing these requirements at this stage is taking place **only** to identify (if existing) potential incompatibilities and interdependencies regarding the choice of the tool and/or technology stack needed to respond to a specific requirement.

2.2.3 Our Approach

While there is no solution found responding to all requirements needed for URBREATH's vision, however, considering all the information, opportunities and restrictions, as described above, the suitable solutions able to address most of the requirements concerning e-participation are:

- **Decidim web application**: Decidim offers thematic participatory spaces within which there are numerous features (surveys, idea sharing, debates, etc.). The concept of a unified participatory space that includes all actions and co-creation activities in one dedicated area is the most efficient way of presenting specific NBS interventions that pilots plan to implement. It also offers assemblies where groups can be formed for internal co-creation activities, organizing meetings, etc. In Chapter 3, Decidim is presented in further detail for a more comprehensive overview.

- **A fully customizable mobile application:** The mobile application will offer many features aiming to foster e-participation and stakeholder engagement. It can provide geolocation features where users can submit their ideas/proposals/input for a specific location on a map. Users can discuss these inputs with each other, debate or offer alternative options. The voting mechanism assists the competent authorities in identifying the most popular suggestions to decide for their implementation. Additionally, users can provide their input directly on the map in case of an issue and inform authorities in a timely manner. This mechanism can also be used by users to indicate the location of potential invasive species for public awareness and diligent relevant actions. In Chapter 4, the mobile application is further detailed for a more comprehensive overview.

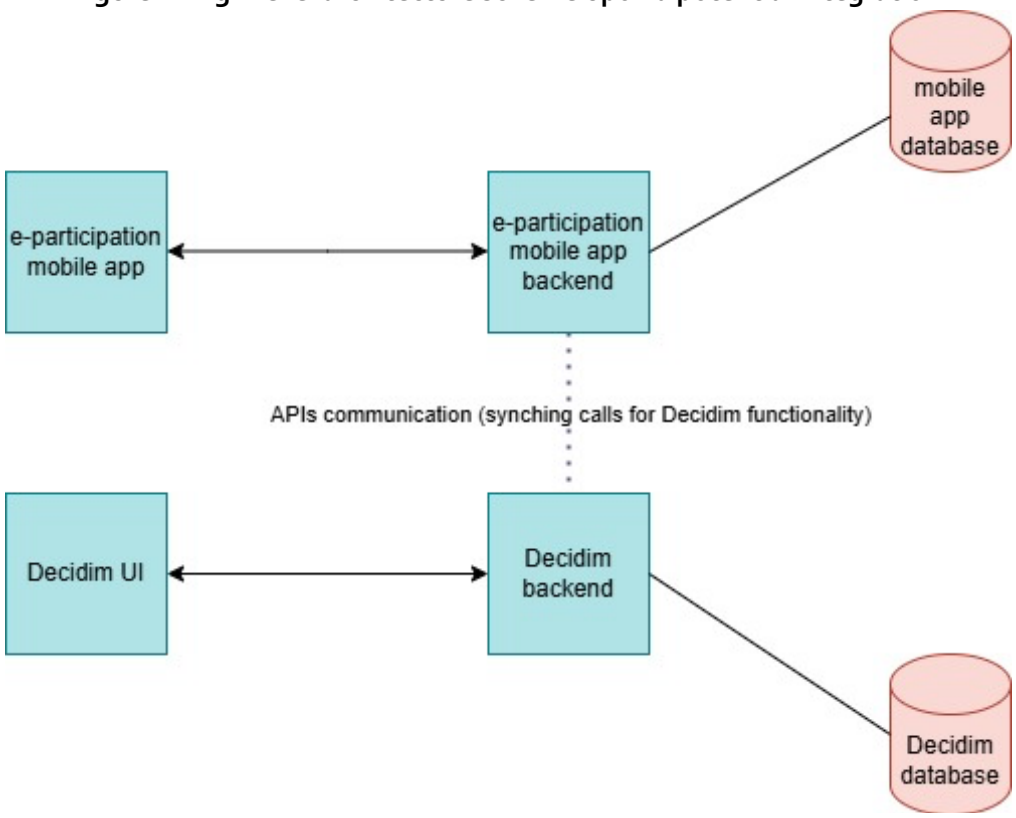
Decidim includes its own User Interface (UI) and backend to support its functionality. Moreover, through its API, Decidim can provide endpoints to the mobile application for access. Thus, the mobile application can incorporate Decidim's functionalities in its native application environment.

The e-participation mobile application in its current development progress, includes its own UI, and its backend is to be developed to support its extra functionalities for each city's needs.

The privilege of an integration between the two tools is that it will offer the features of the Decidim web app, in the palm of the hand of stakeholders, through their mobile devices. Additionally, pilot cities and their communities can benefit from a versatile mobile application that can offer extra features based on their needs.

Figure 1: High-level architecture scheme shows the high-level architecture scheme for the e-participation mobile tools and their potential integration.

Figure 1: High-level architecture scheme upon a potential integration



3 Decidim

3.1 The Decidim project

Decidim[6] is one of the innovative and ambitious projects that aim to reshape how community engagement in democratic, participatory processes is conducted. It is an open-source participatory democracy platform developed and designed to facilitate citizen engagement, collaborative decision-making, and transparent governance.

Barandiaran et al. (2024) define Decidim as a public-common, free and open, digital infrastructure for participatory democracy. In other words, they assert that Decidim is more than an open-source platform that facilitates various forms of community engagement in participatory processes [5], such as public consultations and collaborative policymaking, etc. Originally developed in Barcelona, it enables governments, organizations, and communities to collaboratively create policies, gather input, and make collective decisions. The project behind Decidim was born out of the participatory movement in Barcelona in 2016, spearheaded by the City Council. The aim was to create a digital tool that could support and enhance the processes of public participation already taking place. Since its inception, Decidim has grown and evolved, gaining international recognition[7] and being adopted by numerous cities, organizations, and institutions globally.

Decidim's primary objectives centre on promoting active citizenship, enhancing transparency in governance, and fostering collaborative decision-making. To achieve these goals, Decidim provides citizens with the tools they need to participate actively in their communities and directly impact decision-making processes. This empowerment is crucial for fostering a more engaged and informed citizenry. The platform ensures that all processes, from proposal submissions to final decisions, are open and accessible to the public, building trust between citizens and their governing bodies. Additionally, Decidim supports collaborative processes that enable multiple stakeholders to come together, discuss, and develop solutions collectively, leading to more inclusive and representative outcomes. The platform also promotes accountability by providing a clear and open record of decisions and processes, holding public officials and institutions accountable to the people they serve. This accountability is essential for maintaining the integrity and effectiveness of democratic systems. Lastly, Decidim is at the forefront of digital democracy, continually exploring new ways to use technology to enhance democratic practices. This innovation includes integrating features like real-time voting, interactive discussion forums, and tools for monitoring and evaluating policies.

[6] From the Catalan “let’s decide” or “we decide”, see more on http://decidim.org

[7] https://interoperable-europe.ec.europa.eu/collection/open-source-observatory-osor/news/decidim-recognized-digital-public-good

Since its launch, Decidim has made significant strides in enhancing democratic engagement around the world. Cities like Paris[8], Helsinki[9], New York[10] , and Kakogawa[11] have adopted the platform to facilitate citizen participation in their governance processes. Additionally, various NGOs and community organizations have used Decidim to mobilize and engage their members effectively [12].

The future of Decidim looks promising as it continues to evolve and expand its reach. Ongoing developments aim to improve the platform's usability, scalability, and functionality, making it even more accessible and effective for diverse user groups. As more communities and institutions adopt Decidim, the potential for greater democratic engagement and more responsive governance continues to grow.

In summary, Decidim is a powerful tool for participatory democracy, offering citizens a platform to actively engage in the decision-making processes that affect their lives. It provides tools for a wide range of participatory processes, such as voting, online consultations, participatory budgeting, and public discussions. The platform is highly customizable and adaptable, supporting different types of decision-making workflows and offering features like surveys, proposals, debates, and events management. By empowering citizens and stakeholders to engage meaningfully, Decidim aims to strengthen democratic processes, increase trust in institutions, and encourage active, informed civic participation. By promoting transparency, collaboration, and accountability, Decidim is helping to build stronger, more inclusive, and more democratic communities worldwide.

3.2 Decidim features

Since the digital platform displays and embodies both the means of project organization and democratic principles, it is important to explain how Decidim works. Decidim facilitates citizen engagement through various participatory spaces, enabling individuals and organizations to propose, discuss, and endorse initiatives that shape public policy and community projects. Thus, users of the platform (participants) interact through participatory mechanisms known as components within different participatory spaces that channel their democratic power to specific results. Decidim's architecture is fundamentally designed so that its components collaborate seamlessly within participatory spaces. The following diagram (Figure 2) depicts the logic behind participatory spaces and components.

[8] https://le14participe.paris/

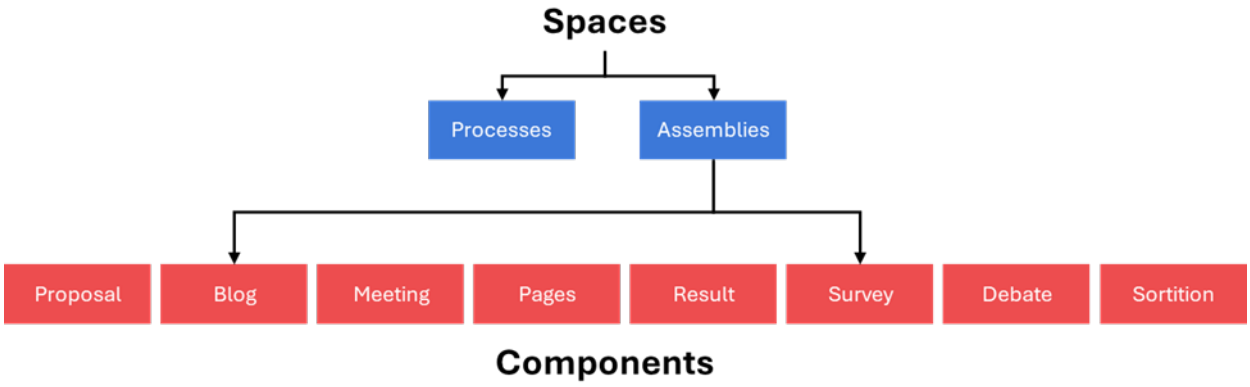
[9] https://omastadi.hel.fi/

[10] https://www.participate.nyc.gov/

[11] https://kakogawa.diycities.jp/

[12] A detailed list of Governments, Cities, NGOs, and Universities that adopted Decidim is available at https://decidim.org/usedby/

Figure 2: Example of participatory spaces and components relationship.



3.2.1 Participatory spaces

Participatory spaces are the frameworks that define how participation will be conducted, the channels or means through which citizens or members of an organization can process requests or coordinate proposals and make decisions. Decidim participatory spaces are designated areas within the platform where citizens can engage in various forms of democratic participation and where users can participate when decisions are being taken.

Decidim includes different types of participatory spaces, each tailored to specific forms of civic engagement. Processes, Assemblies, Initiatives and Consultations are all participatory spaces. Processes are structured sequences of activities that lead to a specific outcome, such as developing a policy or creating a strategic plan. Processes often involve multiple stages, including idea generation, proposal development, voting, and implementation. Assemblies are spaces for long-term participatory bodies, such as neighbourhood councils, community boards, or advisory committees. Assemblies facilitate ongoing dialogue and decision-making on various issues. Initiatives allow citizens to propose new ideas or projects that can be supported by others. If an initiative gains enough support, it can be taken forward for further consideration or implementation. Consultations are designed to gather public input on specific topics or proposals. Citizens can provide feedback, share ideas, and discuss matters that require community input before a decision is made.

Each participatory space within Decidim is designed to be transparent, inclusive, and accessible, ensuring that all citizens can contribute to the decision-making processes that affect their communities. These spaces foster a collaborative and democratic environment, enabling meaningful civic engagement and active participation in governance.

3.2.1.1 Assemblies

Assemblies are participatory spaces of the Decidim platform, designed to support long-term participatory bodies such as neighbourhood councils, community boards, and advisory committees. These assemblies provide a structured environment where citizens, organizations, and government officials can engage in continuous dialogue and decision-making on various community and policy issues. The primary aim of Decidim Assemblies is to foster a culture of active participation, inclusivity, and transparency within the democratic process, ensuring that a diverse range of voices are heard and considered in the governance of their communities. Assemblies operate as ongoing forums for discussion and collaboration, allowing participants to address specific issues over an extended period. This long-term engagement is crucial for building trust and understanding between different stakeholders, as it provides the opportunity for in-depth exploration of complex topics. Through them participants can propose, debate, and refine ideas and policies in a transparent and collaborative manner, leading to more well-rounded and representative decisions.

One of the key features of Decidim Assemblies is their flexibility and adaptability to various contexts and needs. They can be customized to suit the specific requirements of different communities, whether they are focused on urban planning, environmental sustainability, social services, or any other area of public concern. This adaptability ensures that the assemblies remain relevant and effective in addressing the unique challenges and opportunities faced by each community. The participatory and collaborative nature of Decidim Assemblies is enhanced by various tools and features named components integrated into the platform. These include proposals, surveys, real-time voting, interactive discussion forums, and mechanisms for monitoring and evaluating the implementation of decisions. These tools facilitate active and meaningful participation, allowing participants to engage with the process in a dynamic and impactful way. Decidim Assemblies also promote accountability by providing a clear and open record of all activities and decisions, ensuring that public officials and institutions are held responsible for their actions and commitments, reinforcing the integrity and effectiveness of the democratic process, and sustaining trust between citizens and their governing bodies.

In summary, Decidim Assemblies are crucial modules of the participatory democracy platform, offering a structured, inclusive, and transparent space for long-term engagement and decision-making. By empowering citizens and fostering collaboration, Decidim Assemblies contribute to the development of stronger, more inclusive, and more democratic communities. Through their innovative approach to participatory governance, they are helping to reshape the way communities engage and influence the decisions that impact their lives.

3.2.1.2 Participatory processes

Compared to Decidim Assemblies, Participatory processes are designed to guide democratic activities from initiation to completion. Participatory processes are dynamic and structured sequences of activities that enable citizens to engage directly in the decision-making processes that shape their communities. These processes are also designed to be inclusive, transparent, and collaborative, ensuring a wide range of voices and perspectives participate in creating policies and making important

decisions. The essence of participatory processes is to democratize decision-making, allowing for more equitable and just outcomes that reflect the needs and desires of the entire community.

One of the core elements of participatory processes is their structured nature. They typically involve multiple stages, each designed to gather input, refine proposals, and ultimately reach a decision. The stages often include idea generation, where citizens can propose new initiatives or solutions to community issues. This stage is crucial for fostering creativity and allowing diverse perspectives to emerge. Following the idea generation, proposals are developed and refined through discussions and feedback from the community. This iterative process ensures that proposals are well-considered and incorporate input from a broad range of stakeholders.

Once proposals are developed, participatory processes often include a voting stage where citizens can express their preferences and choose the options that best meet their needs. This voting process is typically designed to be transparent and accessible, allowing all eligible participants to have their say. Real-time voting tools and digital platforms enhance the accessibility and efficiency of this stage, ensuring that participation is as broad and inclusive as possible. These processes enable multiple stakeholders, including citizens, organizations, and government officials, to come together, discuss, and develop solutions collectively. This collaborative approach fosters a sense of shared responsibility and ownership over the decisions made, leading to more sustainable and effective outcomes. It also helps to build stronger relationships and trust between different stakeholders, creating a more cohesive and resilient community.

In conclusion, participatory processes within Decidim represent a powerful approach to democratic engagement. By structuring activities to include idea generation, proposal development, voting, and implementation, these processes ensure that decision-making is inclusive, transparent, and collaborative. Through their emphasis on inclusivity, transparency, and collaboration, participatory processes empower citizens to have a direct and meaningful impact on the decisions that affect their lives, helping to build stronger, more democratic communities.

3.2.1.3 Initiatives and Consultations

Initiatives are grassroots participatory spaces within Decidim that empower individuals and groups to propose and advocate for specific actions or projects. They provide a platform for citizens to take the lead in addressing issues that are important to them, mobilizing support and resources to achieve their goals. Initiatives can be used for a wide range of purposes, such as community projects, policy changes, or social campaigns. They typically involve various stages, such as proposal development, signature collection, and public voting, with clear criteria for success. By supporting grassroots initiatives, Decidim helps foster a sense of agency and empowerment among citizens, enabling them to take an active role in shaping their communities and influencing decision-making.

Consultations are interactive participatory spaces designed to gather input and feedback from stakeholders on specific issues or projects. They can be used by governments, organizations, or communities to engage with the public on a wide range of topics, such as urban planning, policy development, or service delivery. Consultations typically involve various methods for collecting input,

such as surveys, questionnaires, public meetings, and online discussions. These methods are designed to be inclusive and accessible, ensuring that all stakeholders can participate and share their views. By providing a structured platform for consultation, Decidim helps to ensure that decision-makers have access to diverse perspectives and that decisions are made based on comprehensive and well-informed input.

3.2.2 Components

Participatory spaces are integral to upholding Decidim democratic principles. They provide structured, transparent, and inclusive spaces for community engagement and refer to the organizational units where participatory processes take place. They are the broader areas within which specific activities and interactions occur. They may incorporate several components, specific tools and functionalities that enable different participatory activities. Participatory components represent mechanisms that enable interaction between users of the platform and the various participatory spaces.

The more notable components that are combined into spaces to deliver participatory mechanisms include:

- Proposals: This feature allows users to submit, discuss, and vote on proposals. It's a central component for gathering ideas and feedback from the community. Imagine a city using Decidim to gather ideas for improving public transportation. Citizens can submit proposals for new bus routes, enhancements to existing services, or innovative solutions like bike-sharing programs. These proposals are then discussed and voted on. The most popular and feasible ideas are selected for further implementation.
- Endorsements: Participants can endorse proposals that can be interpreted as votes, signatures or any other format that demonstrates a positive agreement in accordance with the political will itself. Participants can issue a single endorsement for each proposal they wish. The number of endorsements can be limited for each participant. There is no limit to the number of proposals that can be endorsed.
- Results: This component allows administrators to publish the outcomes of participatory processes, it is used to turn proposals into results and give official responses to them. It is possible to merge various proposals into a single result or to create different results related to the same original proposal.
- Debates: Discussions and debates can be opened on questions and specific issues established by administrators or participants.
- Surveys: A versatile tool for collecting data and opinions from stakeholders through customized surveys. It can be used to design and publish surveys and to display and download their results.
- Meetings: Schedule and manage physical or virtual meetings, ensuring that stakeholders can participate in discussions and decision-making processes.
- Pages: Create informational pages to share important updates, documents, and resources with the community.
- Blogs: The blog component makes possible the creation of posts or news associated with a participatory space, and to navigate them chronologically. Comments associated with blog entries will be treated like the platform's other comments, as described below.

- Notifications: Stay informed about ongoing activities and updates through customizable notifications.

3.3 Why enhance Participation Through Decidim

Decidim stands as a robust and versatile platform designed to revolutionize how stakeholder participation is managed and implemented in decision-making processes. By leveraging the power of digital tools, Decidim fosters a more inclusive, transparent, and democratic environment where every voice can be heard and considered.

One of the fundamental principles behind Decidim is transparency. The platform ensures that all participatory processes are open and transparent, allowing stakeholders to see how decisions are made, who is involved, and what the outcomes are. This transparency not only builds trust among participants but also holds decision-makers accountable, ensuring that the processes are fair and unbiased.

Inclusivity is another cornerstone of Decidim. The platform is designed to be accessible to all, regardless of their technical expertise or socio-economic background. By providing a user-friendly interface and support for multiple languages, Decidim ensures that everyone can participate. This inclusivity is crucial in creating a diverse and representative decision-making process where all voices, especially those from marginalized communities, are heard and valued.

Collaboration is at the heart of Decidim's functionality. The platform facilitates various forms of collaborative work, from brainstorming sessions and proposal drafting to voting and feedback collection. By enabling stakeholders to work together in real time, Decidim fosters a sense of community and shared purpose. This collaborative approach not only enhances the quality of decisions but also ensures that the outcomes are more sustainable and widely accepted.

Empowerment is a key outcome of using Decidim. The platform empowers individuals and communities to take ownership of the decision-making process by providing stakeholders with the tools and opportunities to participate actively. This empowerment leads to greater engagement and commitment from participants, resulting in more meaningful and impactful decisions.

Flexibility is another significant advantage of Decidim. The platform can be customized and adapted to suit the specific needs and contexts of different organizations and municipalities. Whether it's participatory budgeting, policy development, or community consultation, Decidim can be tailored to meet diverse requirements, making it a versatile tool for various participatory processes.

Moreover, Decidim's emphasis on open-source development ensures that the platform is continuously evolving and improving. By engaging a global community of developers and users, Decidim benefits from a wealth of knowledge, experience, and innovation. This collaborative development model

ensures that the platform remains cutting-edge, reliable, and responsive to the changing needs of its users.
In conclusion, Decidim is more than just a digital tool; it is a catalyst for change in the realm of stakeholder participation. By addressing the principles of transparency, inclusivity, collaboration, empowerment, and flexibility, Decidim creates a participatory space that is not only effective but also transformative. As organizations and municipalities continue to seek ways to engage stakeholders meaningfully, Decidim stands out as a powerful solution that can help bridge the gap between decision-makers and the communities they serve. Through Decidim, the vision of a more participatory, democratic, and just society becomes increasingly attainable.

3.4 Potential integration with other tools

Decidim is a powerful digital platform. When integrated with other advanced tools, its potential may grow exponentially, creating a comprehensive ecosystem for urban planning and management. In this section, we explore the reason why Decidim could be potentially integrated with other URBREATH tools (Digital Twin, KPI Manager, and Data Catalogue). Decidim is based on Ruby on Rails (a framework for the development of web application based on Ruby programming language) leveraging a modular architecture and APIs, that allow it to extend its capabilities and integrate with external systems and applications. For this purpose, it is possible to follow three main approaches:

- **iFrames or Web Embedding:** Decidim offers a specific module that allows the embedding of external web applications within an IFrame. This approach is the less complex one, representing a fast and easy option to implement; however, simultaneously, it limits the possibilities for more advanced integrations between Decidim and third applications.
- **Customizing Decidim Gems:** Ruby on Rails supports a "gems" ecosystem that aligns well with Decidim's modular nature. A gem is packaged codes that offer specific functionalities; a gem can be considered as plugins. Custom features can be implemented as Decidim-compatible gems, enabling developers to add new functionality without modifying the core codebase.
- **Implement a new Gem:** as a natural evolution of the previous point, it is possible to implement a new gem from scratch to integrate the functionalities of a third application into Decidim properly.

From a technical perspective, the potential integrations presented below are currently under investigation.

3.4.1 Digital Twin

Integrating a Digital Twin (see D4.1 – Local Digital Twin and KPIs catalogue for urban NBSs - V1) within Decidim, may represent a significant advancement in community engagement and urban planning. The Digital Twin tool is a virtual representation of physical entities, allowing real-time data exchange and providing simulation of urban environments. This enables planners to visualize and analyse data,

predict outcomes, and test scenarios. By combining this technology with Decidim, cities and communities can enhance their decision-making processes and foster greater community involvement.

Purpose of the potential integration with Decidim:

- Enhanced Visualization: Integrating Decidim with the Digital Twin allows stakeholders to visualize proposals and their potential impacts in a simulated environment. Participants can see how their ideas might transform the cityscape, leading to more informed decision-making.
- Scenario Testing: Proposals submitted in Decidim can be tested in the Digital Twin environment to predict their effects on traffic, pollution, and public spaces. This ensures that only feasible and sustainable proposals move forward.
- Engagement and Feedback: The visualization capabilities of the Digital Twin can be used in public meetings and consultations, making it easier for participants to understand complex data and provide meaningful feedback.

Rationale: The integration of Digital Twin with Decidim enhances the participatory process by providing a tangible and interactive way for stakeholders to engage with proposals. It bridges the gap between abstract ideas and real-world outcomes, fostering a more collaborative and informed decision-making process.

3.4.2 KPI Manager

The Key Performance Indicator (KPI) Manager (see D4.1 – Local Digital Twin and KPIs catalogue for urban NBSs - V1) tool tracks and monitors key metrics related to urban planning and development. It provides insights into the performance of various projects and initiatives.
Integrating the KPI Manager can significantly enhance the platform's ability to track and measure the effectiveness of various initiatives. Its primary purpose is to provide insights into the performance of various aspects of a project or a solution. By combining this tool with Decidim, cities and organizations can ensure more transparent data-driven decision-making.

Purpose of the potential integration with Decidim:

- Performance Tracking: Proposals and projects approved through Decidim can be linked to specific KPIs. This allows stakeholders to track the performance and impact of these projects over time.
- Data-Driven Decisions: The KPI Manager provides data that can be used to inform decision-making in Decidim. Stakeholders can prioritize proposals that align with the city's performance goals and objectives.
- Transparency and Accountability: Integrating KPI Manager with Decidim ensures that the progress and outcomes of participatory projects are transparent. Participants can see how their contributions are making a difference.

Rationale: The integration of the KPI Manager with Decidim ensures that participatory projects are aligned with the city's strategic goals and performance indicators. It establishes the foundation for a

data-driven decision-making approach, enhancing the participatory process's transparency and accountability.

3.4.3 Data Catalogue

The Data Catalogue is based on Idra[13] a web application that can federate existing Open Data Management Systems (ODMS) based on different technologies and provide a unique access point to search and discover open datasets coming from heterogeneous sources. The Data Catalogue allows access to a centralized repository where data assets are registered, described, and made accessible.
It is based on international standards like DCAT-AP, ensuring consistent representation of datasets.

Purpose of the potential integration with Decidim:

- Data Accessibility: By integrating the Data Catalogue with Decidim, stakeholders may have easy access to relevant datasets coming from heterogeneous resources (Open Data management systems such as portals provided by Municipalities and PAs) when submitting and reviewing proposals. This ensures that decisions are based on accurate and comprehensive information.
- Informed Proposals: Participants could use data from the catalogue to support their proposals, making them more compelling and evidence-based.
- Enhanced Analysis: The integration may allow for advanced data analysis within Decidim, helping stakeholders identify trends, challenges, and opportunities in urban development.

Rationale: The Data Catalogue integration enhances the quality of proposals and decisions in Decidim by providing easy access to relevant data. It ensures that participatory processes are informed by accurate and up-to-date information, leading to more effective and sustainable outcomes.

[13] https://github.com/URBREATH/Idra

3.4.4 Mockups

Integrating Decidim with the Digital Twin, KPI Manager, and Data Catalogue could create a powerful ecosystem for participatory urban planning and management. These integrations may enhance stakeholder engagement, provide data-driven insights, and ensure transparency and accountability in decision-making processes. In this section, the mockups of the potential Decidim integrations are presented.

Figure 3: Digital Twin

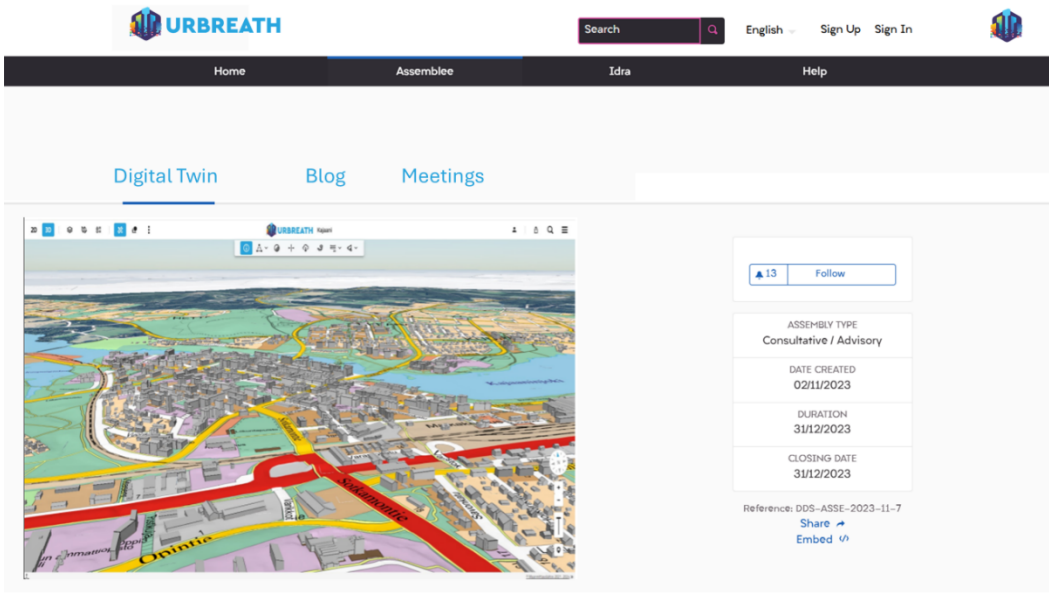


Figure 4: KPI Manager

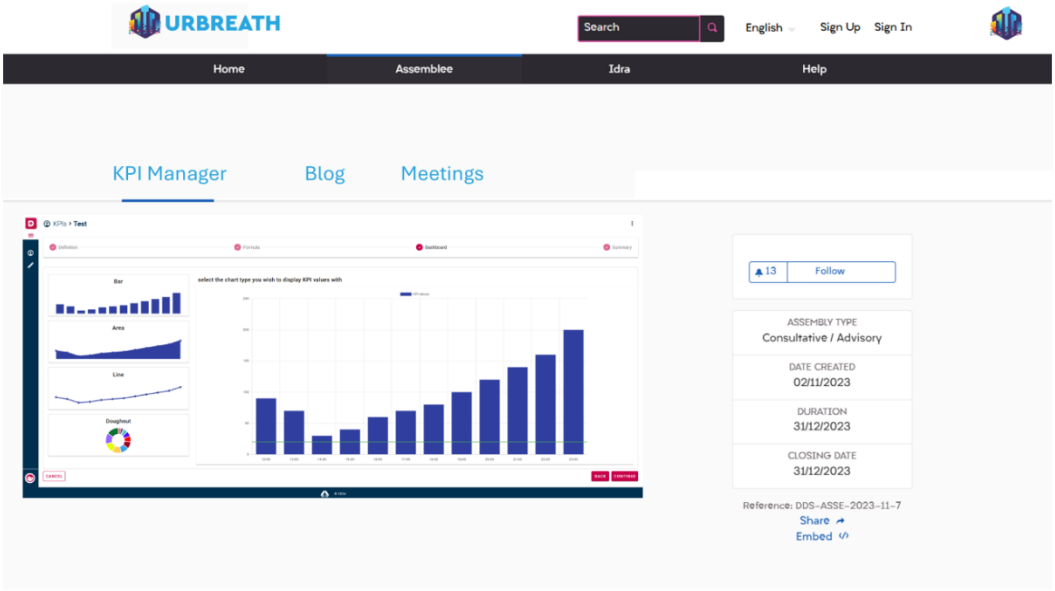
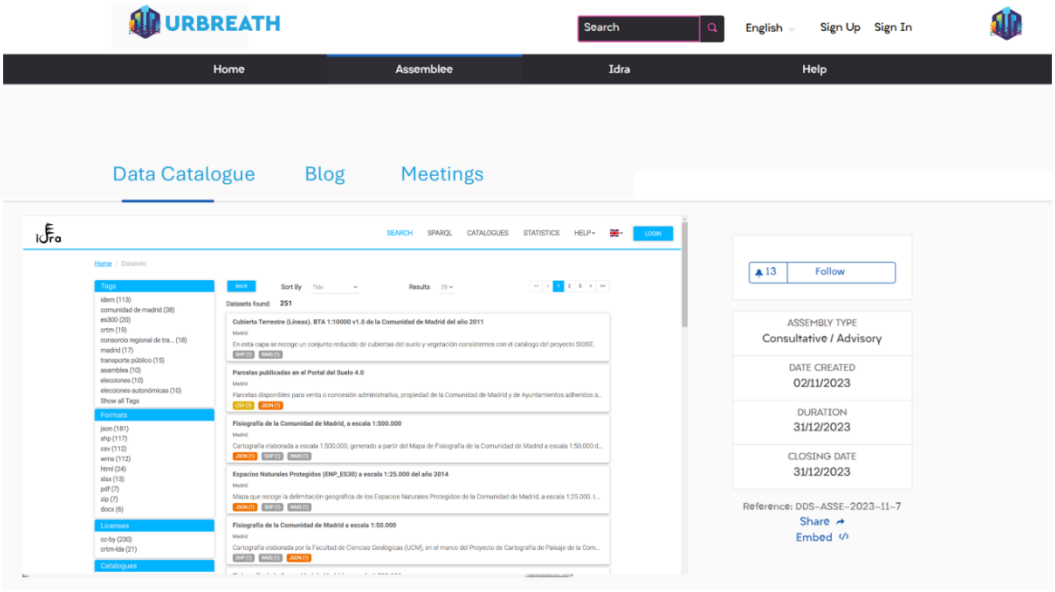


Figure 5: Data Catalogue



4 E-participation Mobile App

Nowadays, having a mobile app is no longer a luxury, but a necessity. Mobile apps provide user engagement, provide convenience, and allow organizations to reach their audience anytime, anywhere. For this project, we developed a mobile app using React Native, a powerful framework that enables cross-platform app development. React Native was chosen for its efficiency, performance, and ability to deliver native experience on both iOS and Android operating systems. Additionally, React Native supports advanced functionalities such as augmented reality (AR).

Why a mobile app is important

- **Increased user accessibility**: Allows users to interact with the platform anytime using just a phone connected to the Internet
- **Improved user engagement**: Push notifications, personalized experience

Why React Native

- **Cross-Platform Development:** Single code base for both iOS and Android
- **Performance:** Delivers smooth and responsive apps with a native feel.

4.1 Expected functionalities

The mobile app is expected to include a range of functionalities based on the pilots' needs to better serve their planned interventions. These functionalities may include but are not limited to:

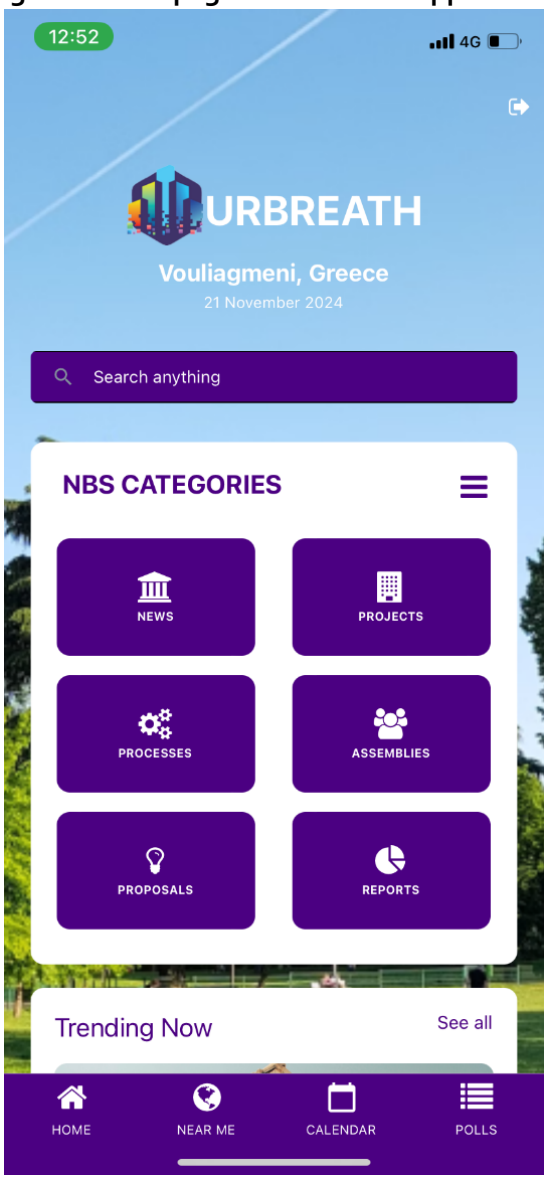
- Interaction with Decidim's API.
- Ideas/Proposals on a map: The mobile application can provide a space for all registered users to submit their ideas/proposals for a specific location, on a map.
- Reporting invasive species and/or issues of the city on a map.
- Geolocation capabilities: Based on the user's location, users can navigate to identify any activity/process/project near their location.
- Polls: Administrators can use polls to get feedback on the interventions and estimate stakeholder satisfaction. This feature can also be used for co-creation activities enabling stakeholders to choose among the different alternatives.
- Provide notifications based on preferences.
- Provide the space for users to redirect to other tools of the Framework
- Calendar (for events, meetings, etc.)

4.1.1 Mockups

In this section, the developed interfaces of the e-participation mobile application's current functionalities are presented in further detail.

The core concept while designing and developing the mobile applications' UI was to provide a very friendly user interface. To begin with, the main page of the mobile application is shown in Figure 6: Main page of the mobile application.

Figure 6: Main page of the mobile application



When accessing the main page, users can see:

- Starting at the top, there is a **search bar**. Users can search for specific content by inserting a keyword.
- A **NBS Categories "burger button menu":** That component, currently under development, is aiming to be used for informative purposes regarding NBS, including redirecting capabilities to relevant sources of information and/or relevant tools created for URBREATH.

- **A main menu consisting of different "buttons"** (currently 6) each representing a specific functionality:
  News: The concept of this feature is to offer a space aggregating the most recent content that has been created (e.g., a new process created, a new report, a new proposal etc.)

  Projects: This feature is subject to different alternatives to be validated with the pilots. A concept could be to present all projects currently implemented in the city to promote awareness and accountability (citizens can use it for tracking progress). This feature can display the project as a list while there will be an option for the users to select an on-map view. There are filtering options foreseen, individual pin colours according to projects' maturity (new, in progress, finished, delayed) while also can enable comments, sharing on social media etc.

  Processes: This feature of the mobile app is developed upon the potential integration with the Decidim web app. Currently, it retrieves all content created in the Participation Processes of Decidim, as shown in Figure 7. By "tapping" a process, users see the details of this process and the participatory components, that admins have included in this process (Figure 8). Users can choose to further engage in the process by selecting each of the components. Each component offers different options for participation. Figure 9 shows the Proposals component.

  Assemblies: Another feature developed to correspond with the relevant feature of Decidim. Similarly, with processes, users can overview the relevant content created in Decidim, and navigate to participatory components as shown in Figure 10.

  Proposals: This feature enables users to provide their proposals for a location directly on a map. When entering proposals, users can navigate through the proposals either on list view (Figure 11) or on a map view (Figure 12). Users can tap on a proposal for further details, comment on it, like or dislike it and share it on social media to promote it. By tapping the + button, users can create their own proposal in a step-by-step manner. At first, they insert the location related to their proposal (Figure 13), then they can select the relevant topic (Figure 14), then add further details (Figure 15). Users can also include relevant photos either by using their camera or by uploading them from the device (Figure 16). After submitting a proposal, users receive a confirmation screen and can be redirected to the main page of the proposals. Another capability to be explored is the ability to upload relevant documents according to needs.

  Reports: This feature enables users to raise attention concerning an issue or raise attention when encountering invasive species (e.g. plants). An issue can be anything from a broken streetlamp to a hole in the road, a pile of garbage neglected etc. Invasive plant species are also in need of diligent management. By using this mechanism, citizens can actively participate in commons and notify others, and authorities in a timely manner. The mechanism involves a step-by-step approach identical to the proposals one. Users insert the relevant location (Figure 17), then they select if this is an issue or invasive species (Figure 18), provide further details (Figure 19) and photos (Figure 20).

- **Trending now:** By scrolling down, users can see the latest activity.

- **A ribbon** consisting of 4 icons each representing a specific functionality:
    - **Home:** When tapping at home icon users will be redirected to the main page of the mobile app.
    - **Near me:** This feature, which is currently under development, is focused on localization capabilities. Based on their location, users will navigate on a map and see the different projects, proposals, reports, etc., (Figure 21). For further details of each activity, users can tap on the icon to open its content.
    - **Calendar:** Through Calendar, the users of the app can be informed of any events happening in the city. Meetings could also appear either physically with their location, time and details, or online with the relevant URL, time and details. There is also the possibility of incorporating a notification system according to specific needs.
    - **Polls:** Polls provide the space for gathering feedback from the users. Competent authorities can use this mechanism to assess citizens' satisfaction and engagement, providing alternative pre-mature scenarios for users to choose from, etc. (Figure 22).

Figure 7: Processes feature. Users can navigate to the available participatory processes.

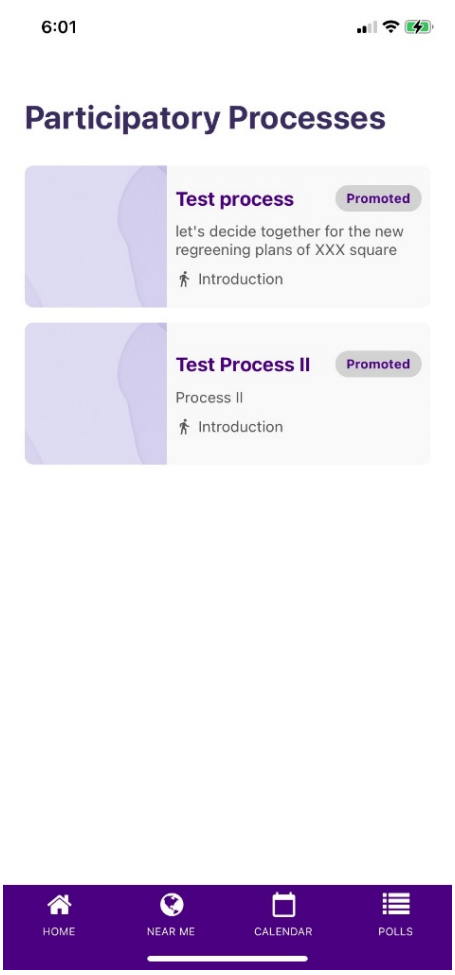


Figure 8: Process details and participatory components.

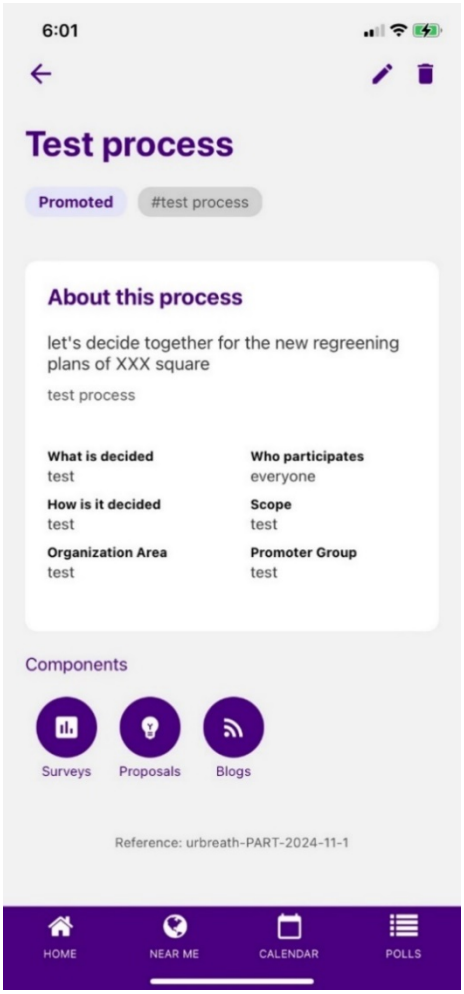


Figure 9: Proposals. Users can see the different proposals.

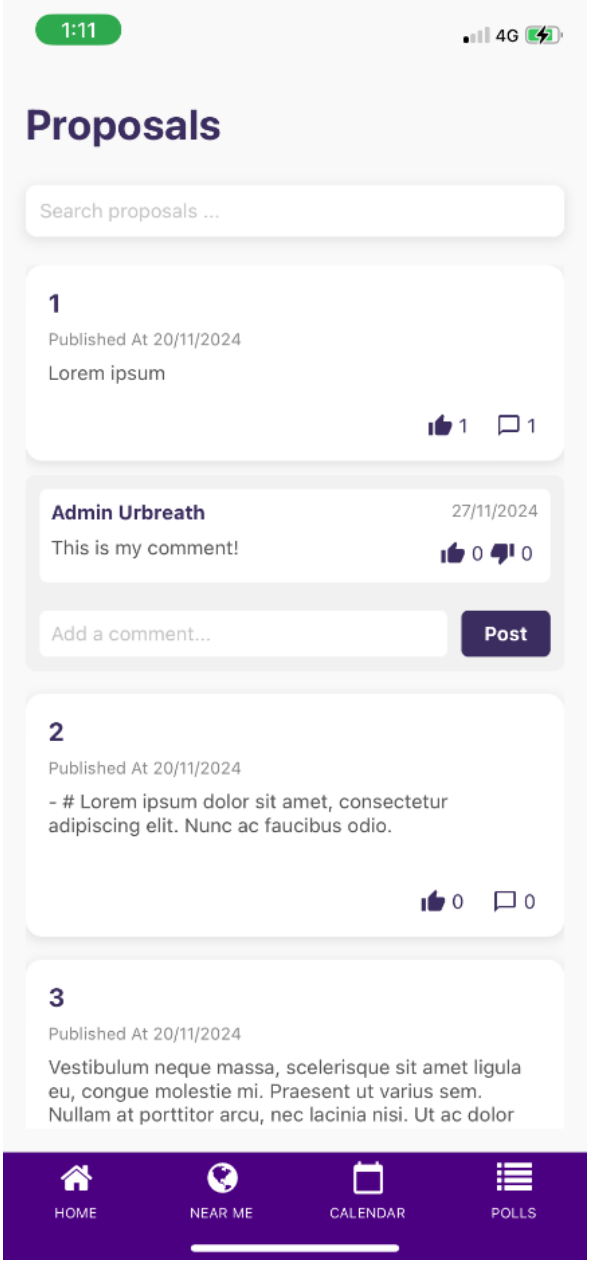


Figure 10: Assemblies overview. Users can see the details of the assemblies and the participatory processes it includes.

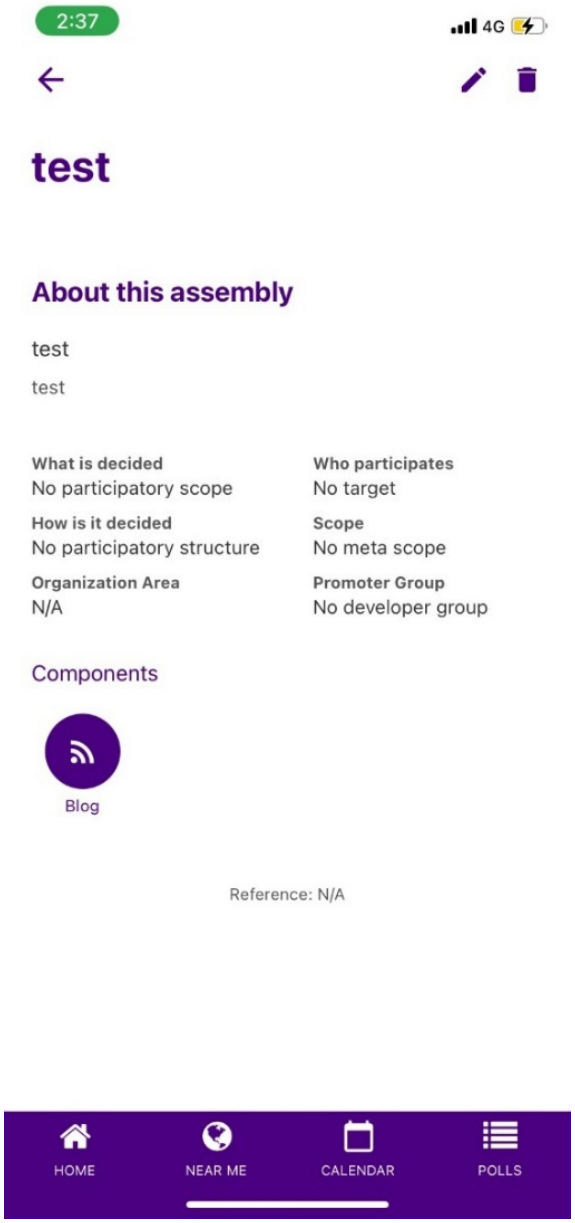


Figure 11: Proposals. Users can navigate through the different proposals on the list view.

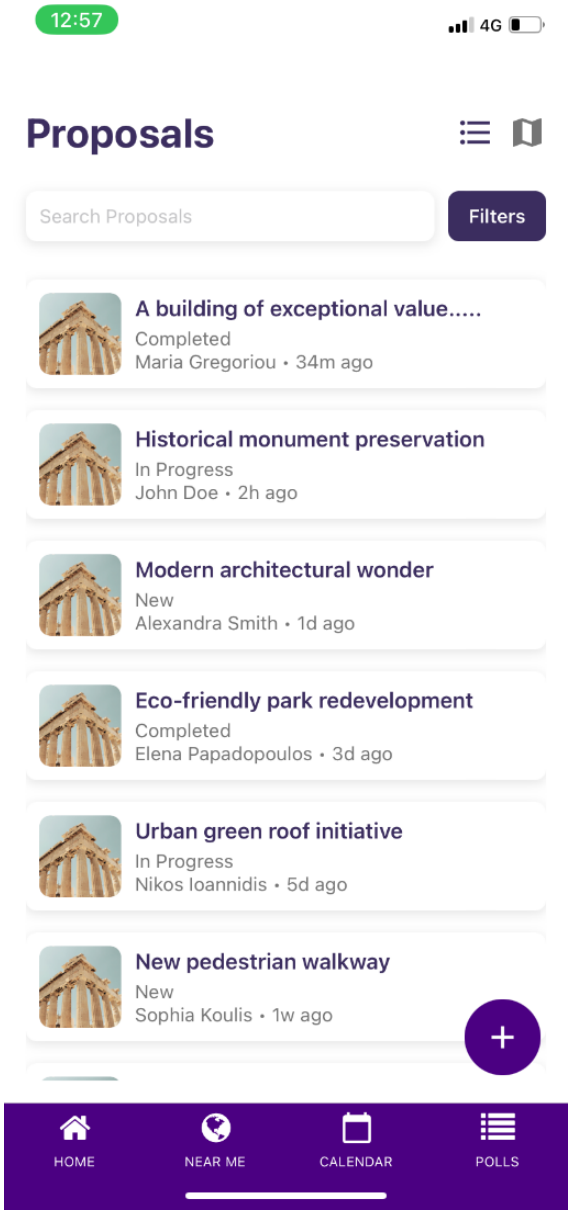


Figure 12: Proposals. Users can navigate through the different proposals on a map.

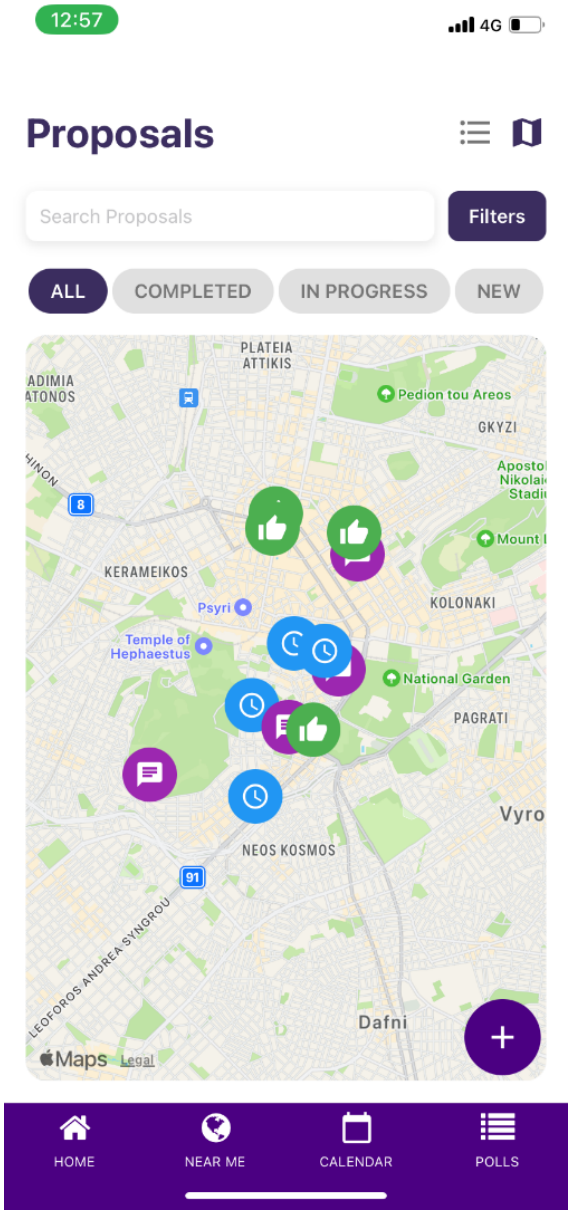


Figure 13: Create a new Proposal – Step 1: Pick a location.

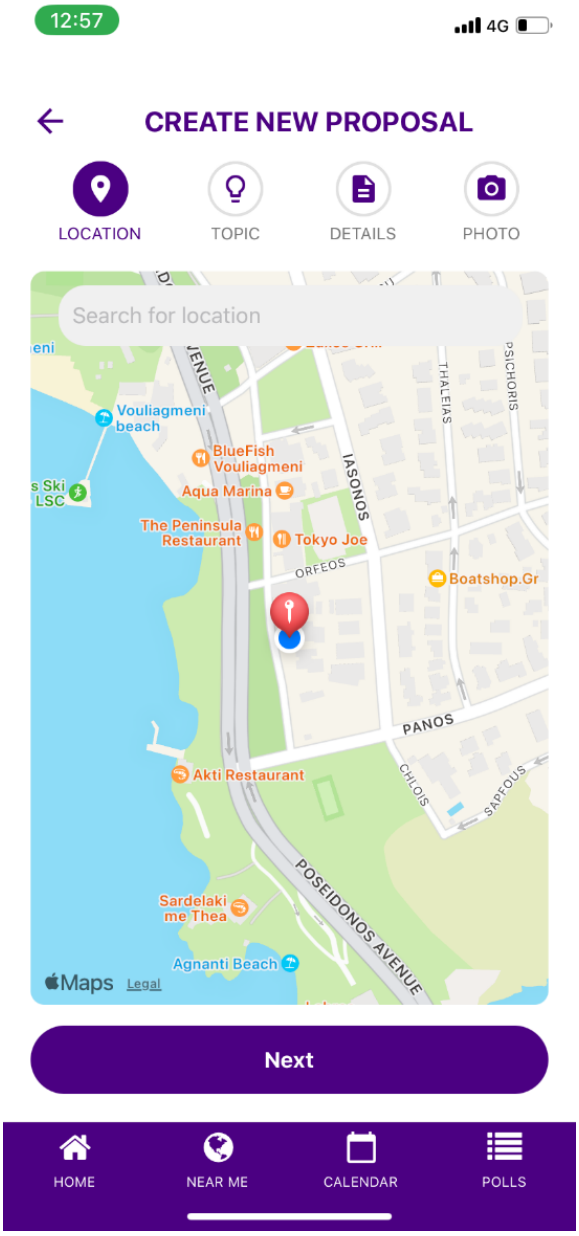


Figure 14: Create a new Proposal – Step 2: Select a topic.

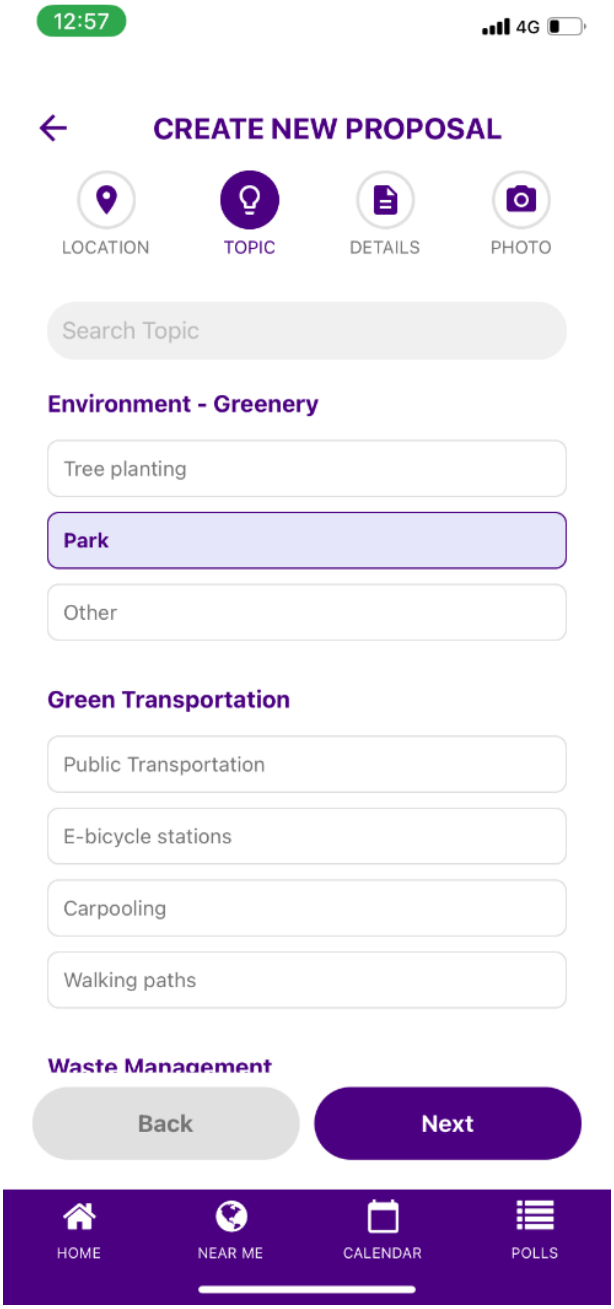


Figure 15: Create a new Proposal – Step 3: Provide the details.

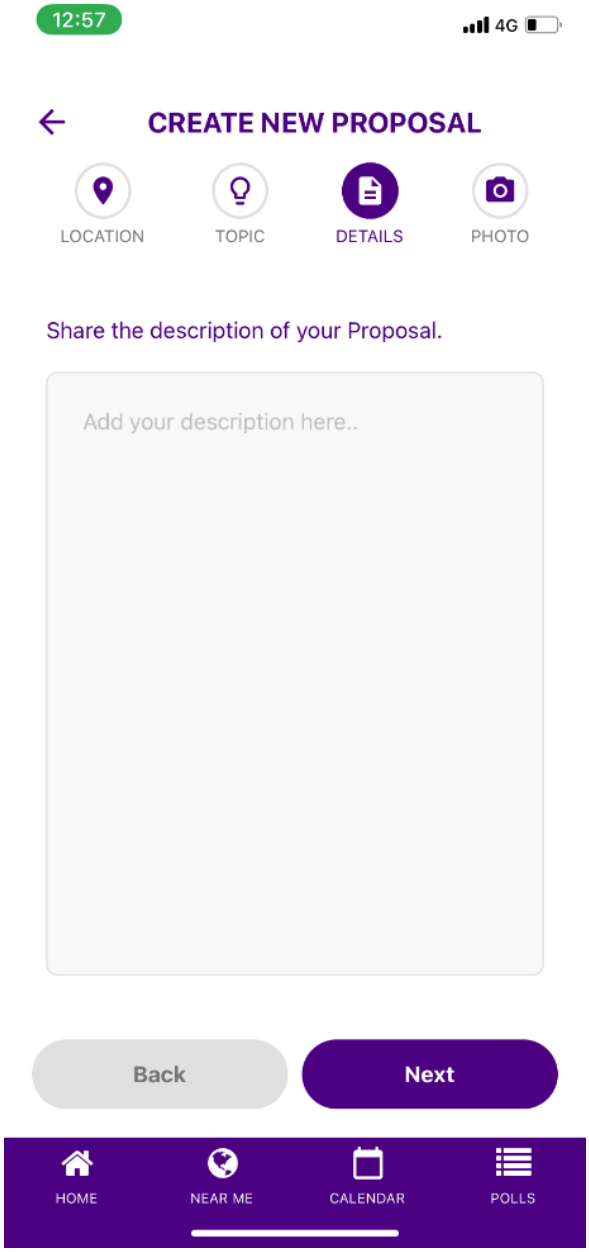


Figure 16: Create a new Proposal – Step 4: Add a photo.

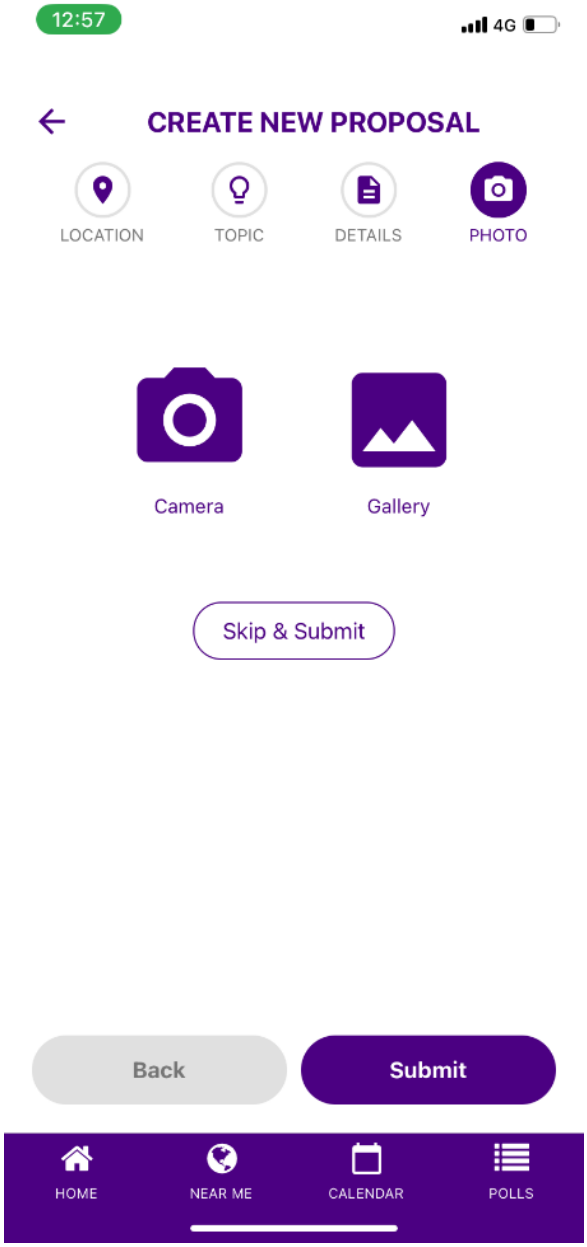


Figure 17: Report an incident – Step 1: Add a location.

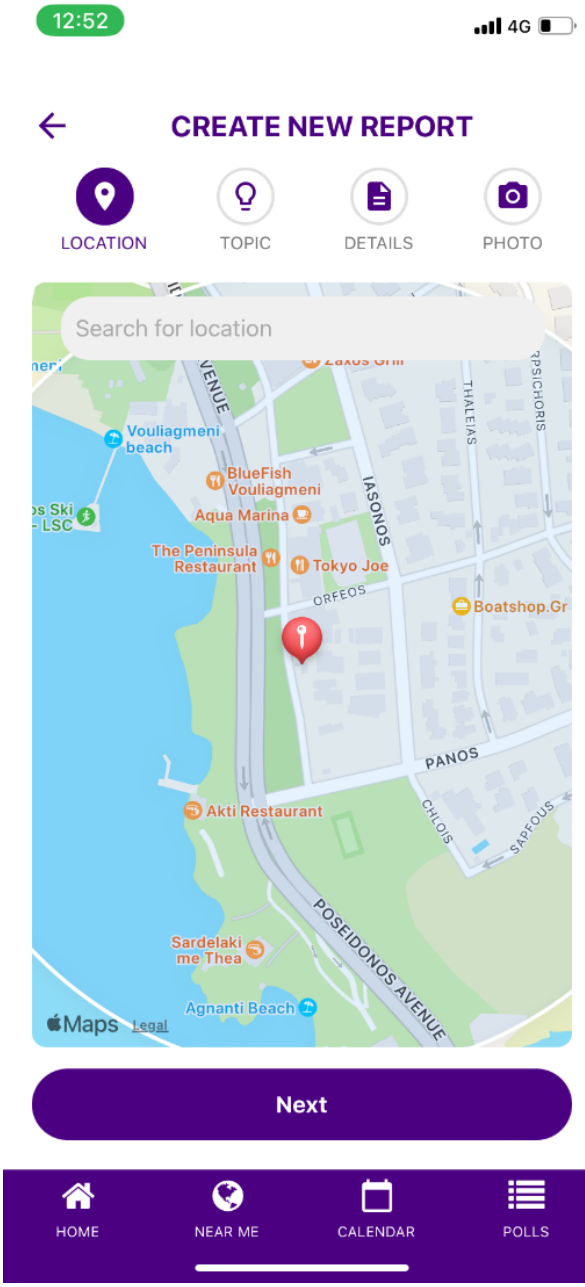


Figure 18: Report an incident – Step 2: Add a topic.

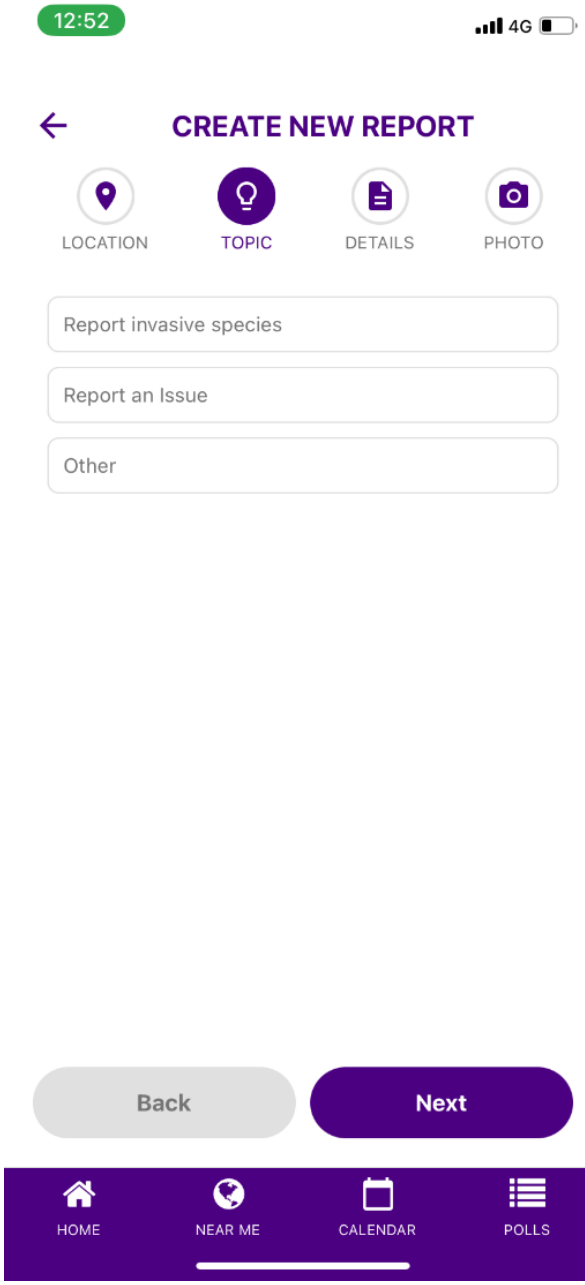


Figure 19: Report an incident – Step 3: Add details.

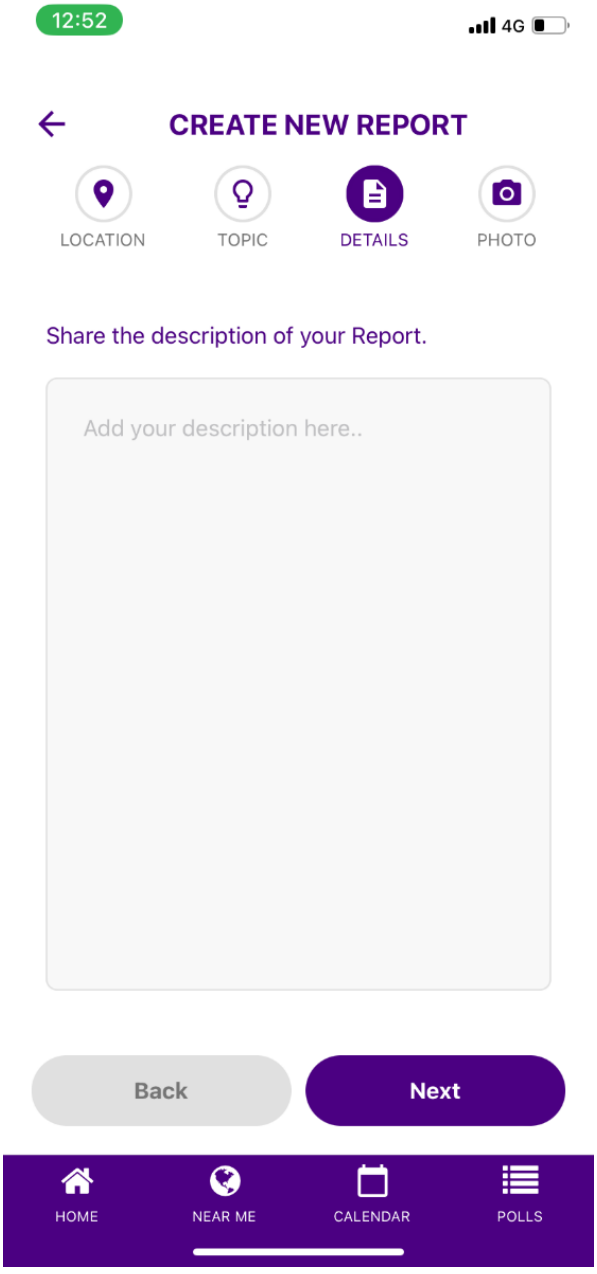


Figure 20: Report an incident – Step 4: Add a photo.

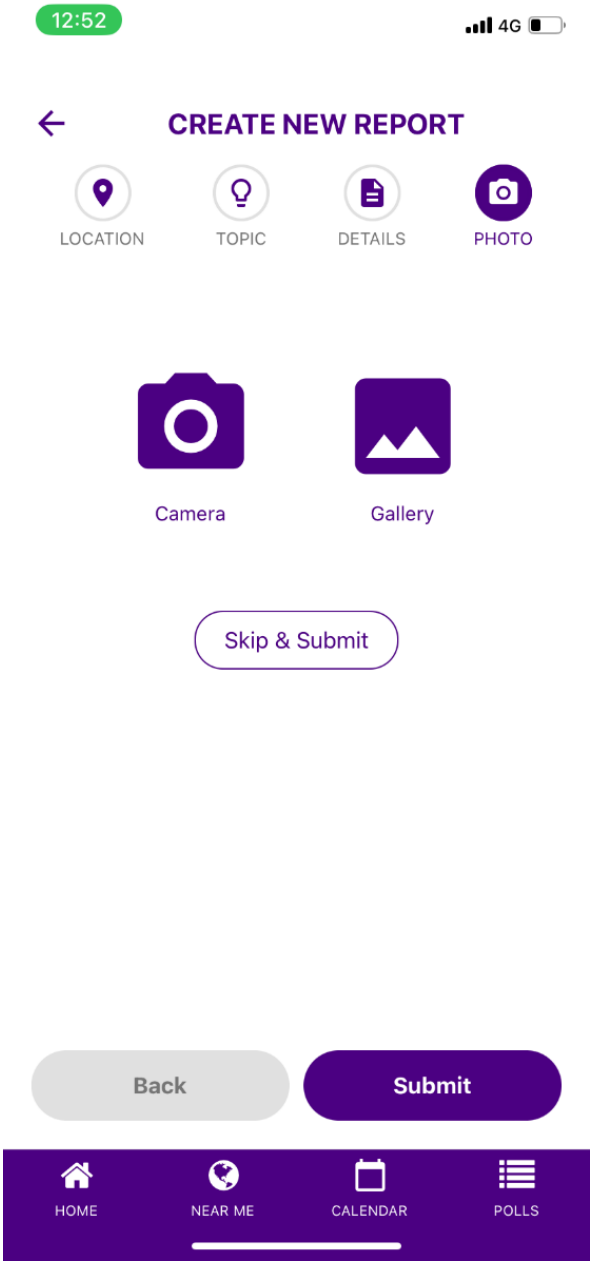


Figure 21: *Near me* feature. Based on their location, users can navigate on a map and see the different projects, proposals, reports etc. Users can use filters or tap on the icons for further details.

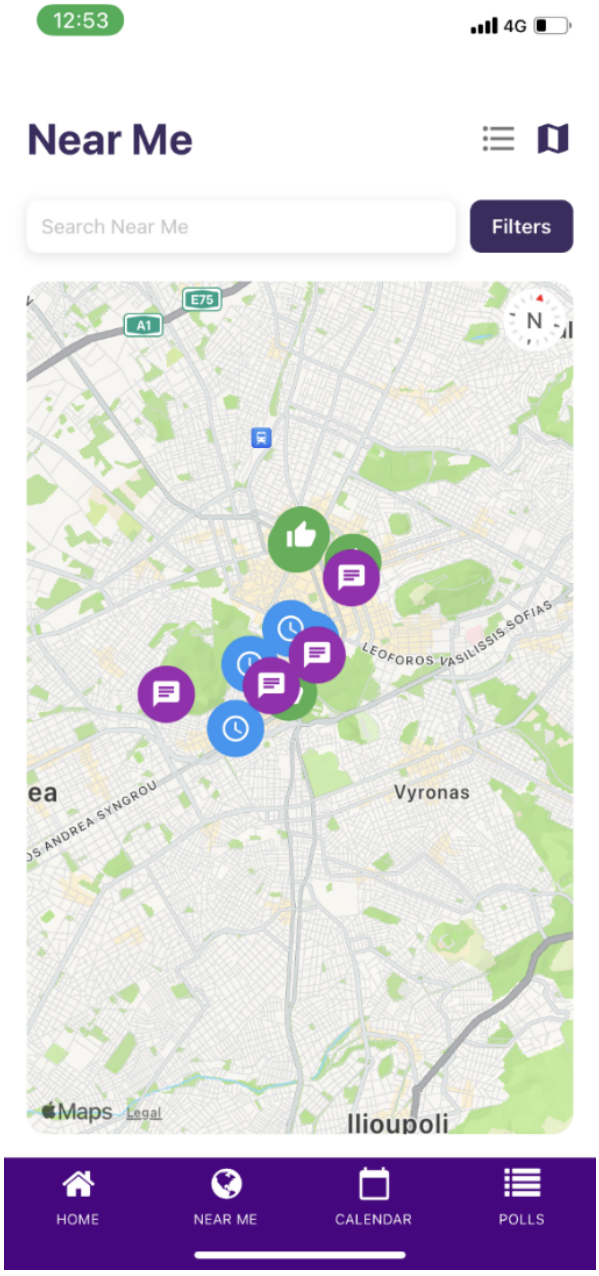
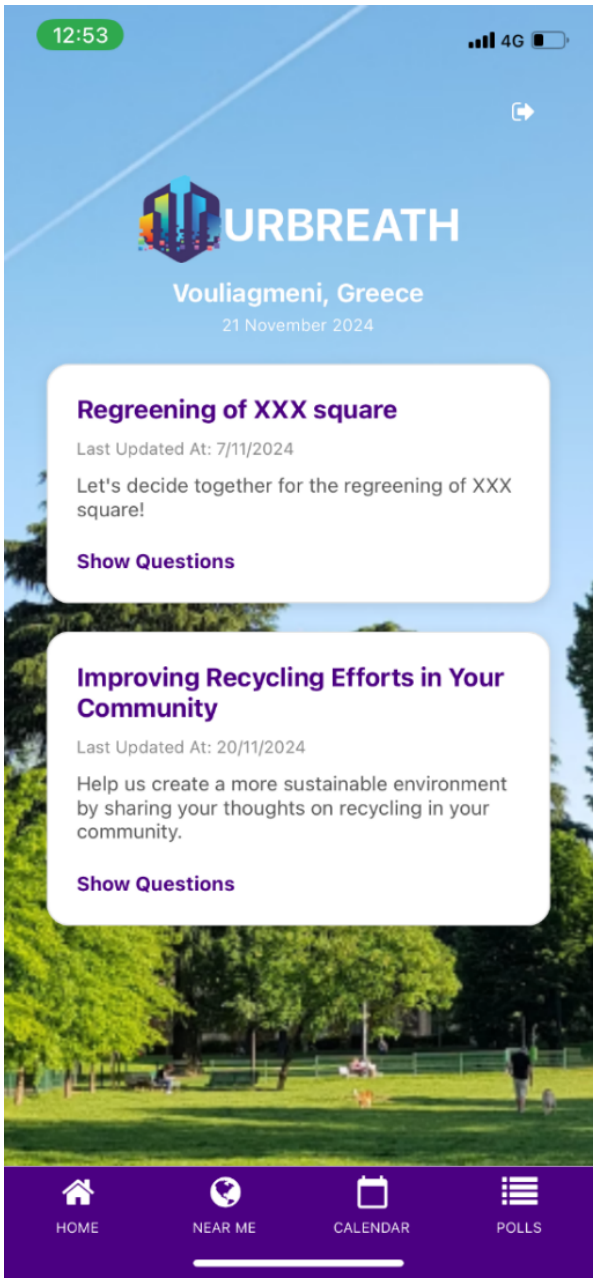


Figure 22: Polls. Competent authorities can use this mechanism to gather feedback, co-create with users, and include a wider audience in decision-making processes.



4.2 Initial PoC

The mobile application is versatile, designed to facilitate functionalities currently missing from e-participation tools and accommodate the different needs of FR cities and FL cities. The e-participation mobile app has also the dynamic of incorporating functionalities offered from Decidim web app to its native environment through accessing Decidim's API.

The application is built with React Native, allowing it to run on both iOS and Android devices from a single codebase. It uses Expo, a platform that makes development and testing easier by providing tools like automatic updates and a preview environment. With Expo, developers can quickly see changes in the app by using the Expo Go app on their phones, making testing and debugging fast and efficient.

Reporting its development progress, the mobile app has developed its interface to a running application and will start developing its backend based on the needs of the cities. For adding functionalities, a one-by-one approach is followed by the ongoing activities of the task. Each feature is to be designed and validated in collaboration with the FRC and FLC to accommodate their specific needs.

4.3 Integration Plans

The e-participation mobile app can provide integration capabilities with other tools. The general integration strategy followed by the activities of Task 4.2, is best described as incremental.

Incremental integration strategy, commonly used in Agile projects, is when a single module is tested and integrated with another module in a one-by-one manner. When this integration is tested, then another module or component is added. Instead of integrating all components at once and testing, the integration is done incrementally as additional components are added. Otherwise, if all components are put together at once, the cause(s) of a potential problem is difficult to address as it could be a single component or a result of multiple different minor ones causing a "big bang"[14]. Additionally, even if the entire system is not complete a part of functionality can be demonstrated.

Aiming to support URBREATH's vision and facilitate communication and engagement the mobile app can provide space and connection points with other tools of the framework to enhance interoperability among the tools but also make them easily accessed and available from a mobile application. Thus, it is of interest for such opportunities to be explored upon feasibility assessment, at the upcoming activities of the task.

14 https://qatestlab.com/resources/knowledge-center/big-bang-testing/

4.3.1 Planned integration with Decidim

The e-participation mobile app is intended to start its integration journey with Decidim. A successful integration between these tools, as already mentioned before, will result in a complete e-participation solution.

The communication between the mobile application and Decidim's API was implemented using HTTPS requests and, more specifically, by using Axios Library. Axios is an efficient solution for making HTTPS requests. In our implementation, we configured Axios with a base URL pointing to Decidim's API endpoint. Each request such as GET, POST, PUT or DELETE was configured with the necessary headers. The responses were handed asynchronously, enabling the application to process data efficiently and update UI in real-time.

Error handling was also implemented to identify and resolve issues like network failures or invalid responses, providing the users with the relevant error information content.

Figure 23: Example of the request implementation retrieving assemblies' feature while also incorporating error handling

```
async fetchAssemblies() {
  try {
    const response = await POST(
      DECIDIM_API_URL,
      {
        query: `…
        }`,
      },
      {
        headers: {
          "Content-Type": "application/json",
        },
      }
    );
    console.log("API raw response:", response);

    const assembliesData = response.data?.assemblies;
    if (!assembliesData || !Array.isArray(assembliesData)) {
      console.error("Unexpected response structure for assemblies:", assembliesData);
      return;
    }

    const formattedAssemblies = assembliesData.map((assembly) => ({…
    }));

    this.setAssemblies(formattedAssemblies);
    console.log("Assemblies", this.assemblies);
  } catch (error) {
    console.error("Error fetching assemblies:", error);
  }
}
```

In its current integration progress, the mobile application is only able to retrieve, public and unauthorized endpoints from Decidim's API. However, as the ongoing activities are progressing, further integration capabilities are being explored.

5 Conclusions and Next Steps

The Deliverable D4.4. "Participatory tools – V1" reports the progress of the activities performed in the context of T4.2. "e-participation tools" until M12 and contributes to the progress of WP4 "Decision Making Framework".

In this accompanying report, we have presented the methodology approach and its rationale alongside the overall architecture and structure of the initial version of the e-participation toolset. This toolset consists of two main components: a Decidim e-participation web application and a tailor-made e-participation mobile application, which is currently in development progress. A general overview of each tool is provided alongside the related mockups and their development progress.

This deliverable is the first of its series of three in total. To this end, these initial versions are to be further enriched as the URBREATH project progresses. The upcoming activities performed under T4.2. include the adaptation of these tools to the specific needs of the FRC. In this sense, the specific requirements for each FR city will be further analysed and, in collaboration with each pilot, the features that each tool can offer will be further assessed for feasibility and validation.

More specifically, during four workshops with climatic zone representatives held in November 19th, 20th, 28th and 29th the technical teams presented potential solutions to meet the pilot cities' requirements. This offered the possibility to collect feedback, suggestions, and needed functionalities from the cities concerning the e-participation tools. These potential suggestions (summarised in Table 3 per climatic zone) will be further technically evaluated as candidate functionalities to be incorporated into the e-participation tools. Technical advancements about the e-Participation tools will be reported on D4.5 "Participatory tools – V2".

Table 3: Suggested technical solutions directly and indirectly related with e-participation toolset.

	BOR	ATL	MED	CONT
E-participation tool				
Tool to participate/cocreate : share content (docs, plans, sketches, …) with stakeholders.	x	x	x	x
- Share results, ideas, options, good practices	x	x	x	x
Tool to participate/cocreate : interact with stakeholders through communication channels (meeting rooms, chats)	x	x	x	x
Tool to participate/cocreate : connected central library to increase expertise (can be achieved through the integration with Idra)	x		x	
Tool to participate/cocreate : connected Digital Twin & other visualisation tools (for datasets & simulations)	x	x	x	x

- visualisation of NBS (projects) on a map (e.g. through the integration with the NBS Catalogue; see D2.5)	x		x	
Tool to participate/cocreate : geolocation of NBS (e.g. through the integration with the NBS Catalogue; see D2.5)	x		x	
Tool to participate/cocreate : alerting about LL, new docs, …	x		x	x
Tool to participate/cocreate : calendar with LL events (including location map)			x	x
Tool to participate/cocreate : connection with social media (e.g. to share content).	x			
Tool to participate/cocreate : option to make survey/questionnaire content, publish & manage participants.	x	x	x	x
- Qualitative survey/questionnaire : liveability/happiness/wellbeing/social justice/city life index - before/after NBS	x	x	x	x
- Qualitative survey/questionnaire : socio economic value/changes - before/after NBS	x	x	x	x
- Qualitative survey/questionnaire : diversification vulnerable groups (lower SES, kids, single person households, older adults, …	x	x		x
- Qualitative survey/questionnaire : option to print surveys for offline use	x		x	x
Tool to participate/cocreate : option to send survey/questionnaire results to other analytic tools (through API) in order to perform relevant analysis	x	x	x	x
Tool to participate/cocreate : reporting of meetings			x	
Tool to participate/cocreate : engage to financially invest in NBS			x	
Tool to participate/cocreate : support for decision-making (e.g. through the integration with the KPI Manager)			x	
Tool to participate/cocreate : search functionalities (participants, library, surveys, …)			x	
Tool to participate/cocreate : Organise meetings for online training			x	
Tool to participate/cocreate : establish a public channel to interact with citizens	x	x	x	x
NBS scenarios & simulations: comment/feedback, vote, suggest ideas	x	x	x	x

In parallel, technical development aspects will also progress to support the functionalities needed.

- **Decidim**: Integrating the Digital Twin, KPI Manager, and Data Catalogue with Decidim holds immense potential for enhancing urban planning and community engagement. These potential integrations may enhance cities and communities ensuring that proposals are feasible, sustainable, and aligned with strategic goals. The next activities will focus on the feasibility analysis of that integration and on the way, they will be integrated within Decidim.

- **E-participation mobile App**: The mobile application will progress by validating existing features and exploring the feasibility of incorporating new ones with the FR cities, while also proceeding with its development progress. Thus, it is expected to develop its own backend to support the validated features and enrich its functionalities.

6 References

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[5] X. E. Barandiaran, A. Calleja-López, A. Monterde and C. Romero, Decidim, a Technopolitical Network for Participatory Democracy, Barcelona, Spain: Springer Cham, 2024, pp. XVI, 133.