

Methodological introduction

Methodological introduction: Design & AI process

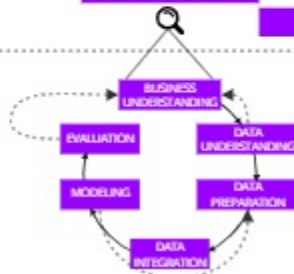
DOUBLE DIAMOND
+ AI PROCESS



TOOLKIT
PHASES



DATA SCIENCE METH-OO



1 Context analysis

Context analysis

“Context Analysis” is about exploring and mapping the specific context of operation. This phase aims to obtain a complete understanding of the particularities of the context.

Particular attention has to be drawn on grasping its **culture**, the **actors** and the **factors** that could influence and even determine the success or failure of solutions developed within and for the context.

The context of operation is seen as a complex ecosystem where several factors are interconnected and interrelated.

In this phase, also the social and cultural factors related to the initial challenge are to be carefully analyzed.

Service Safari

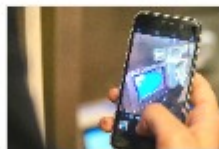
? WHAT IS IT?

Service Safari is an **autoethnography research tool** that helps designers develop interesting insights and inspirations by experiencing a service in first-person.

☰ HOW?

You will immerse in the service experience to explore it on your own. It is important to **document** your experience for future reference. You can use the *Service Safari - "Field" Notes* to do that, noting, for example, perceived strengths and flaws in the different phases of your experience.

↺ REFERENCES



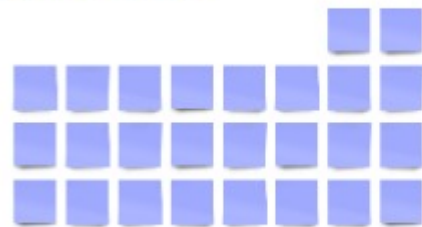
Reference to autoethnography techniques and tools.



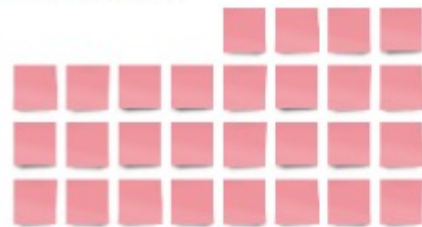
Description of Service safari in particular.

Service Safari - "Field" Notes

STRONG SUITS



PAIN POINTS



MISCELLANEOUS



ONBOARDING



INTERACTION

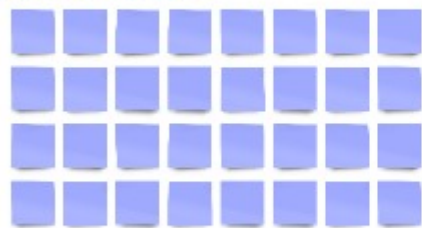


END OF EXPERIENCE

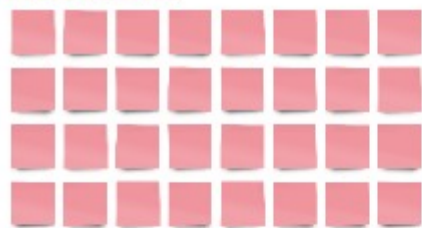


Service Safari - "Field" Notes

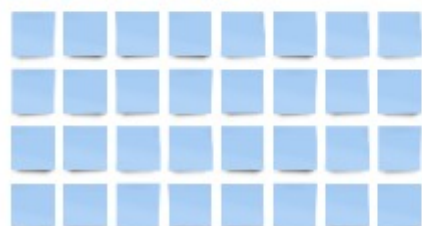
STRONG SUITS



PAIN POINTS



MISCELLANEOUS



ONBOARDING

INTERACTION

END OF EXPERIENCE



AI460V

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PROBLEM STATEMENT

WHAT would you like to focus on to reach the goal?

Revitalize
disused urban
areas

TARGET AUDIENCE

WHO is affected by the problem?

Local
administrations

EXPECTED IMPACT

WHY is it relevant?

No or poor green areas
could reduce the quality of
urban life and pollution
would be unopposed

CONTEXT

TIME

WHEN does the problem becomes critical?

3 years (for
deployment)

PHYSICAL OR ABSTRACT SPACE

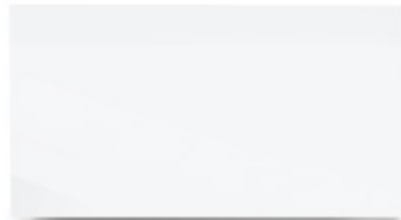
WHERE does the problem becomes critical?

Disused areas
with green
spaces

Problem Framing

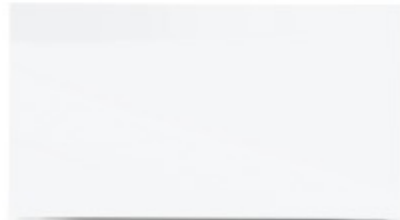
PROBLEM STATEMENT

WHAT would you like to focus on to reach the goal?



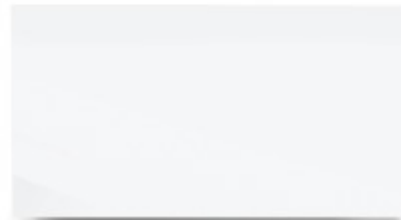
TARGET AUDIENCE

WHO is affected by the problem?



EXPECTED IMPACT

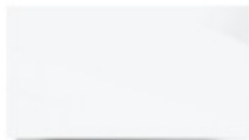
WHY is it relevant?



CONTEXT

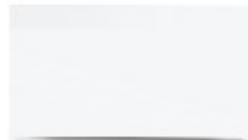
TIME

WHEN does the problem becomes critical?



PHYSICAL OR ABSTRACT SPACE

WHERE does the problem becomes critical?



Stakeholder Map

? WHAT IS IT?

The *Stakeholder Map* is a visual representation of all the **stakeholders involved in a system** according to how much they can influence the situation under investigation or be impacted by it. It answers the question “who are the groups, partner organizations, institutions affected?” and, in this case, is used to identify the main target audience.

☰ HOW?

The *Stakeholder Map* is presented as a matrix, defined by two parameters: the **impact** a problem might have on a person/group of people, and the **influence** they have on solving the problem.

- Brainstorm all the possible categories of people that can be of interest for your project. Remember to consider also data-related stakeholders (data providers, controllers, stewards, etc.)
- Place them on the map according to the impact/influence criteria.

Place those who are the most critical targets for solving the problem in the top-right corner (possibly, they overlap with the WHO of the *Problem Framing* tool).

It follows that stakeholders can be distinguished into direct and indirect. The former needing to be taken into account and involved more.

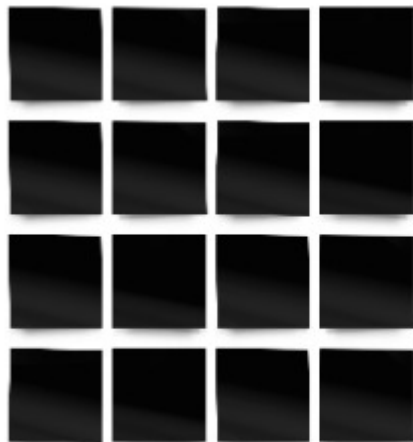
↺ REFERENCES



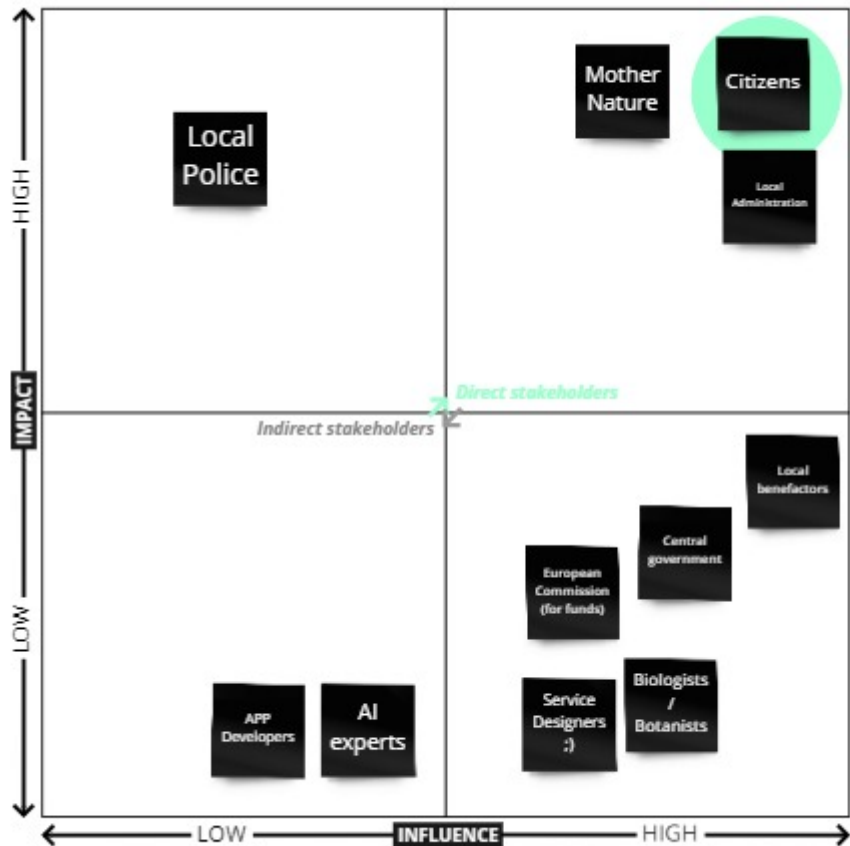
Giordano, F. B., Morelli, N., De Götzen, A., & Hanziker, J. (2018). *The stakeholder map: A conversation tool for designing people-led public services*. In *Service Design and Innovation Conference: Proof of Concept*. Linköping University Electronic Press.

Stakeholder Map

1. Use the post-its to list the different stakeholders related to your system.
2. Place them in the matrix according to how much they can **influence** the situation you are designing for or **be impacted** by it to have a clear representation of who are the most relevant people for you.



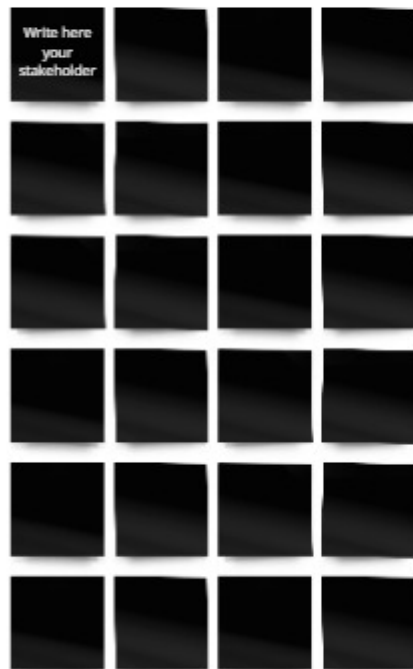
How much is the stakeholder **IMPACTED** by the project?



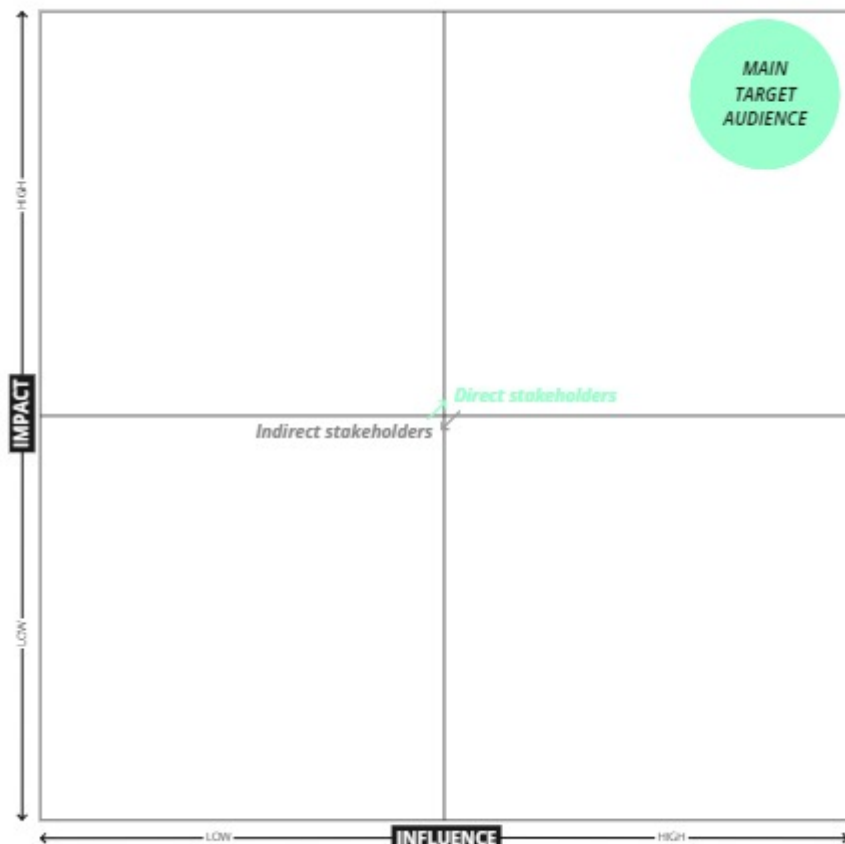
How much can the stakeholder **INFLUENCE** the success of the project?

Stakeholder Map

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How much is the stakeholder **IMPACTED** by the project?



How much can the stakeholder **INFLUENCE** the success of the project?

Stakeholder Value Map

? WHAT IS IT?

The *Stakeholder Value Map* is a visual representation dedicated to specifically elaborate on the **values of key stakeholders**. It allows to reason about what values might be important for them according to their needs. Different kinds of values can emerge, based on the **character of needs**.

- *Practical needs* relate to basic or primary necessities.
- *Social needs* are connected to values that take place in the relationships with others.
- *Higher personal needs* belong to a more abstract sphere of necessities linked to an individual sense of dignity and realization.

☰ HOW?

1. Select (up to) 3 stakeholders in the top right quadrant of the *Stakeholder Map* and place them on the board.
2. Think about the different kinds of values associated to each primary stakeholder.
3. Place them in the corresponding area, according to need they refer to.

↺ REFERENCES



Stakeholder Value Map



User Research Interview Guide

? WHAT IS IT?

The tool supports the design of structured or semi-structured interview questions to directly involve **relevant users or stakeholders** for the problem at hand. *Interviews* are useful to investigate their **needs, desires, expectations**, as well as their **current state, habits, or potential**.

☰ HOW?

For an appropriate preparation to conduct a (semi-)structured interview:

1. Define **clear and limited scope and objective(s)** for the interview.
2. Identify **relevant interviewees** for the investigation.
3. Understand the **best context** (preferable and possible time, place, modality) for a successful interview;
4. Define a **structure** for your interview:
 - identify the **relevant dimensions** to explore to achieve the objectives (you can select some among those proposed, or imagine new ones or different interpretations)
 - For each selected dimension, elaborate **one or more questions**. Pay attention NOT to overwhelm your interviewee!



TIP

Keep your questions **simple and open**. To gain interesting insights you must **not be prescriptive**.

↺ REFERENCES

Interview Guide | Service Design Tools

Get ready for user research by listing all the questions you want to ask.

Design Kit

Design Kit is IDEO.org's platform to learn human-centered design, a creative approach to solving the world's most difficult problems.

#TISDD Method: In-depth interview

A free method from the #TISDD book: A qualitative research technique of conducting intensive individual interviews.

#TISDD Method: Contextual interview

A free method from the #TISDD book: Interviews conducted with customers, employees, or any other relevant stakeholders in a situational context relevant to the research question; also known as contextual inquiry.

User Research Interview Guide

Interviews can be structured based on, but not limited to, the following dimensions.

Interview possible dimensions from which to select those relevant for your case

Profiling	Gathering of relevant info on the interviewee and/or the organization represented (e.g., role, domain, expertise, etc.).
Contents	Inquiry into the extent of knowledge and interest in the topic under consideration (e.g., use cases, best practices, papers, etc.).
Tools & services	Investigation of tools and services currently in use, those desired, or relevant references.
Know-how	Exploration of previous experience, expertise, and skills related to certain domains, activities, initiatives, tools, services, or other.
Ecosystem & network	Investigation of existing or interesting ecosystems and networks where collaboration, sharing of solutions and expertise can take place and benefit.
Data	Inquiry into data approach, availability, collection, use, sharing, and so forth.
Training	Exploration of existing, required, or relevant training-related activities (e.g., upskilling, long-life learning, etc.) and/or of the attitude and desiderata towards them.
Funding	Inquiry into forms and/or scope of funding already available and accessed, existing or to be obtained.
Infrastructure	Exploration of the infrastructure - owned, to be implemented, or further existing possibilities (e.g., to support AI systems).
Initiatives & com.	Inquiry into the attitude to events, communication and dissemination, their role and relevance.

Interview scope and objective(s)

Write here the specific scope and objective(s) of your interview

Dimensions Questions

Profiling

1. Where are you currently working?
2. What is your role in the local administration?
3. Why is it relevant in relation to the improvement of disused green areas in the city?

Initiatives & com.

4. What kind of initiative did you implement to improve green urban areas?

Ecosystem & network

5. Who was involved in the solution implementation?
6. Did you reach out to other cities to reuse solutions already developed by them?

Dimensions Questions

Funding

7. How was the initiative funded?

Know-how

8. What problems did you encounter in the implementation of your solution?
9. What benefits have you observed as a result of your intervention?

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

User Research Interview Guide

Interviews can be structured based on, but not limited to, the following dimensions.

Interview possible dimensions from which to select those relevant for your case

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Exploration of previous experience, expertise, and skills related to certain domains, activities, initiatives, tools, services, or other.

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Data

Inquiry into data approach, availability, collection, use, sharing, and so forth.

Training

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Dimensions Questions

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

Dimensions

Questions

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

Place here a relevant dimension for you

Elaborate your questions here:

1. ...
2. ...

From Needs to Insights

? WHAT IS IT?

The tool is meant to build on the needs previously identified to infer **relevant insights** that might **change or enrich your perspective towards the problem**, in the form of a simple and synthetic sentence. This mental exercise can help you reframe the initial definition of the problem and guide you towards more effective solutions.

☰ HOW?

The *Stakeholder Value Map* is the starting point for this tool.

1. Select one of your **primary stakeholders**, this will be the **subject** of the sentence.
2. Choose one of their **needs** and put it in the form of a **verb**.
3. Reason about **why your subject has this need** to see if something interesting comes up. >> **Keep an open mind and try to find latent and insightful motivations!**
4. **If the insight is valuable** for you, write it down on the board. Repeat this process for all the stakeholders and needs that you think might bring you to relevant insights.



TIP

Start from Practical needs. It can happen that Higher personal needs coincide with the insights / motivations.

↶ REFERENCES

#TiSDD Method: Developing key insights

A free method from the #TiSDD book: Summarizing main findings in a concise and actionable format for communication within and across project teams.

Reference on building tool to develop key insights, summarizing the main findings in a concise and actionable format for communication within and across project teams.

Design Kit

Design Kit is IDEO.org's platform to learn human-centered design, a creative approach to solving the world's most difficult problems.



From Needs to Insights

Stakeholder needs

Bring here the needs derived from the insights mapped in the Sense-making wall and in the Stakeholder Value Map.



You can group visually stakeholders by changing the background color

	STAKEHOLDER	NEEDS	IS THERE ANY RELEVANT INSIGHT?
#1	Mother Nature	needs to be taken care of	because it needs human commitment and action to survive
#2	Mother Nature	needs to grow in suitable environments	because it can help human life
#3	Citizens	need to have healthy and safe public spaces	because they should also have an outdoor life
#4	Citizens	need to commit to public life	because they can contribute to environmental issues
#5	Citizens	need to contribute to environmental issues	because they can feel a sense of accomplishment
#6	The Local Administration	needs to reduce air and noise pollution	because it guarantees better life conditions
#7	The Local Administration	needs to have aesthetically appealing cities	because it guarantees better life conditions
#8	Add stakeholder here...	needs to verb	because new insight
#9	Add stakeholder here...	needs to verb	because new insight

From Needs to Insights

Stakeholder needs

Bring here the needs derived from the insights mapped in the Sense-making wall and in the Stakeholder Value Map.



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	STAKEHOLDER		NEEDS		IS THERE ANY RELEVANT INSIGHT?
#1	Add stakeholder here...	needs to	verb	because	new Insight
#2	Add stakeholder here...	needs to	verb	because	new Insight
#3	Add stakeholder here...	needs to	verb	because	new Insight
#4	Add stakeholder here...	needs to	verb	because	new Insight
#5	Add stakeholder here...	needs to	verb	because	new Insight
#6	Add stakeholder here...	needs to	verb	because	new Insight
#7	Add stakeholder here...	needs to	verb	because	new Insight
#8	Add stakeholder here...	needs to	verb	because	new Insight
#9	Add stakeholder here...	needs to	verb	because	new Insight

Problem Reframing

? WHAT IS IT?

In the light of the research and reflections done so far, the problem reframing activity aims at **consolidating a deeper comprehension of the problem**.

Reaching a sharp understanding of the **real problem** can help you in the idea development phase to envision more effective and innovative solutions.

☰ HOW?

Now that you have better analyzed your user, can you reframe your problem from a different and more comprehensive way?

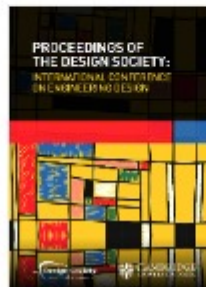
1. Collect all the elements that might help you in this process from the previous tools (or create new ones if you need it), and place them in the corresponding spaces in the upper part of the tool.
2. **Synthesize** all the info you deem necessary in the form of an "How might we ... to ...?" question. It should allow several possibilities, without being too broad.
3. In this way, you should have your **scenario** and **expected impact** defined for the next steps.



TIP

Keep the question short and easy to understand!

↻ REFERENCES



www.cambridge.org
 Tackling Reframing: The Development and Evaluation of a Problem Reframing Canvas | Proceedings of the Design Society: International Conference on Engineering Design | Cambridge Core
 Tackling Reframing: The Development and Evaluation of a Problem Reframing Canvas - Volume 1 Issue 1

In this article two Dutch case studies are examined in which the proposed reframing canvas is tested.

www.designkit.org

Design Kit

Design Kit is IDEO.org's platform to learn human-centered design, a creative approach to solving the world's most difficult problems.



Problem Reframing

TARGET AUDIENCE

Citizens

Local
Administration

Mother
Nature

MAIN NEED

Revitalize
disused
urban
areas

Improve
the quality
of citizens
life

EXPECTED IMPACT

Have quality
green areas for
better urban life
and reduced
pollution

Have
healthy and
fulfilled
citizens

TIME

3 years (for
deployment)

PHYSICAL OR ABSTRACT SPACE

Disused areas
with green
spaces

Green
public
spaces

INSIGHTS

Citizens
outdoor life
should be
promoted

People's
psycho-
physical needs
should be
fulfilled

How might we **revitalize and take care of green urban areas** SCENARIO
to improve people's lives quality? EXPECTATION

Problem Reframing

TARGET AUDIENCE

MAIN NEED

EXPECTED IMPACT

TIME

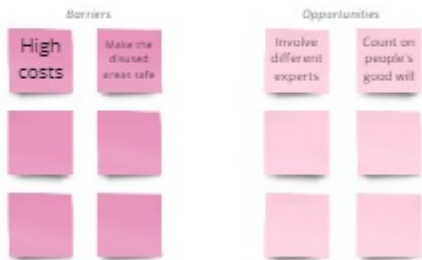
PHYSICAL OR ABSTRACT SPACE

INSIGHTS

How might we ... to ...?

SCENARIO EXPECTATION

Sense-making Wall: Barriers & Opportunities

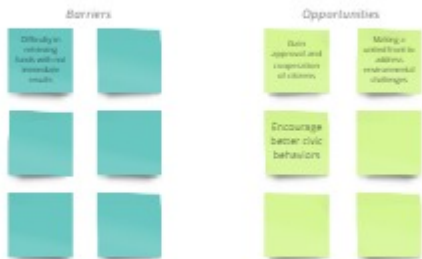


USE CONTEXT



AI & TECHNOLOGY

SOCIO-CULTURAL VALUES



ORGANIZATIONAL CONTEXT



Sense-making Wall: *Barriers & Opportunities*



USE CONTEXT

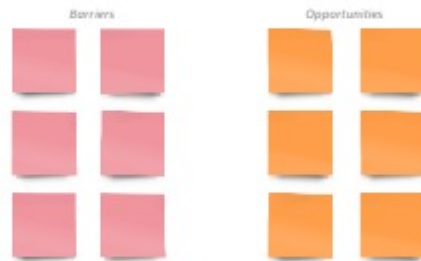


AI & TECHNOLOGY

SOCIO-CULTURAL VALUES



ORGANIZATIONAL CONTEXT





Envisioning solutions

Envisioning solutions

Envisioning solutions is a phase dedicated to the ideation of new solutions aimed at meeting and solving the identified problem.

The first part is dedicated to further explore the problem, in order to move to its reframing and hence identifying effective solutions.

Through ideas elicitation, a large quantity of ideas is to be developed that are then discussed, grouped and eventually combined leading to one single concept of the final solution. Brainstorm and reason even on ideas that are impossible to implement bring to consider aspects that can be combined in new ideas that narrow down to a feasible concept able to meet the needs of all stakeholders and users.

Ideas Elicitation

? WHAT IS IT?

Having built the right question is fundamental to **start exploring possible solutions** that meet the problem. Your *How Might We (HMW)* question should help you generate lots of creative ideas as possibilities to be discussed to extract the best solution. These can be further explored through the *Desktop Walkthrough* prototype.

☰ HOW?

1. Report your HMW question in the apposite box.
2. Keep in mind the assumptions you made earlier about what is of value to your primary target audience.
3. With the acquired sensitivity, use the space on the board to brainstorm **various ideas** to answer it. There is no right or wrong in this phase, any suggestion can be an inspiration for you and your design team.
4. Among the ideas proposed, choose one to develop. You can do this freely within your design team or use an *Evaluation Matrix* to facilitate the decision.

↻ REFERENCES



Article explaining that constructing how-might-we questions generates creative solutions while keeping teams focused on the right problems to solve.



How might we **revitalize and take care of urban green areas** to improve people's life quality?

SCENARIO EXPECTATION

Every problem is an opportunity for design. Properly framed How Might We doesn't suggest a particular solution, but gives you the perfect frame for innovative thinking.

Replanting urban greenery by having AI systems identify the best species for greater pollution reduction in relation to the location

Giving up the management of green areas to cultural associations

Organizing events to foster collective action towards green areas

Having people and AI systems collaborate for the monitoring and maintenance of urban greenery

Hiring private contractors to maintain green areas

Predicting when trees are going to have a disease

Generating inventory of green areas of the city and how they are used by people

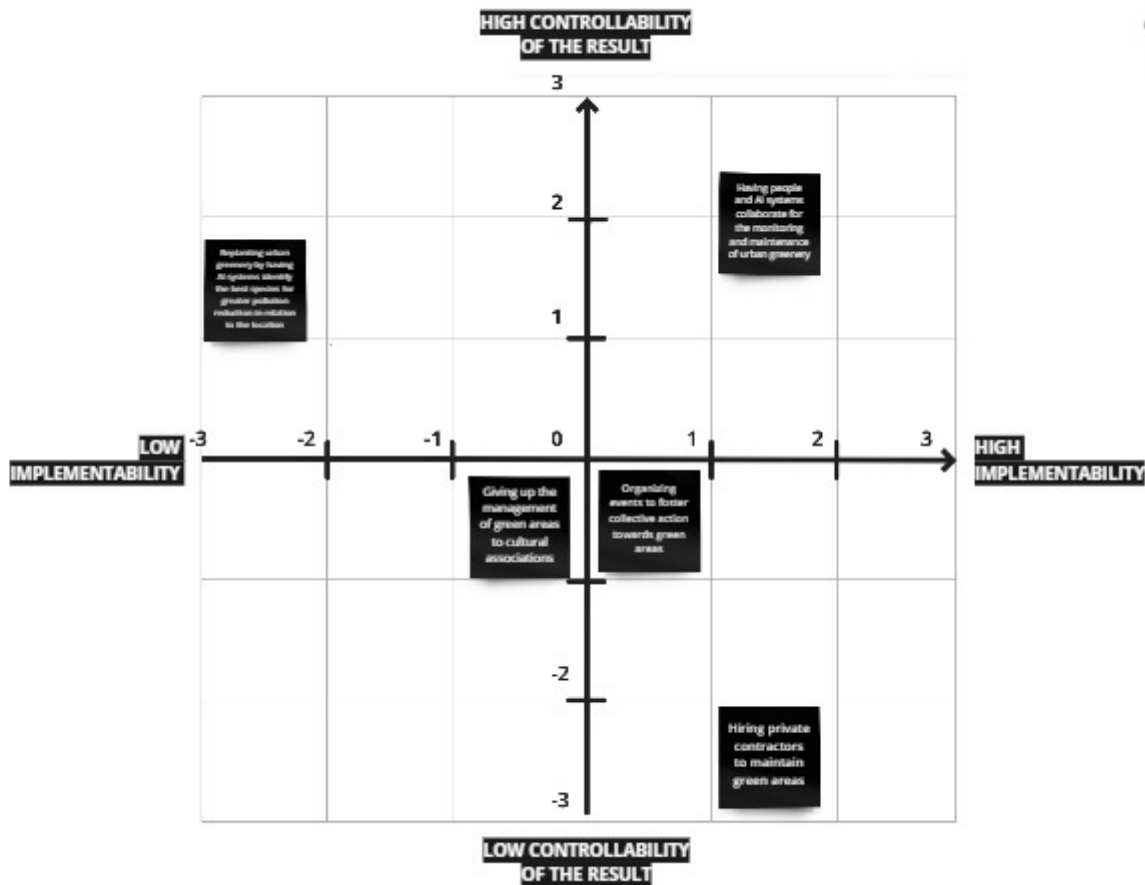
How might we ... to ...?

SCENARIO EXPECTATION

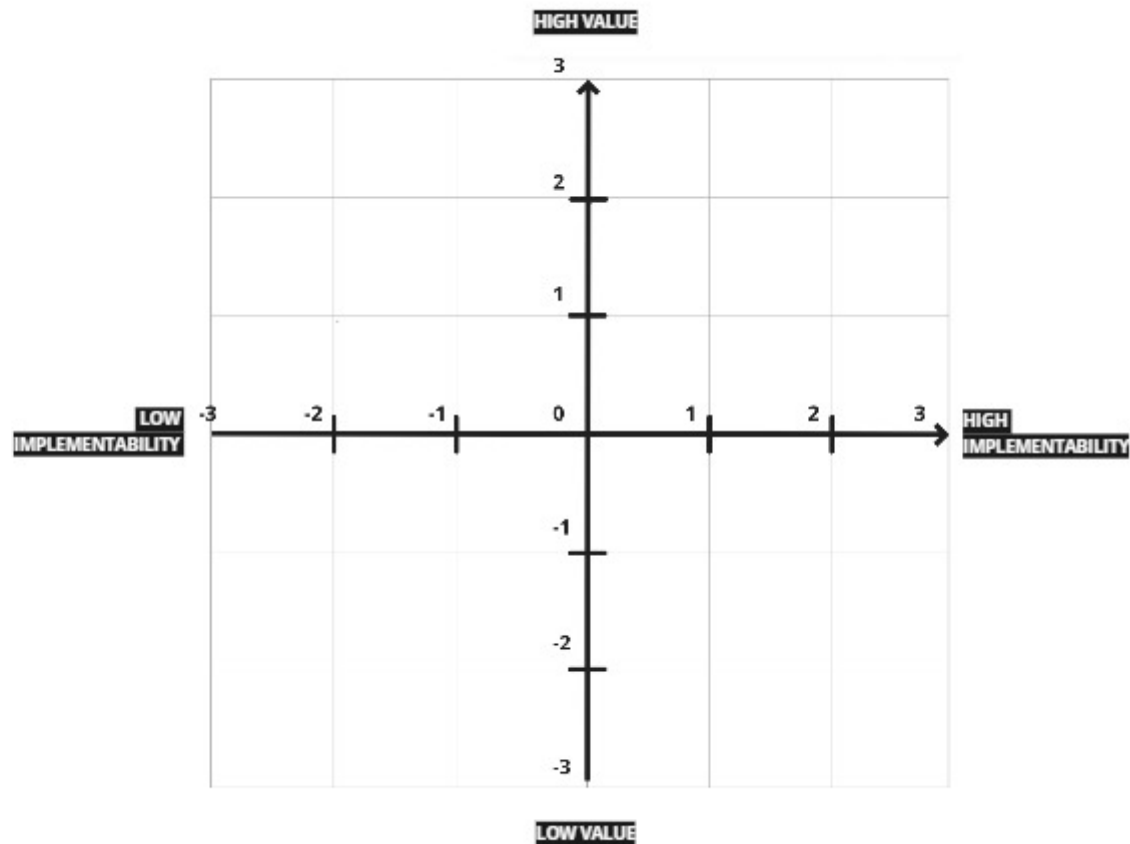
Every problem is an opportunity for design. Properly framed How Might We doesn't suggest a particular solution, but gives you the perfect frame for innovative thinking.



Evaluation Matrix



Evaluation Matrix



3

Idea

development

Idea development

The phase is dedicated to the development of the idea identified in a multi-dimensional way. The idea development unfolds from ethical implications to system requirements.

A first part is dedicated to unpack the ethical issues and implications of a project, reasoning on the role of data by focusing on specific aspects one at a time.

Then, it is required to reason on the solution as a system consisting of data to be inputted in order to run certain tasks and obtain specific outcomes, ruminating on implications, even unintentional.

A high-level description of the solution and a reasoning on its technological feasibility completes the provision of a multi-level understanding of the idea.

Idea Description

? WHAT IS IT?

To properly communicate, share, and develop an idea, it is very important to define it in a **synthetic and immediate** way. Therefore, this tool allows this process encouraging the identification of a title and a catch phrase.

☰ HOW?

In a "fake it before you make it" approach, try to describe the idea identified in the HMW activity as you should sell it to a possible customer or funder.

1. Give a **name/title** to your concept, leveraging its most characterizing qualities.
2. Compile a **catch phrase** that identifies the substance of your idea (what is it in a nutshell?) and its main function. You can use the space at the bottom of the board to gather ideas.



TIP

Remember, the key is to be as synthetic and clear as possible in the message you want to send.

↺ REFERENCES



www.thisserviceadvertising.com/

#TISDD Method: Service advertisement

A free method from the #TISDD book: Service advertisements are prototype advertisements that allow us to (re)focus on the core value proposition and test the desirability and perceived value of a new offering.



Connected urban forest

a platform

to engage people and collaborate with AI systems to monitor and take care of green areas

what is your idea?



what is its function?



Insert here the title of your idea

concept name

a what word could synthetically describe your concept?

synthetic name

to what is the key function you expect your project to perform?

key function

what is your idea?

what is its function?

Desktop Walkthrough

? WHAT IS IT?

Desktop Walkthrough is a low-fidelity prototyping tool. It's useful (i) to get a **shared understanding** within your team about the experience you are designing, (ii) to identify the **critical steps** in the journey, (iii) to identify any other **key elements** or problem areas that need **to be addressed**.

☰ HOW?

To have an overview of the experience you want to propose:

1. Identify the key actor of the journey.
2. Visualize the steps with the necessary (digital) props,
3. Create maps and stages,
4. Iterate your idea through different - complete - walkthroughs.
5. Document your results in the *Journey Map*.

📄 TIP

Remember: the goal of this prototyping tool is to help you envisioning the development of your idea in a clear and sharable way.

🔗 REFERENCES



www.tisdd.com/desktop-walkthrough/

#TISDD Method: Desktop walkthrough

A free method from the #TISDD book: Desktop walkthroughs can be seen as interactive trans-theater plays that simulate end-to-end customer experiences.

Desktop Walkthrough



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User Stories

? WHAT IS IT?

User stories are short and straightforward descriptions of something that users of your product/service/system want to achieve (need and desired outcome), written in a simple and non-technical way.

☰ HOW?

After having identified and collected a set of users' needs (e.g., from interviews with end-users):

1. Start writing an **explanatory description** of a possible user story. You can provide general information (e.g., describing a short user journey), examples of use cases, and pictures (if needed).
2. Synthesize the description in a straightforward structure, identifying the **subject**, the **objective**, and the **motivation** of the story.
3. Identify some **general conditions that could validate** the implementation of the user story (*sort of acceptance criteria*). Note that they should bring some **value** to users.

📄 TIP

*In the end, User Stories should be synthetic and immediate to understand. Remember: they should **not provide solutions**.*

🔗 REFERENCES



#TiSDD, LEARN FROM THE #TiSDD BOOK: Summarizing what customers or users want to be able to do; used to bridge design research with defining requirements for software development.

www.tissdd.com/designing...

#TiSDD Method: Writing user stories

A free method from the #TiSDD book: Summarizing what customers or users want to be able to do; used to bridge design research with defining requirements for software development.



User Stories

EXPLANATORY DESCRIPTION

When a notification for intervention is displayed on the platform, as a citizen who wants to help, I need to be able to understand where the plants requiring attention are located and which kind of assistance is needed. If it is something that I can handle, like watering them or give them some nutrients, I can go in the right location and I should find clear information on how to provide the correct assistance. For instance, I need to know where I can find the tools I need, if I have to bring something from home, and what specific actions I have to perform.

SUBJECT
OBJECTIVE /
VERB
MOTIVATIO
N

*use the bg
for adding IMG
or color clusters*

You can also add pictures or other complementary material



SORT OF
ACCEPTANCE
CRITERIA

- *Plant location*
- *User location on the map*
- *Plant identification*
- *Clear understanding of the problem / needed intervention*
- *Identification of the modality of intervention*
- *Identification of the required tools (Is a watering can needed? Where to find it?)*

A **citizen** should be able to **understand how to intervene to assist urban plants** so that **necessary actions can be accomplished**



User Stories

EXPLANATORY DESCRIPTION

Insert your description here

SUBJECT
OBJECTIVE / VERB
MOTIVATION

A *(user/item)*
 should be able to *(do something)*
 so that *(an outcome can be achieved)*

*use the bg
 for adding IMG
 or color clusters*

You can also add pictures or other complementary material

**SORT OF
 ACCEPTANCE
 CRITERIA**

- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*

Human Agent Journey

? WHAT IS IT?

Journey maps are a common UX tool that visualize the **process** that a person goes through in order **to accomplish a goal**. They are characterized by an Agent, a Scenario and Expectations, some Phases, Action and Opportunities/Insights.

☰ HOW?

After or while developing your *Desktop Walkthrough*, you can fix your ideas into a *Journey Map*.

1. Frame the **Agent, Context and Expectation** (you can find them in your *Stakeholder Map* and *HMW question*).
2. Identify and write down the different **phases** of the experience you are prototyping.
3. List the **actions** that your actor carries out during the different phases.
4. Look for **opportunities or insights** in each phase.



TIP

You can adapt the number of phases, actions and opportunities to your needs.

🔗 REFERENCES

The references section contains four cards:

- Journey Mapping 101**: A journey map is a visualization of the process that a person goes through in order to accomplish a goal. Source: www.infragistics.com
- #TISDD Method: Mapping journeys**: A free method from the #TISDD book: Visualizing specific experiences of a main actor, often exemplified by a persona, over time. Source: www.fishbase.com/designing
- Journey Map | Service Design Tools**: Describe how the user interacts with the service, throughout its touchpoints. Source: www.designkit.org
- Design Kit**: Design Kit is IDEO.org's platform to learn human-centered design, a creative approach to solving the world's most difficult problems. Source: www.designkit.org



System UX map | Human Agent Journey

Specific human agent USER <small>The protagonist of the journey. It gives a point of perspective for the experience described.</small>	Citizen			Scenario <small>It is the situation that the user addresses and is associated with an actor's goal or need and specific expectations. It can be real (result of research on existing products/services) or artificial (based on the design intent).</small>	Expectations <small>The quality that the actor expects as a result of the rest of the experience.</small>
Phases <small>Key high-level stages of the service experience.</small>	ONBOARDING	MAPPING	MONITORING	MAINTAINING & CARING	IMPACT MEASURING
Action(s) <small>High-level behaviors and steps taken by users. They have to consider simple things and avoid to be a step-by-step log of every discrete interaction.</small>	<p>Gets to know about the initiative</p>	<p>Contributes to identify where the green areas are in the city</p>	<p>Complements the information about trees' characteristics (height, trunk diameter,...)</p>	<p>Can take action when plants need ordinary maintenance (e.g., watering)</p>	<p>Leaves feedbacks about the outcomes of the programme</p>
<p>Takes action to participate and be involved</p>	<p>Contributes to identify the species of plants living in the city</p>	<p>Contributes with information about the health of urban plants</p>	<p>Can add information about events or conditions that may have affected the green area</p>	<p>Can advise the system when plants need special attention (e.g., pruning)</p>	<p>Is involved in making project and funding decisions based on simulated outcomes</p>
<p></p>	<p></p>	<p></p>	<p></p>	<p></p>	<p>Have people live outdoor spaces more</p>
Opportunities <small>Difficulties and insights gained from mapping the experience. They can be useful for further steps in the design process.</small>	<p>What are the best strategies to involve citizens?</p>	<p>Citizens can send (geolocalized) photos to complement an automated mapping.</p>	<p>There can be a gamified system to encourage citizens to give their contributions over time.</p>	<p>Citizens can feel the responsibility to personally take action if the project directly speaks to them.</p>	<p>Important to keep track of the value the project has to attract funds.</p>

Specific human agent | USER

The protagonist of the journey. It gives a precise perspective for the experience described.



Scenario

It is the situation that the user addresses and is associated with an actor's goal or need and specific regulations. It can be real (result of a research on existing products/services) or anticipated (based on the design stage).



Expectations

The goals that the actor expects to reach at the end of the experience.



Phases

Key high-level stages of the user experience.

PHASE #01

PHASE #02

PHASE #03

PHASE #04

PHASE #05

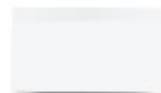
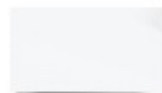
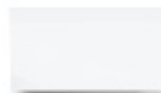
Action(s)

High-level tasks and steps taken by users. They have a variable scope: they do not need to be a step-by-step list of every discrete interaction.



Opportunities

Reflections and insights gained from mapping the experience. They can be used for further steps in the design process.



System UX map | Human Agent Journey



Specific human agent | PROVIDER

The protagonist of the journey. It gives a point of perspective for the experience described.



Context of intervention

Clearly called contexts. It is the situation that the user addresses and is associated with an actor, goal or need and open to negotiations. It can be the end result of a process or existing problem's scenario or application context for design steps.



Expectation/Goal

The goal(s) that the actor expects to reach at the end of the experience.



Phases

Key, highlighted stages of the entire experience.

PHASE #01

PHASE #02

PHASE #03

PHASE #04

PHASE #05

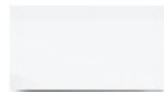
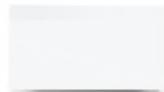
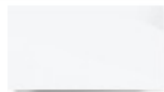
Action(s)

High-level activities and steps taken by users. They have a duration across stages and extend to the whole step by taking up of many sub-steps interaction.



Opportunities

Reflections and insights gained from engaging the experience. They can be useful for further steps in the design process.



Ecosystem Map

? WHAT IS IT?

The *Ecosystem Map* is a synthetic representation capturing all the stakeholders that populate an ecosystem. While the *Stakeholder Map* aims to identify the most relevant stakeholders (who might be involved in developing the solution), the *Ecosystem Map* aims to portray a **broader picture** and the **connections** between actors in the form of a loop, in which value is exchanged.

☰ HOW?

In order to **uncover gaps** and identify **opportunities for synergies**:

1. Identify and **categorize** your **stakeholders** with post-its of different colors **according to their roles**, like those related to data/knowledge, service providers, users, impacted parties, etc.
2. Place them in the **related levels** of the map.
3. **Draw logical connections** and exchanges (loops) between the different actors: they can be materials and physical relationships, as well as emotional and invisible links.
4. Identify relevant issues to depict in the *Integrated Journey*.

🔗 REFERENCES



Ecosystem Map

1 | USE POST-ITS OF DIFFERENT COLORS TO IDENTIFY THE ROLES OF YOUR STAKEHOLDERS.

Define the categories according to your project.
Some examples might be:

DATA OWNER, PROVIDER, CURATOR, CREATOR, ...



SERVICE PROVIDERS



USERS



IMPACTED PEOPLE, ORGANIZATIONS, ...



OTHERS (TO DEFINE)



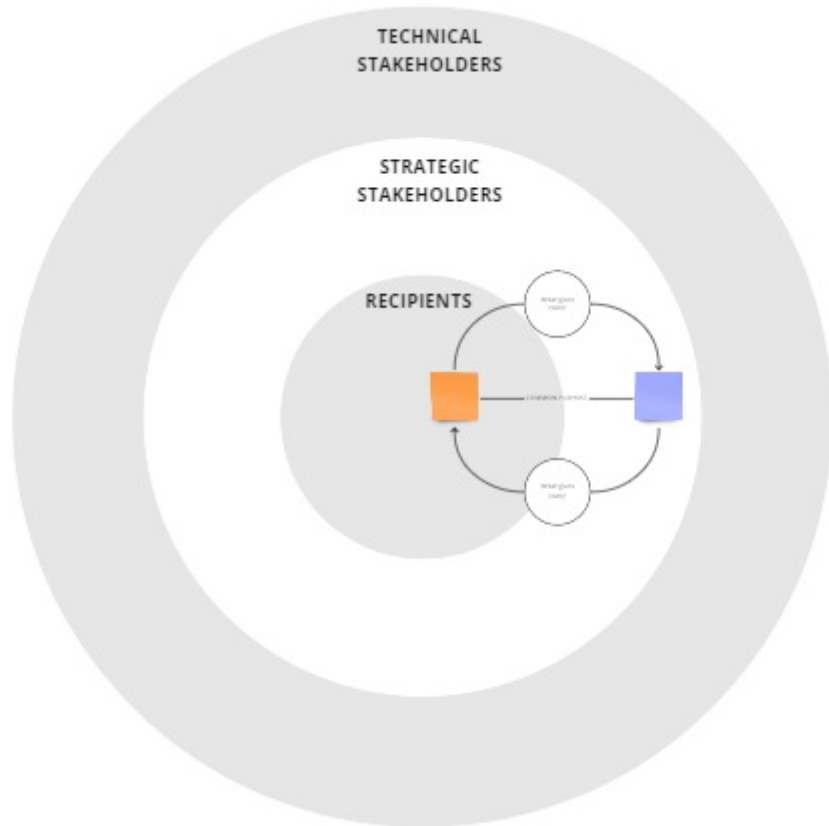
2 | PLACE THEM IN THE MAP

3 | DEPICT THEIR RELATIONSHIPS

Highlighting:





























1. An **objective** they might share
2. The **concrete or abstract values** they can **exchange** in order to reach their goal.

This should give you an idea of the possible interactions that might happen within your system. Create all the connections that you feel necessary. You can also use the blank space to zoom in more elaborated loops.



System UX map | Integrated Journey

TITLE
Catch phrase

Task	PHASE #01	PHASE #02	PHASE #03	PHASE #04	PHASE #05	PHASE #06	PHASE #07
Search/analyze Detailed description of the task							
Technical analysis journey Detailed description of the task							
Human agent journey (user) Detailed description of the task							
Human agent journey (operator) Detailed description of the task							

Data & Knowledge Catalogue

? WHAT IS IT?

When working with AI and ML systems data play a key role to have effective and trustworthy results. This tool helps you identify and describe primary and secondary data sources and portals.

☰ HOW?

Identify useful sources of data and knowledge for your purposes and fill in the canvas to gain a good overview. Based on the information you collect here, you can make your decisions.

For each data or knowledge source:

- Identify **basic descriptive information** (name, primary/secondary, internal/external nature, where and how the source can be retrieved, who are the relevant figures involved, whether there is a license, and the cost)
- Better specify them based on **parameters** that can help you **define their quality** (format, frequency of update, availability, main concepts & attributes, possibly missing information)

🔗 REFERENCES



DEFINE YOUR DATA / KNOWLEDGE SOURCE

City parks and gardens location

Is the data/knowledge source:

 PRIMARY
 SECONDARY
 INTERNAL
 EXTERNAL

What is the source? (URL or any other reference)

https://dati.comune.milano.it/dataset/ds89_infogeo_parchi_giardini_localizzazioni

Who are the owner, provider, curator?

Data owner: Comune di Milano

Data editor: Direzione Innovazione Tecnologica e Digitale

Is there a license?

Creative Commons Attribution 4.0 International (CC BY 4.0)

How much does it cost?

Free dataset

IS IT SUITABLE FOR YOU? CAN YOU TRUST IT?

What is their format (images, audio, video, categorical, numbers)?

GEOJSON (map), Shapefile, CSV

What is their quality (completeness, correctness, consistency)?

Green areas identification in Milan municipality, old data (2012)

What is the frequency of update? (realtime or not?)

None

What is the availability (in terms of formats, downloads, API, etc.)?

CKAN Data API (for CSV only), download

What are the main concepts (knowledge) & attributes?

Zone (num), Area code (num), Area mq (num), Perimeter m (num), Park or garden (txt), Longitude centroid (num), Latitude centroid (num)

What's missing?

Smaller urban green areas (parks and gardens are usually already taken care of), trees classification, up-to-date information

DEFINE YOUR DATA / KNOWLEDGE SOURCE

Name your data/knowledge source _____

Is the data/knowledge source:

PRIMARY SECONDARY INTERNAL EXTERNAL

What is the source? (URL or any other reference)

Who are the owner, provider, curator?

Is there a license?

How much does it cost?

IS IT SUITABLE FOR YOU? CAN YOU TRUST IT?

What is their format (images, audio, video, categorical, numbers)?

What is their quality (completeness, correctness, consistency)?

What is the frequency of update? (realtime or not?)

What is the availability (in terms of formats, downloads, API, etc.)?

What are the main concepts (knowledge) & attributes?

What's missing?

AI System Core

? WHAT IS IT?

The *AI system Core* helps you outline the **main components of an AI system**, connecting the dots between the problem you are addressing, data collection, artificial intelligence capabilities, and the final output. Hence, it is meant to help you reflect on how to use AI.

☰ HOW?

If you have a precise **problem to solve using AI**:

1. Identify what **output** you might need.
2. Understand which **AI task** can provide you with it.
3. Start reasoning on the **inputs** that the system might need (and how to collect them).

If you already have (or plan to have) **data as inputs**:

1. Understand which **problem** they might help you address.
2. Identify a **task** consistent with your that outcome.
3. Define the **output** you can and aim to obtain.

🔗 REFERENCES

Sciannamè, M. (to be published in 2023). *Machine Learning (for) Design. Introducing Designery ML Translations for Responsible Design Education*. [PHD Thesis]. Politecnico di Milano, Department of Design.

The doctoral thesis offers a specific focus on the core components to communicate ML systems in a clear and sufficient way also for non-ML-experts who deal with the design of ML-infused products or systems.



AI PROBLEM

Identify the issue(s) that you want to overcome thanks to AI systems

Recall the expectations of your project (e.g. synthesized in the HMM question and in your Human Agents Journey). What problem underlying them can be uniquely solved with AI systems?

To have revitalized, healthy and good quality green areas what is needed is:

- mapping
- support maintenance and care
- measuring impact

DATA SOURCES

Identify which sources are relevant to address the problem.

Reason on the data that the learning system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

Satellite images: ESA's Sentinel 2
Ad hoc dataset generated by users' pictures taken with their mobile phones

Sensors

Users and biologists data

INPUTS

Identify the input(s) that your system needs.

Reason on the specific data that the system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

Geo-localized pictures and coordinates

Images + Categories

Real-time data on plants' status (soil humidity, temperature, wind, appearance, etc.)

Plants' characteristics (dimensions, oxygenation capacity, etc.)

AI TASK

Identify the AI task to be used to process inputs.

AI tasks are the probability-based actions that a system performs by processing available data to address a problem. Common ones include classification, regression, clustering, generation, etc.

CLASSIFICATION
Green area detection
Map definition

CLASSIFICATION

PREDICTION

PREDICTION

OUTPUTS

Identify the output/s obtained from the task.

The desired output, which is obtained by applying AI task(s) on given data as input(s).

Detection of existing urban green areas on a map

Categorization of plants according to different factors

Notification of required action

Estimation of captured CO₂

AI PROBLEM

Identify the issue(s) that you want to overcome thanks to AI systems

Recall the expectations of your project (e.g. synthesized in the HMI question and in your Human Agent Journey). What problem underlying them can be uniquely solved with AI systems?

DATA SOURCES

Identify/select which sources are relevant to address the problem.

Reason on the data that the learning system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

INPUTS

Identify the input(s) that your system needs.

Reason on the specific data that the system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

AI TASK

Identify the AI task to be used to process inputs.

AI tasks are the probability-based actions that a system performs by processing available data to address a problem. Common ones include classification, regression, clustering, generation, etc.

OUTPUTS

Identify the output/s obtained from the task.

The desired output, which is obtained by applying AI task(s) on given data or inputs.

System UX Map | Artificial Agent Journey

? WHAT IS IT?

The Artificial agent journey helps you visualize your idea from the **technological perspective**, considering when and how the core elements of an AI/ML system are generated and needed. It also allows to highlight in the map the necessary relationships with human agents.

☰ HOW?

1. Identify and **place the AI task** you need in the related phase of the Artificial agent journey level.
2. Write and **link the needed inputs and expected outputs** to the AI task. If they are produced or impact some agent or touchpoint in the system, **visualize the relations with lines and arrows**.
3. If inputs and/or outputs are already in the system map, just connect them to the AI task.



TIP

Copy and paste the elements in the previous levels from the System UX Map | Integrated Journey

TITLE
Catch phrase

Task	PHASE #01	PHASE #02	PHASE #03	PHASE #04	PHASE #05	PHASE #06	PHASE #07
Task 1 Description of the task...							
Technical agent journey Description of the technical agent journey...							
Human agent journey (user) Description of the human agent journey (user)...							
Human agent journey (assistant) Description of the human agent journey (assistant)...							
Artificial agent journey Description of the artificial agent journey...							

Value-driven Design Map

? WHAT IS IT?

Any project should provide for intentional reasoning and discussion about which **values** it should **promote** or **preserve**. This is a tool to incorporate and express values to be embedded in a product, service or system, while the idea is still being generated.

☰ HOW?

1. Report your service phases identified in the *System UX Map*.
2. Identify **which phases** need to **embed and foster values**.
3. Define **which value(s)** should be most evident in each phase and place it/them in the corresponding column. You can select them from the post-its or identify new ones.
4. For each, try to **envison significant possibilities to preserve or promote it/them** and connect them to the related value. You can also go back to the *System UX Map* and look at the actions already set in that phase: can you modify or add something to reinforce the related value? **Get inspired by the tools linked in the references.**



TIP

Your project is not only about the technology. You can act on any part of the socio-technical system, not only the artificial agent.

🔗 REFERENCES

For the rational and research behind the value selection, please, refer to:

Sciannamè, M. (to be published in 2023). *Machine Learning (for) Design. Introducing Designery ML Translations for Responsible Design Education*. [PHD Thesis]. Politecnico di Milano, Department of Design.

To have an overview of **possible AI-related issues** that can be **addressed by the explicit integration of values** in the design process, you can look at:



The Ethics Canvas
This tool is a canvas to explore and map the ethical implications of a project. It is designed to help you identify and address potential ethical issues early in the design process.

AI Blindspot: A Discovery Process for preventing, detecting, and mitigating bias in AI systems
This tool is a process for identifying and addressing bias in AI systems. It is designed to help you understand the different types of bias that can occur and how to prevent, detect, and mitigate them.

The Tarot Cards Of Tech
This tool is a set of tarot cards that explore the different ways in which technology can impact society. It is designed to help you think about the potential risks and benefits of technology in a more holistic way.



Ethical Explorer Pack - Tools to help manage the future impact of today's tech
This tool is a pack of resources that help you manage the future impact of today's technology. It includes a variety of tools and techniques that can be used to identify and address potential ethical issues.

AI Needs an Ethical Compass. The Tool Can Help.
This tool is a compass that helps you navigate the ethical challenges of AI. It is designed to help you understand the different values that are at stake and how to balance them.

AI Needs an Ethical Compass. The Tool Can Help.
This tool is a compass that helps you navigate the ethical challenges of AI. It is designed to help you understand the different values that are at stake and how to balance them.



Value-driven Design Map

Transcribe here the phases you identified in the System UX Map. For each, which value(s) do you think might be beneficial to preserve or promote? Place the related sticky note from those below (or create your own) to better fit with your context in the middle of the phase and brainstorm ideas to do it. To reflect on some critical points you might find when dealing with the design of AI systems, you can get inspired by the references provided in the instruction.

SUSTAINABILITY
Sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. It encompasses economic, social, and environmental aspects.

WELL-BEING
Well-being refers to the state of an individual or a community, encompassing physical, mental, and social health. It is a holistic concept that goes beyond just material wealth.

ACCESSIBILITY
Accessibility is the ability of people with disabilities to access and use products, services, and environments. It is a key principle of inclusive design.

AGENCY
Agency refers to the capacity of an individual or organization to act independently and make their own choices. It is a fundamental aspect of human rights.

JUSTICE / NON-DISCRIMINATION
Justice and non-discrimination are principles that ensure fairness and equality for all individuals, regardless of their background or characteristics.

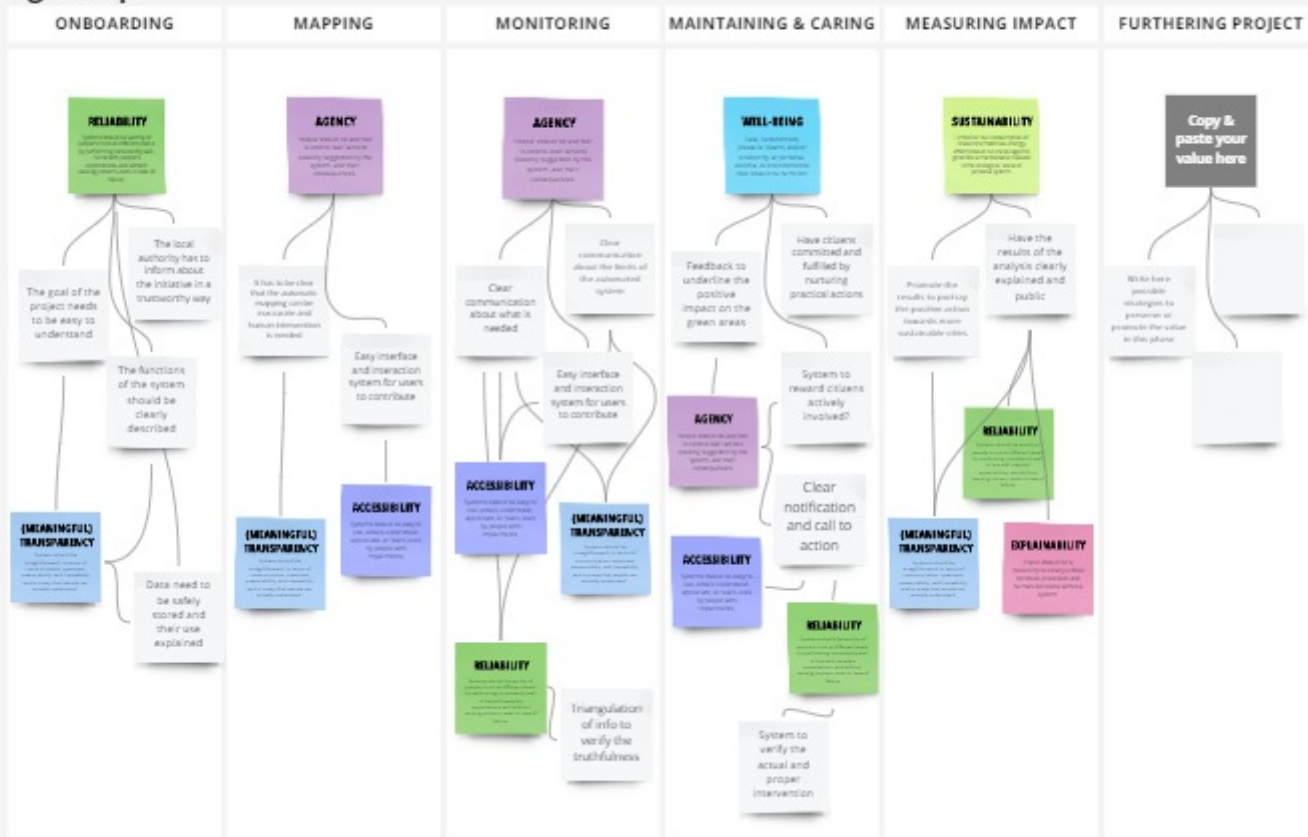
RELIABILITY
Reliability is the ability of a system or component to perform consistently under stated conditions. It is a critical factor in building trust in technology.

FREEDOM
Freedom is the power or right to act, or to be, as one chooses. It is a fundamental human right and a key component of well-being.

MEANINGFUL TRANSPARENCY
Meaningful transparency is the practice of providing clear, understandable information about how a system works, its data sources, and its decision-making processes.

EXPLAINABILITY
Explainability is the ability to provide a clear and understandable explanation of the reasons behind a system's decisions or actions.

ENVIRONMENTAL FRIENDLY
Environmental friendliness refers to practices and products that are designed to minimize harm to the environment and promote sustainability.



Value-driven Design Map

Transcribe here the phases you identified in the System UX Map. For each, which value(s) do you think might be beneficial to preserve or promote? Place the related sticky note from those below (or create your own) to better fit with your context in the middle of the phase and brainstorm ideas to do it. To reflect on some critical points you might find when dealing with the design of AI systems, you can get inspired by the references provided in the instructions.

SUSTAINABILITY

Consider the long-term impact of your design decisions on the environment, society, and the economy. Aim for solutions that are resource-efficient, resilient, and adaptable to future changes.

RELIABILITY

Ensure that your system consistently performs as expected under various conditions. Implement robust error handling and recovery mechanisms to maintain user trust and system integrity.

WELL-BEING

Design with the user's physical and mental health in mind. Minimize cognitive load, reduce stress, and promote positive emotional states through clear communication and intuitive interactions.

FREEDOM

Empower users to make their own choices and control their experience. Offer customizable settings and options that allow users to tailor the system to their preferences and needs.

ACCESSIBILITY

Design your system to be usable by people with a wide range of abilities and disabilities. Follow accessibility guidelines to ensure that your design is inclusive and equitable for all users.

(MEANINGFUL) TRANSPARENCY

Communicate clearly and honestly about how your system works, including any data collection, processing, and sharing practices. Provide understandable explanations for system decisions and actions.

AGENCY

Empower users to take control of their experience and make meaningful choices. Provide clear feedback and support for user actions, ensuring that users feel their input is valued and effective.

EXPLAINABILITY

Design your system to provide clear and understandable explanations for its decisions and actions. Use simple language and visual aids to help users understand the underlying logic and data behind the system's outputs.

JUSTICE / NON-DISCRIMINATION

Design your system to be fair and equitable for all users, regardless of their background, identity, or characteristics. Identify and address potential biases and disparities in the system's design and outcomes.

EMPLOYMENT OPPORTUNITIES

Design your system to create and support meaningful employment opportunities for diverse groups of people. Consider the impact of automation and AI on the labor market and explore ways to enhance human skills and productivity.

PHASE #01

Copy & paste your value here

Write here possible strategies to preserve or promote the value in this phase

PHASE #02

Copy & paste your value here

Write here possible strategies to preserve or promote the value in this phase

PHASE #03

Copy & paste your value here

Write here possible strategies to preserve or promote the value in this phase

PHASE #04

Copy & paste your value here

Write here possible strategies to preserve or promote the value in this phase

PHASE #05

Copy & paste your value here

Write here possible strategies to preserve or promote the value in this phase

System UX Map | Value Journey

? WHAT IS IT?

With the *Value Journey*, the relationships between values and the solution you are conceptualizing become more evident, as they enter into the *System UX Map*.

☰ HOW?

1. Starting from the *Value-driven Design Map*, select the values you believe are most important and for which you envisioned valuable possibilities for preservation or promotion: max 1 per phase.
2. Place them in the corresponding *Values journey* level.
3. Color the background of the phase column of the same color.
4. Write down and connect the ideas that help embedding the value inserted in each phase.

📄 TIP

Copy and paste the elements in the previous levels from the *System UX Map* | *Service Blueprint*

SUSTAINABILITY

Systems should be conceived as resources that can be managed to generate a maximum value in the ecological, social or economic sphere.

RELIABILITY

Systems should be capable of providing a service over time by ensuring consistency with the user's expectations, and without having negative effects on the user or system.

WELL-BEING

User satisfaction, pleasure, health, and/or prosperity, at personal, social, or environmental level should be promoted.

FREEDOM

Systems should promote user's freedom, avoid barriers and dependencies, and avoid manipulation or external influences.

ACCESSIBILITY

Systems should be easy to use, usable, understandable, operable, or easily accessible by people with disabilities.

(MEANINGFUL) TRANSPARENCY

Systems should be understandable, visible, and explainable, so that users can understand and control the way that their data is being processed.

AGENCY

People should be enabled to control own actions, possibly suggested by the system, and their consequences.

EXPLAINABILITY

There should be a possibility to clearly and fully understand system's actions and human decisions within a system.

JUSTICE / NON-DISCRIMINATION

Systems should be fair, impartial, and non-discriminatory in compliance of laws, human rights, and dignity to avoid discrimination.

REPRESENTATIVENESS

Different perspectives should be provided to fight of diversity and inclusivity to prevent manipulation.

TITLE
Catch phrase

Task	PHASE #01	PHASE #02	PHASE #03	PHASE #04	PHASE #05	PHASE #06	PHASE #07
Technical agent journey							
Technical agent journey							
Human agent journey (user)							
Human agent journey (provider)							
Artificial agent journey							
Values							

4 Prototyping & Testing

Prototyping & Testing

Testing entails the transformation of the developed concept into **prototypes** to be tested with end users and stakeholders, also understanding its possible multi-level implications.







































The testing is fundamental to verify the validity and functionality of the solution obtaining insight for further improvement.

The activity should be conducted in a period of the design process when changes are still possible, before implementing the final solution.

The prototype can be low or high-fidelity, and the testing can be conducted in different ways, with different aims.

System UX Map | Emotional Journey

TITLE
Catch phrase

Task	PHASE #01	PHASE #02	PHASE #03	PHASE #04	PHASE #05	PHASE #06	PHASE #07
Technical Description of the task and its purpose, including user goals and expectations.							
Technical anti/next journey Description of the anti/next journey, including user goals and expectations.							
Human agent journey (user) Description of the human agent journey, including user goals and expectations.							
Human agent journey (operator) Description of the human agent journey, including user goals and expectations.							
AI/Chat agent journey Description of the AI/Chat agent journey, including user goals and expectations.							
Notes Additional notes or observations related to the journey.							
Key level journey feedback Key level journey feedback							
Key level journey feedback Key level journey feedback							
Key level journey feedback Key level journey feedback							

Red and Green Feedback

? WHAT IS IT?

Red and Green Feedback is a closed feedback method to gather **as much feedback as possible**. In a human-centered design perspective, this is meant to be integrated in future iterations and refinements of an idea.

☰ HOW?

Present your idea focusing on the most important aspects (5 mins). Then the audience will:

1. Ask questions if they need explanations on unclear points
2. Express (orally and in writing) what they liked or loved about the proposal, and what should be kept or expanded on in future iterations. **(Green feedback)**
3. Share and motivate their worries or doubts by giving constructive suggestions. **(Red feedback)**

📄 TIP

*The presenting team just responds "thank you" now.
Discussion will follow the collection of feedbacks.*

🔗 REFERENCES



Red and Green Feedback

If the functioning of the system is not clearly explained, it can demotivate people to use it.

The advertising of the initiative needs to be clear and engaging for citizens. If not well informed, they won't use it.

Citizens might be unaware of the relevant services offered by the app, despite advertising activities which try to draw their attention to the app.

When providing the data to help users of the system, they may choose to share their data with other people, not with the authorities (e.g. the water supply network).

The active participation of citizens needs to be furthered and awarded.

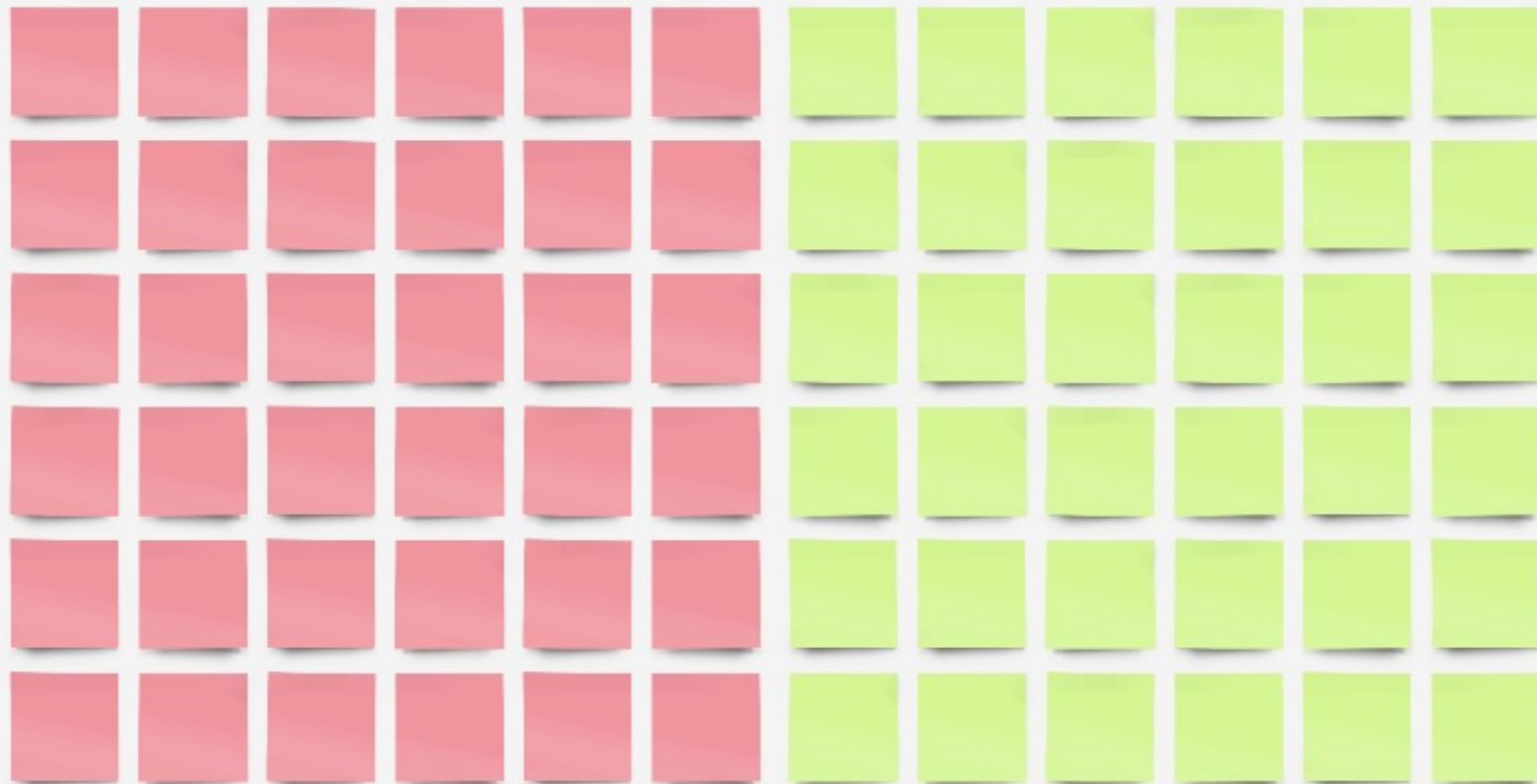
Once the app has been developed, the PAs has to put little effort and money.

If well developed, the app can be engaging for citizens.

People can immediately see the results of their actions.

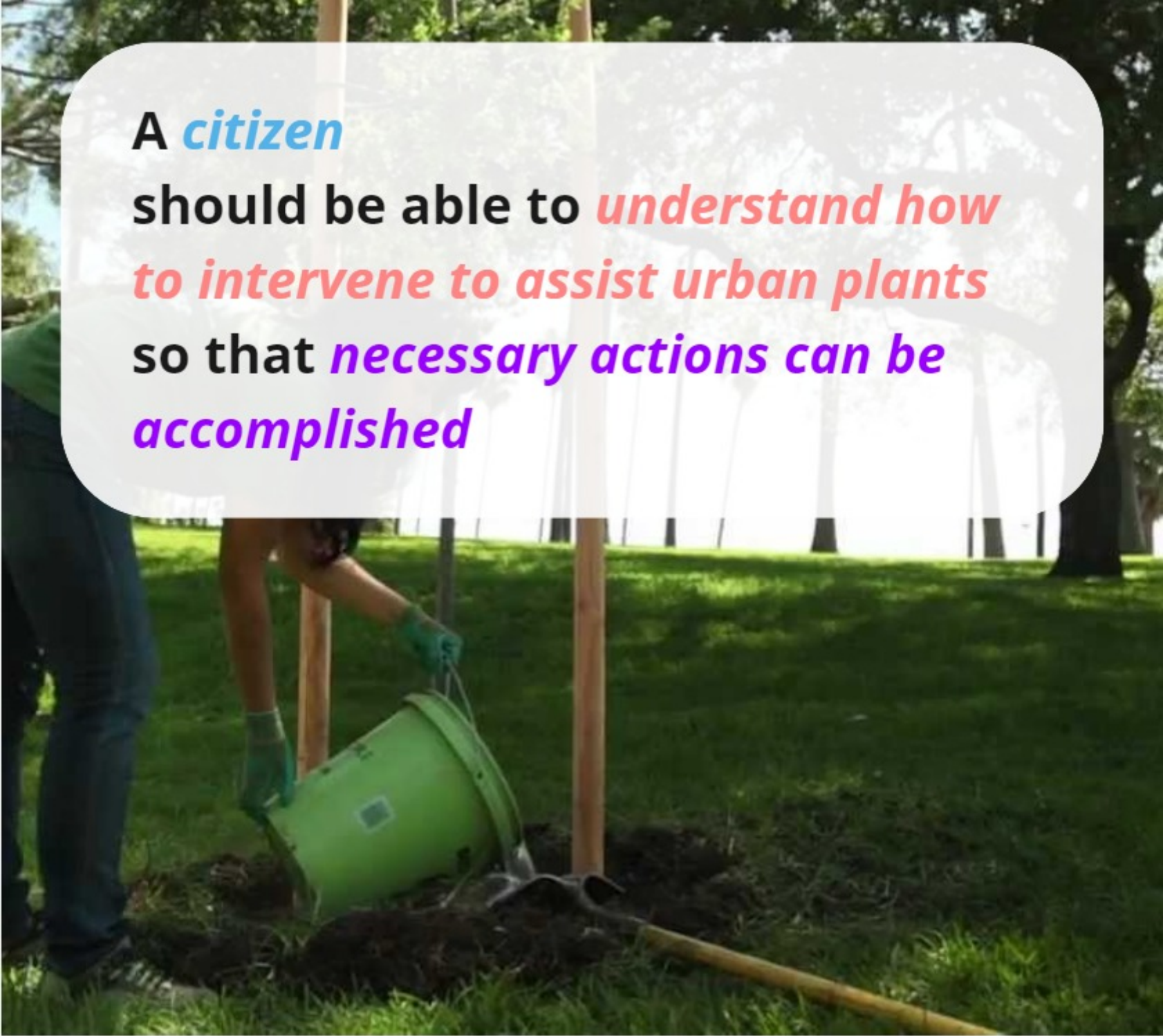
The initiative helps citizens and PA to work together towards an important cause.

Red and Green Feedback



A (user/item)
should be able to (do something)
so that (an outcome can be achieved)

- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*
- *Add condition useful to validate the user story implementation*

A photograph showing a person in a green shirt and blue pants watering a young tree in a park. The person is using a green bucket and a shovel. The tree is supported by a wooden stake. The background shows a grassy area with other trees and a fence.

A **citizen** should be able to **understand how to intervene to assist urban plants** so that **necessary actions can be accomplished**

- *Plant location*
- *User location on the map*
- *Plant identification*
- *Clear understanding of the problem / needed intervention*
- *Identification of the modality of intervention*
- *Identification of the required tools (Is a watering can needed? Where to find it?)*

