

D11

Co-Designed IoT Concepts 2

Felipe Schmidt Fonseca
ESR 4 - Smart Cities



**Northumbria
University**
NEWCASTLE



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 813508.

Contents

This file contains documentation about the concept ideas co-designed during the second year of PhD research focusing on waste prevention and smart cities within the OpenDoTT project.

Some of the original concepts created in earlier stages of research were remixed, refined and updated during this period. The versions presented here result from experimentation and reflection, as well as discussions with colleagues, supervisors, consortium partners and the audience of conferences and events where the research was presented.

1. Background
2. Updated concepts (2021)
 - Universal Registry of Things
 - E-I
 - Transformation Labs

1. Background (2019 / 2020)





The groundwork for the research was a critical approach to the mainstream narrative about smart cities, in a dialogue with social studies of science and technology.

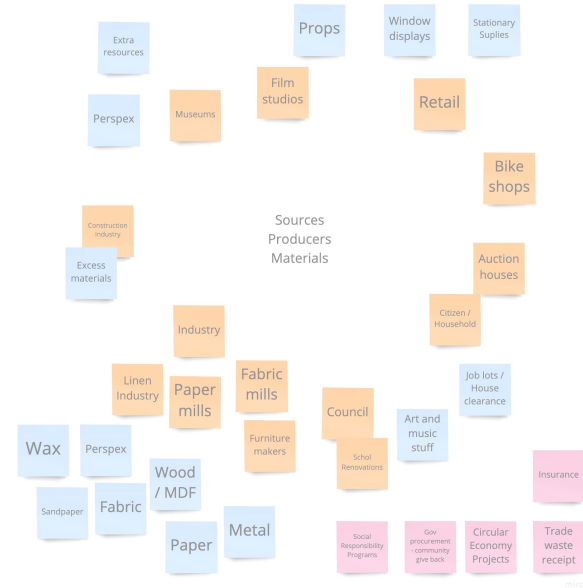
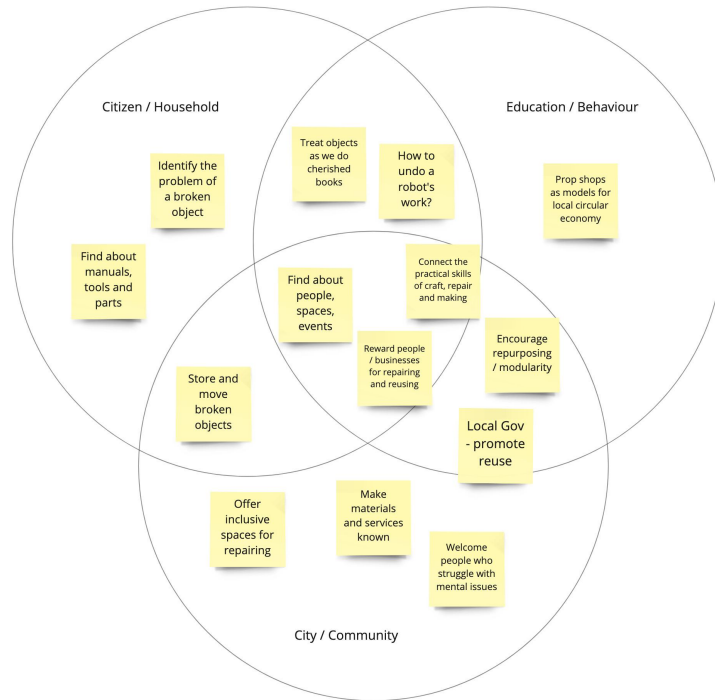
With that course defined, the focus was set on issues related to waste and discarded materials in contemporary cities.

Instead of working on waste management, however, a different avenue was explored. In line with contemporary understanding about the environmental as well as social impacts of industrial production, the decision was to focus on waste prevention.

A central issue identified in that landscape is the ability to assess the potential value of second-hand goods and materials. In order to promote a greater level of reuse, the skills and experience to evaluate must be accessible to interested parties.

In the first year, two design research studies were conducted.

The Repair Journey investigated behaviour and decision-making surrounding the reuse of materials at an individual / household level.



The Ecosystem Mapping identified types of organisations active on the reuse of discarded materials and how they relate to each other at a city scale.

The research studies offered the basis to map typical stakeholders of waste prevention.

Citizen

Individual/household who has broken or unwanted things.

Individual/household who is interested in acquiring affordable and reliable used things.

Community

Group or organisation willing to generate income for community members.

Volunteer group or not-for-profit organisation in charge of repair cafes, clothes swaps and other zero-waste projects.

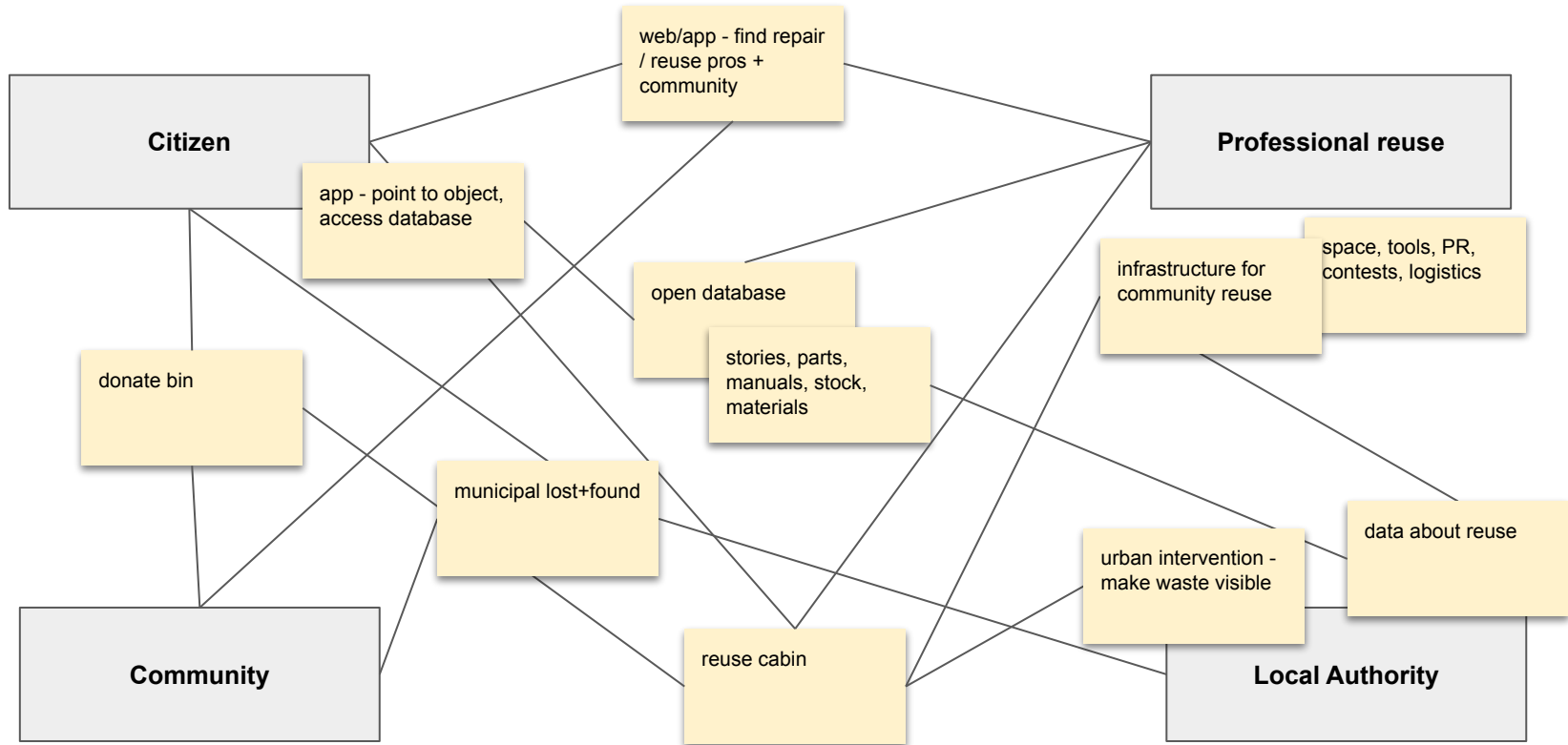
Professional reuse

Social enterprises or SMEs working on the selection, transformation and redistribution of second-hand materials.

Local Authority

City council / local gov looking into social, environmental and economic benefits of encouraging the reuse of materials.

Brainstorming for concept ideas was informed by analysing the relationship of stakeholders.



Concept ideas - Year 1

1/8

Universal Registry of Things

Open database

Information about as many types of objects as possible.



2/8

Point and Reuse

App / Website

Allows users to quickly evaluate the potential value of an object.



3/8

Save This Thing

App / Website

Geo-referenced open directory of reuse alternatives with user evaluation / reputation system.



4/8

Make Waste Visible

Urban Interventions

Expose the volume of waste generated by towns and cities.



5/8

Data on Reuse

Open Dataset

Data about different kinds of reuse of materials in urban environments.



6/8

Reuse Bin

Urban Service

Track your donations.



7/8

Transformation Lab / Shop

Blueprint

Urban infrastructure for reuse / upcycling of materials.



8/8

Reuse Commons

Urban Service

Collective stewardship of post-consumption materials.



[illegible]

Some of the original concept ideas were carried to the second year of research. They were remixed and updated along a combination of activities: training modules on hardware prototyping, privacy and internet health, as well as exchanges and presentations. A new participatory research study called reuse.city co-design lab was conducted to help turn the concepts into prototypes.

Two of the concept ideas developed on the first year were updated: the **universal registry of things** and the **transformation labs**. A third concept called "**evaluation interface**" emerged from iterating discussions over the original concept called point and reuse.



reuse.city

online co-design lab

prototyping tech to reuse stuff

5th - 30th April 2021



SIGN UP NOW



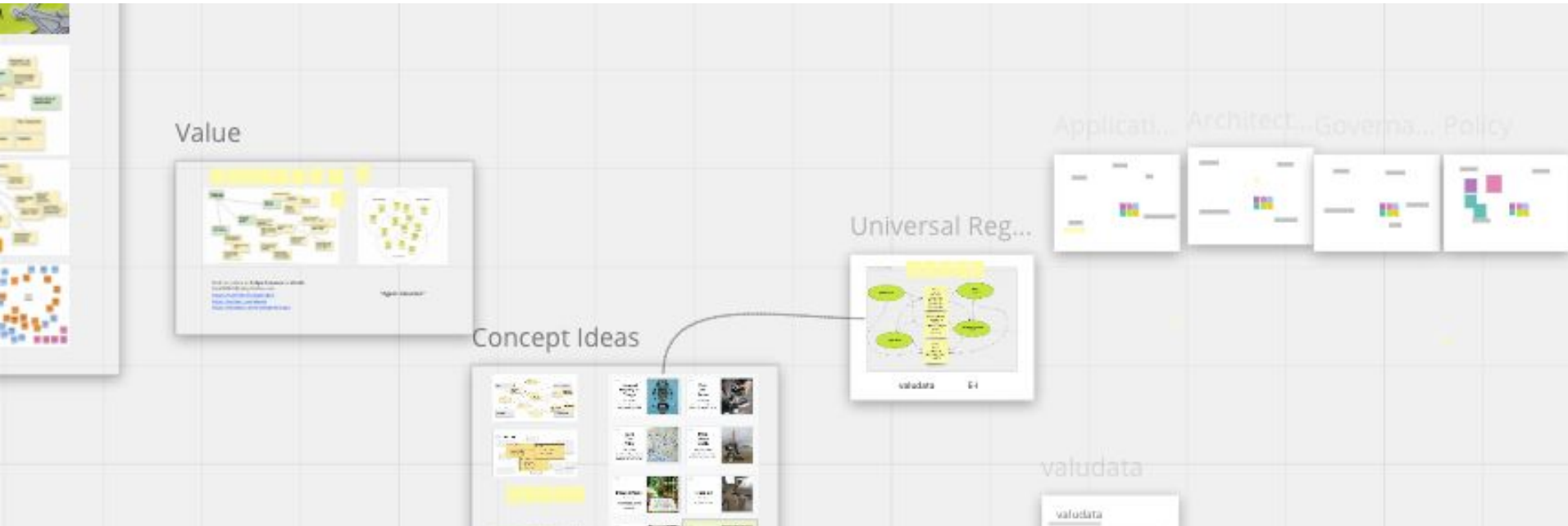
TELL ME MORE

1/3

Universal Registry of Things

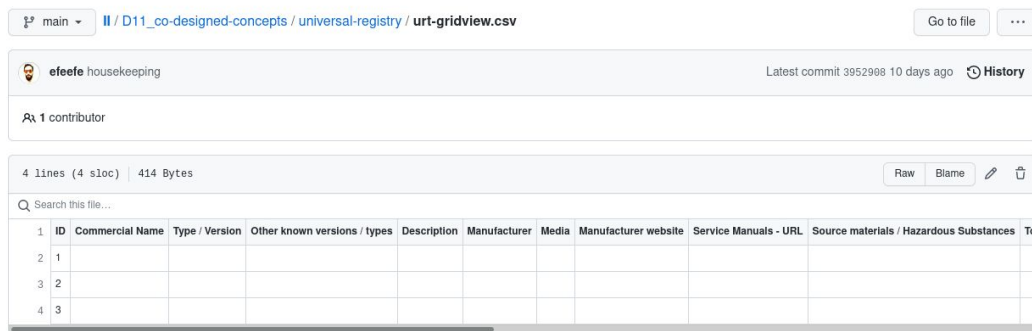
The **Universal Registry of Things** is a dynamic source for information about the value and reusability of goods and materials. It connects constantly to third-party data sources and uses AI to normalise them and make them available through open protocols.

Its deployment and use is promoted by initiatives related to zero waste, circular economy and the right to repair. There are commons-based mechanisms to validate and solve disputes over data.

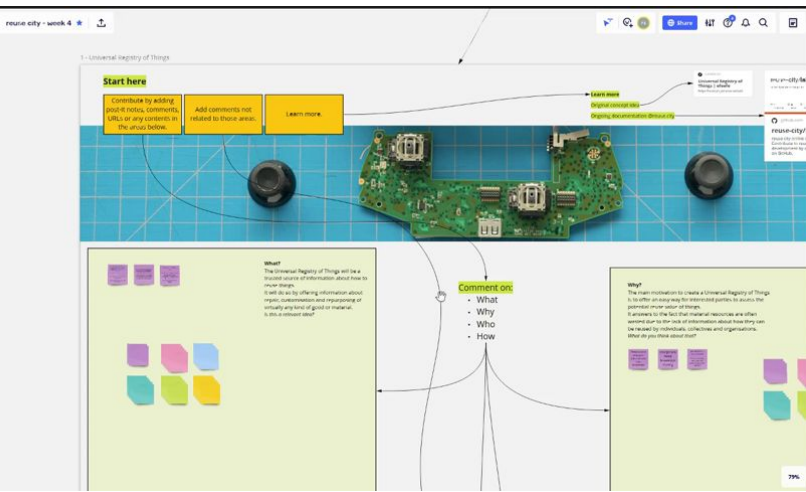


Commons-based specifications and governance

Data for the Universal Registry of Things is provided by manufacturers, associations, repair professionals, community groups, artists and other stakeholders. It comprises of objective specifications, descriptions and links to online resources as well as stories and subjective accounts on the reuse of things.



1	ID	Commercial Name	Type / Version	Other known versions / types	Description	Manufacturer	Media	Manufacturer website	Service Manuals - URL	Source materials / Hazardous Substances	To
2	1										
3	2										
4	3										



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback while prototyping a version of the Universal Registry of Things.

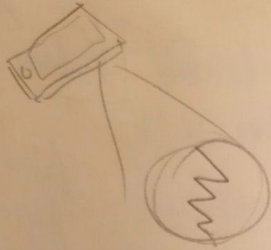
The video is available on the internet archive:

https://archive.org/download/reuse-city_prototypes/prototype_universal-registry.mp4

2/3

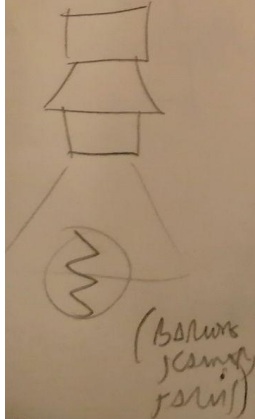
E-I

PHONE APP

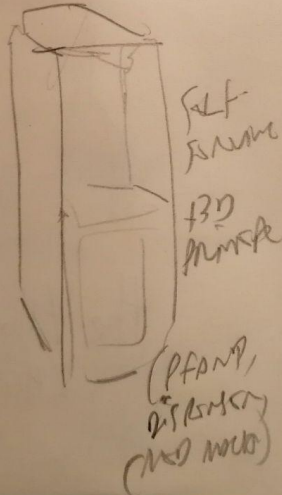


Portable/
Desktop
Assistant

SHOP/
ADDS
SPONS



(Barcode
scanning
unit)



Self
Service
3D
Printer

(PUMP,
AIR, WATER,
AND MORE)

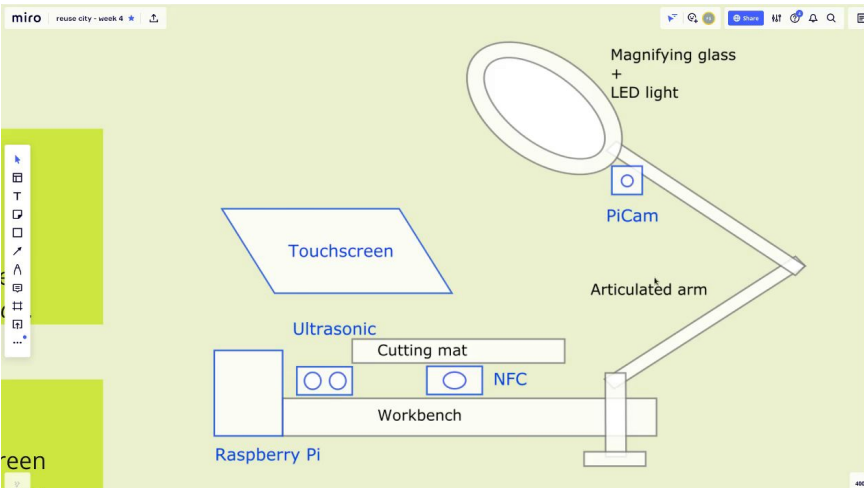
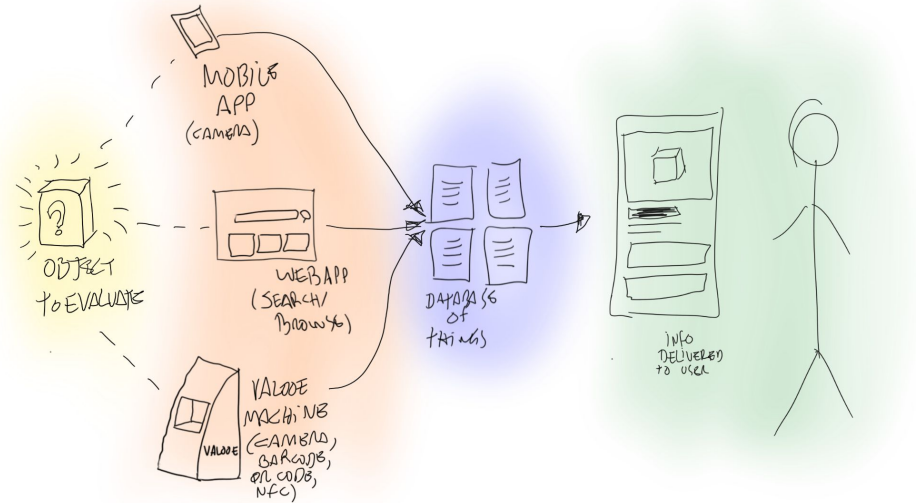
E-I, Evaluation Interface, is technology (hardware + software) created to increase the ability to reuse materials. It works as follows:

1. The user brings an object before the machine.
2. E-I identifies the object based on its characteristics - size, shape, color, weight, barcode, qr code, description label and/or any other identifiers. The user can feed additional characteristics by typing or interacting with E-I via voice.
3. E-I parses the identified object against the Universal Registry of Things and delivers to the user information about the potential reuse of the object: repairability index, acces to spare parts, list and description of raw materials, service manuals, second-hand market value, possibilities of upcycling, adaptations and transformations, user stories, etc.

E-I can be deployed in different form factors: an app for mobile devices; a workbench equipment; or even a larger version shaped as a kiosk or vending machine.

Speculative assistant

The goal with E-I at this point is not to develop a functional product, but rather to discuss how digital information can technologies help society reuse a larger proportion of materials that are currently discarded, and what would the implications of such technologies be in terms of use, privacy, health and safety, policy and economy.



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback while prototyping a version of E-I.

The video is available on the internet archive:

https://archive.org/download/reuse-city_prototypes/prototype_E-I.mp4

3/3

Transformation Labs

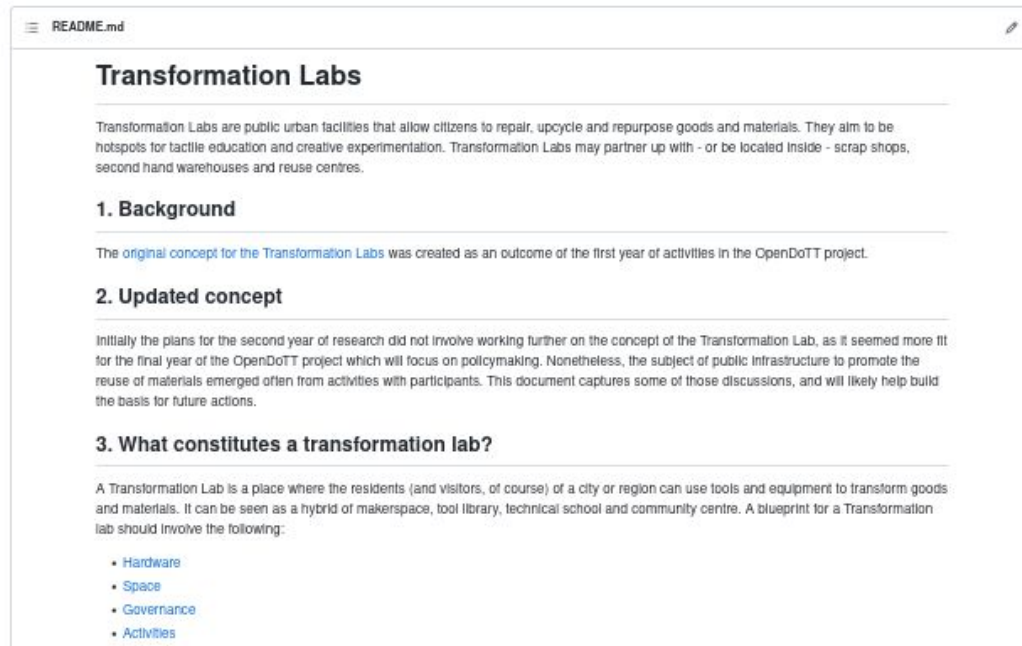
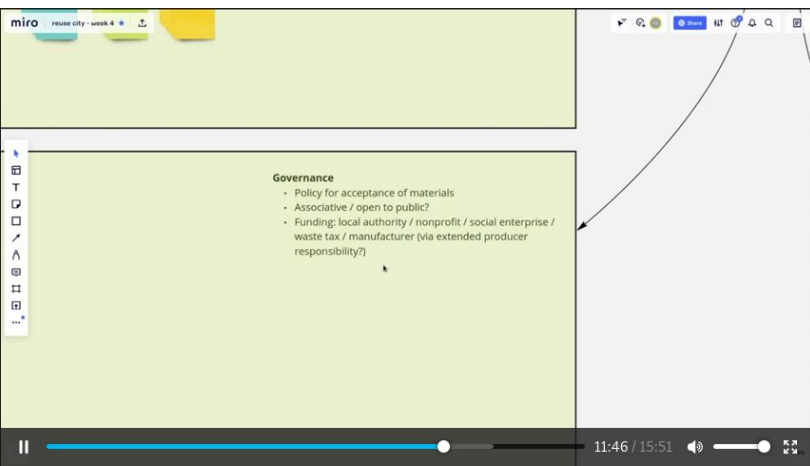


Transformation Labs are public urban facilities that allow citizens to repair, upcycle and repurpose goods and materials. They aim to be hotspots for hands-on and technical education, as well as creative experimentation. Transformation Labs may partner up with - or be located inside - scrap shops, second hand warehouses and reuse centres.

A Transformation Lab is a place where the residents (and visitors) of a city or region can use tools and equipment to transform goods and materials. It can be seen as a hybrid of makerspace, tool library, technical school and community centre.

Open blueprints

The specification for creating Transformation Labs must include definitions of technology, space requirements and management. Such specifications must be open and freely accessible to municipalities, businesses and nonprofits to use - and improve on - them.



A video presentation of this concept idea was made to trigger participation during the reuse.city lab and collect feedback about Transformation Labs.

The video is available on the internet archive:

https://archive.org/download/reuse-city_prototypes/prototype_transformation-labs.mp4

Full documentation of the concepts with additional notes can be found on
https://github.com/opensmartcities/II/tree/main/D11_co-designed-concepts