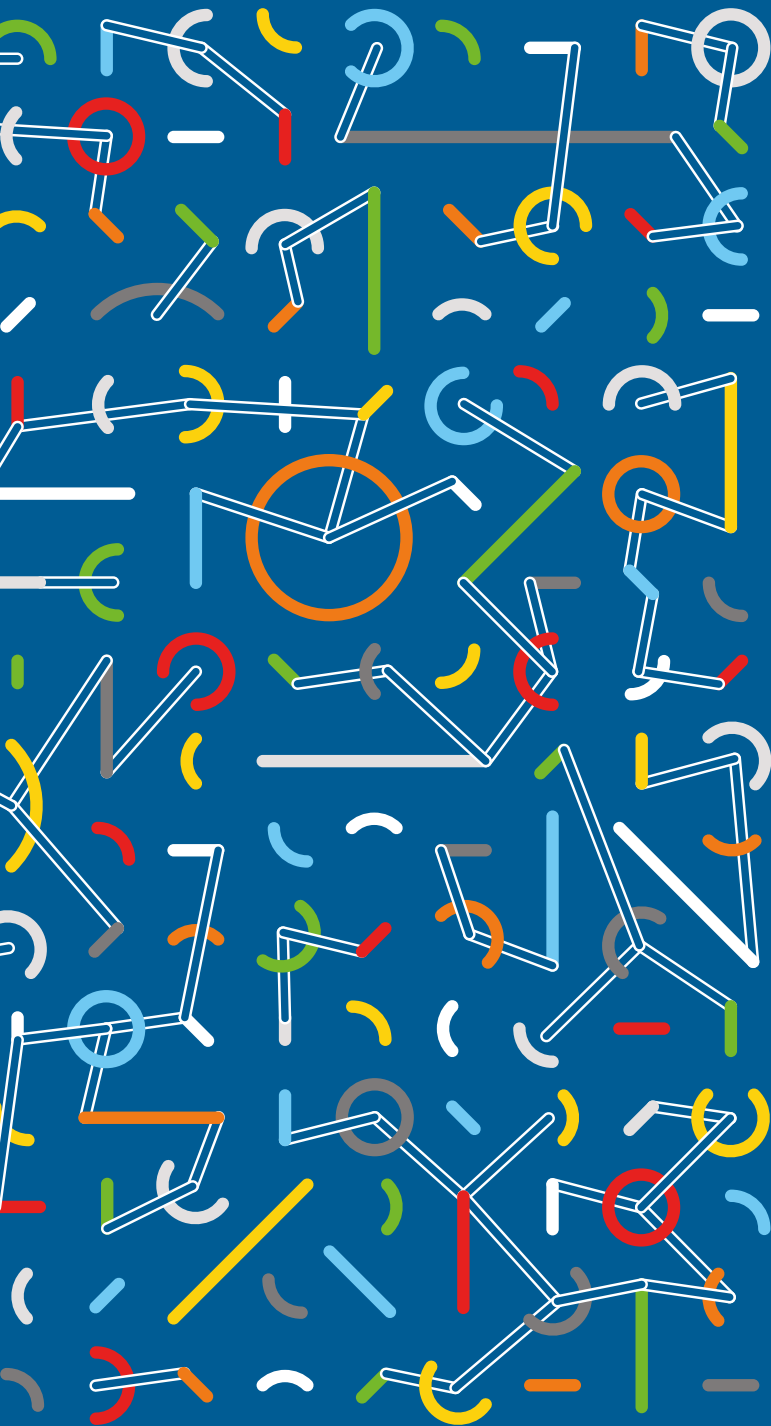


Student Design Competition Catalogue 2019



the Learning Network
on Sustainability

Introduction

LeNS Student Design Competition invited student teams from all over the world to design a Sustainable Product-Service System (S.PSS) applied to Distributed Economies (DE).

LeNS Student Design Competition 2019

The LeNS Student Design Competition 2019 invited student teams from all over the world to design a Sustainable Product-Service System (S.PSS) applied to Distributed Economies (DE) that addresses key environmental and social issues in the global and local context.

The competition welcomed students to form design teams and to familiarize themselves with S.PSS and DE tools available on the LeNSin platform (www.lens-international.org), to tackle sustainability issues preferably in their own local context.

Evaluation criteria

- S.PSS applied to the DE concept
- Environmental and socio-ethical sustainability
- Overall quality

Selection by jury

The selection took place in two rounds. The first round of selection was made by a jury consisting of LeNSin partners. Together they selected the best entry for the LeNSin countries (Brazil, China, India, Mexico, South Africa) and the categories Europe and Rest of the World. This resulted in six regional winners which went to the second and final round. In addition the LeNSin jury selected four honourable mentions.

For the final selection an international Grand Jury was assembled to decide upon the Top 3. The international Grand Jury consisted of:

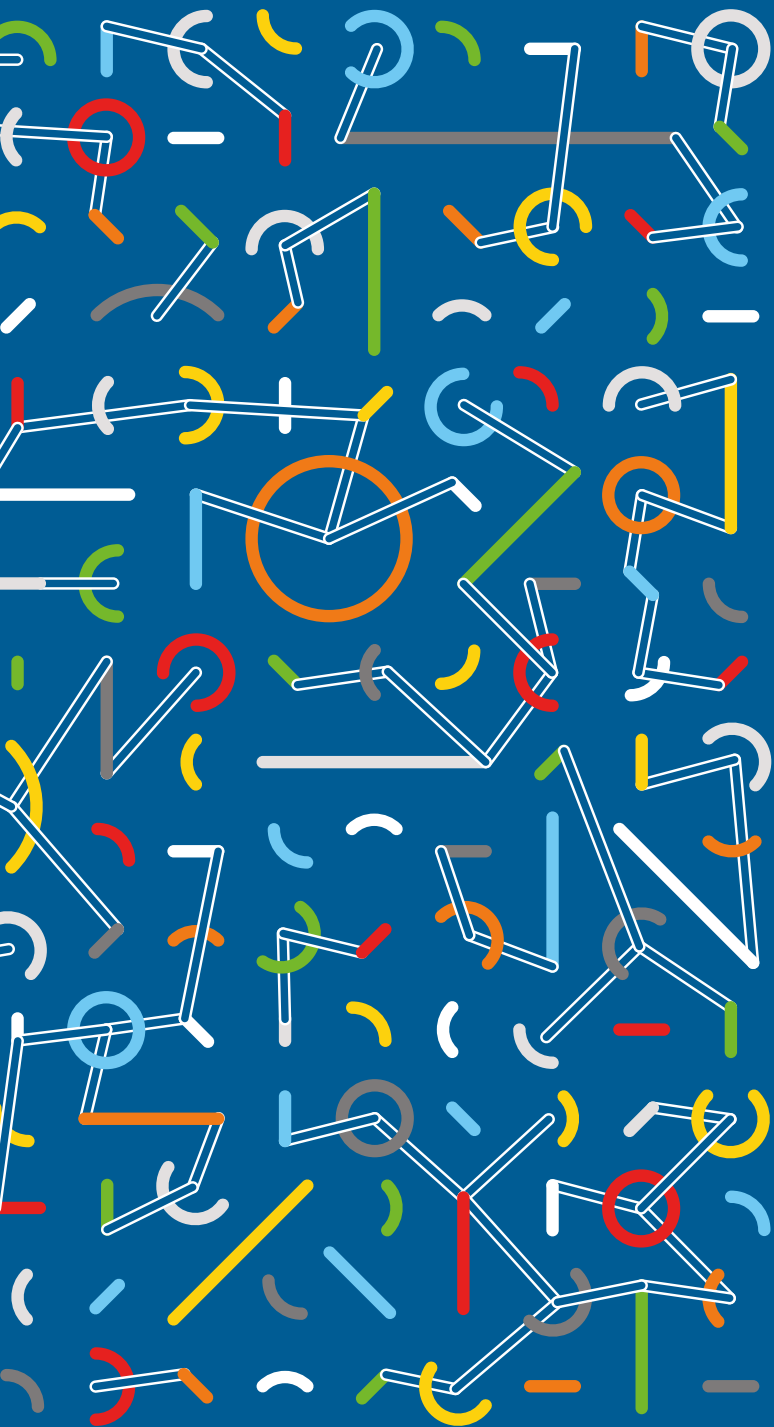
- Prof. Dr. Han Brezet (Delft University of Technology / Aalborg University) – Design for Sustainability
- Prof. Dr. Mikko Jalas (Aalto University) – Sustainable Consumption

This LeNS Student Design Competition Catalogue presents the six winning regional concepts and the four honourable mentions.

Each project is presented with its title, team members' names, the description of the problem, developed solution and explanation of social, environmental and economic benefits. The projects are illustrated by the following diagrams and figures: solution, interaction board and stakeholder map.

Sustainable Product-Service System (S.PSS) are offer models providing an integrated mix of products and services that are together able to fulfil a particular customer demand (to deliver a “unit of satisfaction”). They are based on innovative interactions between the stakeholders of the value production system, where the economic and competitive interest of the providers continuously seeks environmentally and/or socioethically beneficial new solutions.

Distributed Economies (DE) is a concept that promotes the development of small-scale, decentralized, flexible units that are synergistically connected with each other and make use of local resources. It has been developed as a response to current centralized industrial production systems and their negative socio-environmental impacts.



National Winners

Competition
Winner!



aguaviva

Manual for sustainable water management
in precarious housing developments

Agua Viva: Manual for sustainable water management in precarious housing developments

Camila Campos Teixeira

*Politecnico di Milano
Milan, Italy*

Problem addressed

Today 2.1 billion people live without access to water that can be used in their homes and it is expected this amount will increase to 5 billion by 2050. A paradox is that often societies that suffer from a lack of regular water provision have more difficulties in managing it. This is the case of the inhabitants of the precarious Brazilian settlements that live in an insecure situation between normal water supply and periods of total drought. This project is aimed not only at contexts in which the lack of water resources is already an emergency, but also to change behaviors that contribute to worsen it.

Concept description

This project consists of a system proposal accompanied by a manual intend to support families that suffer from a poorly managed water distribution network, leading to conscientization. Thanks to an analysis done with volunteers of the Latin American NGO TETO, aimed at overcoming extreme poverty through the team work of young volunteers and

slum dwellers, it was noticed a certain difficulty in reconciling the few tools available in these homes.

In Brazilian homes due to reduced interior spaces and the favorable climate, the vast majority of housework takes place in the courtyards and gardens: washing clothes, dishes, vegetables. In the existing system a lot of grey water, whose properties can become a value if reused, instead ends up in the drain. For example, rice cooking water can be stored and reused in the kitchen as well as water from legumes if stored can be used to irrigate a vegetable garden. In parallel, for example, the soapy water of clothes washing can be stored and used to wash the floor.

The manual aims to guide the user in collecting, purifying and reusing water. From the kitchen to the garden, to the courtyard laundry. Using a “do it yourself” concept, very appropriate in the environment we are dealing with, a step by step guide of how with materials easily provided by any DIY store and with very little effort from the user it is possible to build a system easily adaptable to its reality.



Concept details

Provider: Home Improvement retailers will provide components

Customer: Inhabitants of precarious housing settlements low-income countries

Service offered: Awareness campaign, Implementation network: NGO/municipality/water supply companies

Product involved: Set of objects and manual for correct use of water

DE characteristics: Components provided/recovered locally, minimized use of resources, distributed work, shared value

Revenue model: Donation, charitable giving, volunteering and municipality support

Sustainability benefits

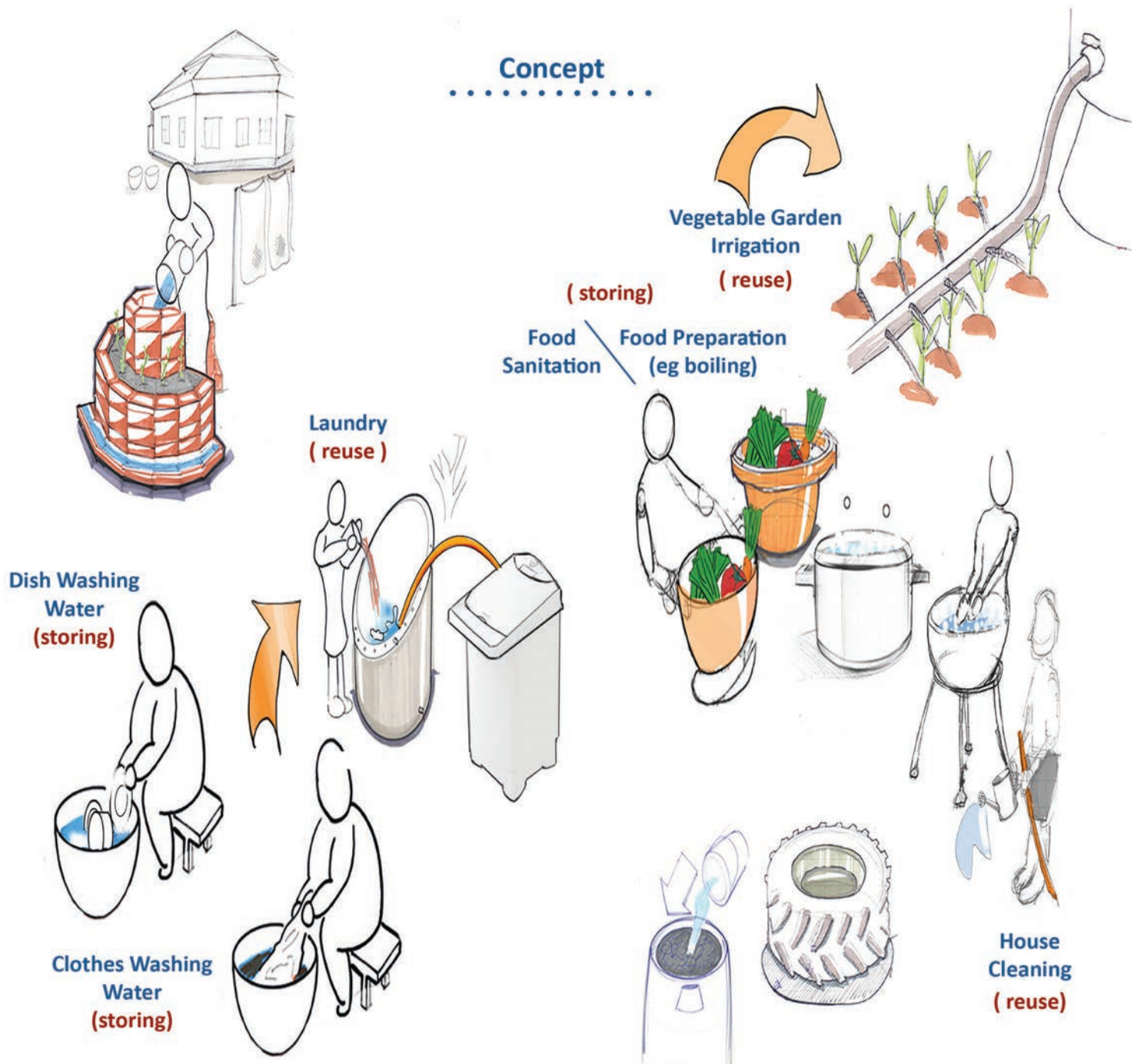
Social: Provides support to people living in precarious conditions with a lack of regular water supply with a system that is easily adaptable to various household tasks

Environmental: Reduces the consumption and waste of water in processes that use a large amount (e.g: clothes washing, food washing) encouraging re-use and adding value to a deficit resource

Economic: Reducing water consumption, which will reduce water bills, with this system gives a second life to objects as well as discarded materials (used in the filter)

Concept

.....



System elements

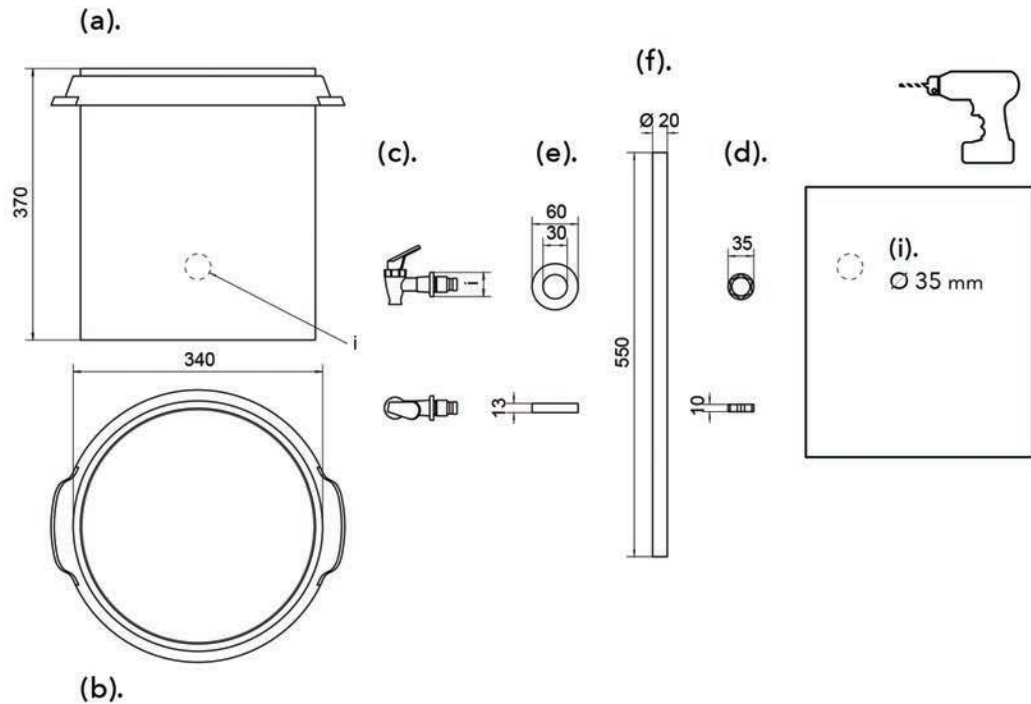


DIY guide example

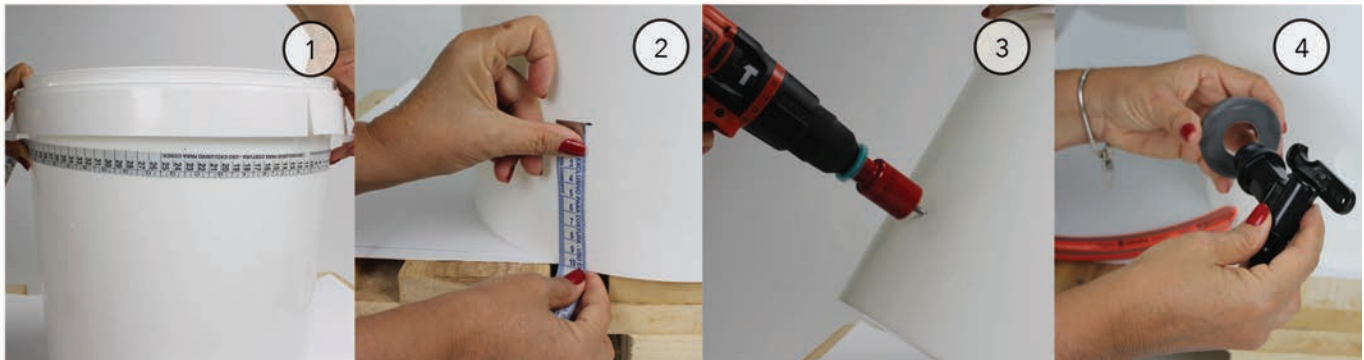
Sistem 1

WHAT YOU WILL NEED

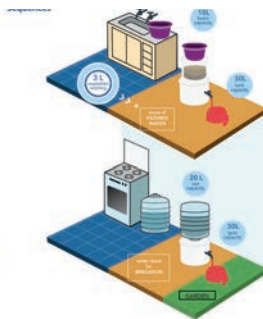
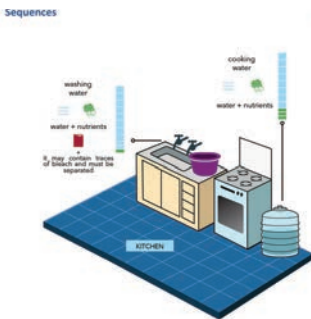
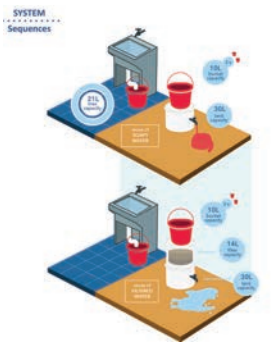
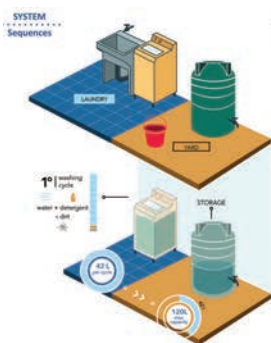
An important part of the manual is the instructions on how to build / compose each part of the system. Here an example.



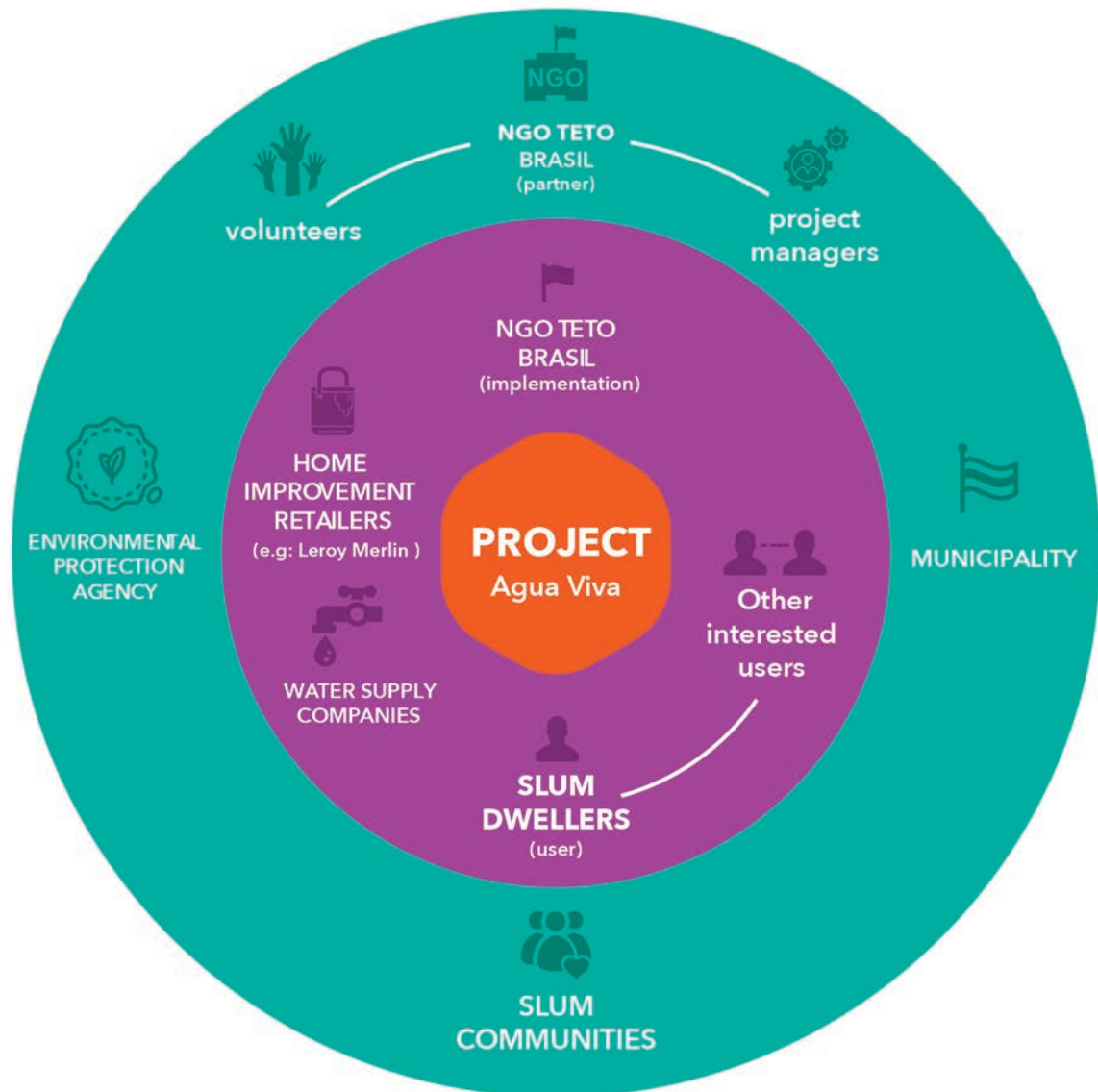
INSTRUCTION

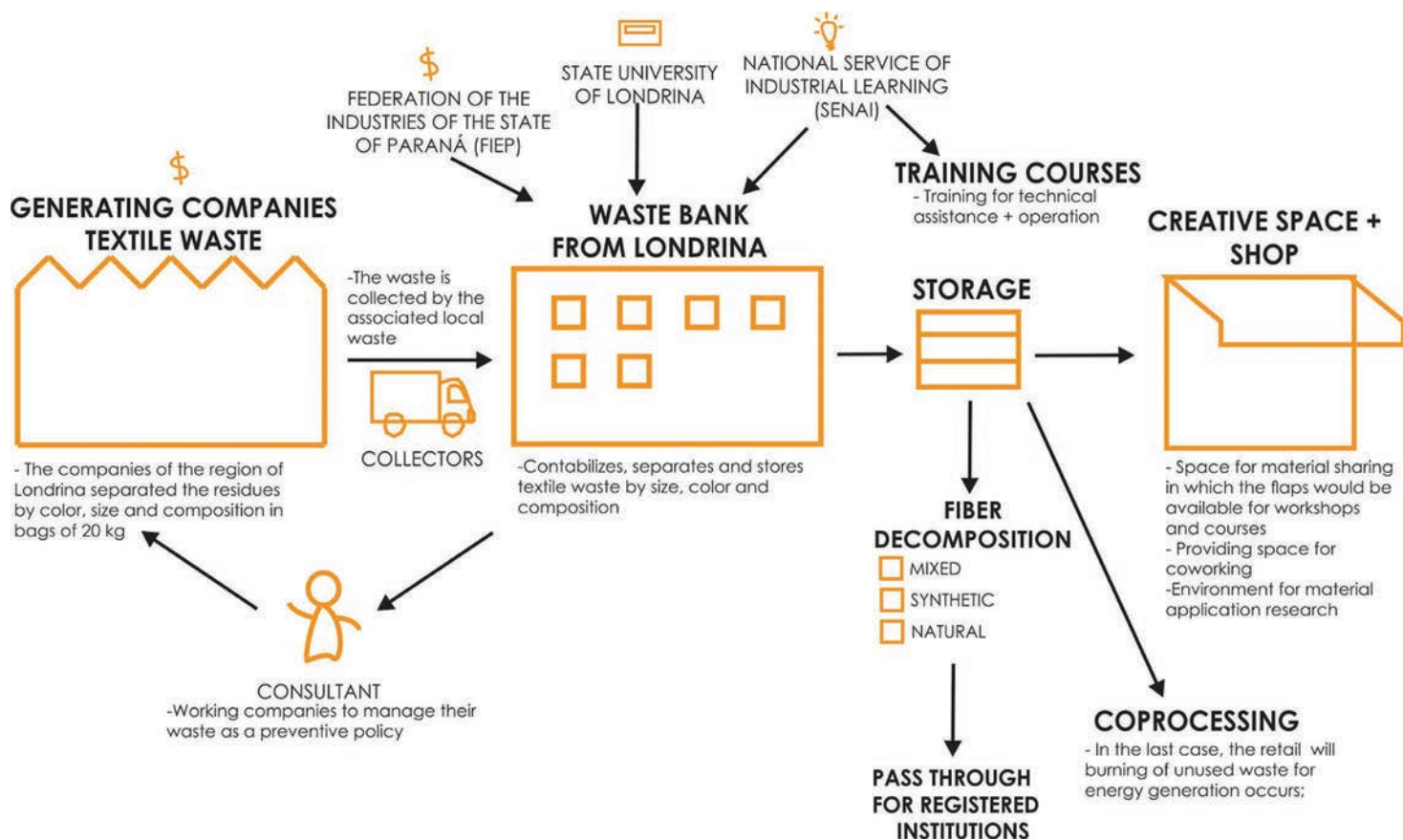


Interaction storyboard



STAKEHOLDERS





National
Winner!

Garment Waste Bank

Bheatriz Silvano Graciano, Brunna Gonçalves Ramos

*State University of Londrina
Londrina, Brazil*

Problem addressed

The project aims at mitigating the social and environmental impacts at a national level caused by the incorrect disposal of garment waste by industries. Moreover, the Garment Waste Bank is the starting point to create a new value chain based on the correct destination of the garment waste, which boosts the environmental and social awareness of the place. The PSS solution includes services like the collection, separation, and distribution of the waste for its customers which may be the companies that generate waste, sustainability research projects in universities, companies with social work, brands of upcycling and artisans.

Concept description

Due to the demand for textile waste eliminated by the fashion industries present in the region of Londrina-PR, the present project sought to elaborate a system whose aim is to mitigate the economic, social and environmental impacts resulting from this disposal, by creating new ways of use for these materials. The proposed solution includes two different proposals for collection and disposal systems for textile waste, one public and one private.

Both systems rely on basic structures for operation such as generating companies, physical space for the Bank and creative space. Generating companies would be responsible for the separation, organization, and transportation of their waste, which would be carried out by the city's waste pickers; the waste would arrive at the Bank and be accounted for for storage; after being stored they could follow three different stages:

- 1) be sent to the defibration process that would add value to the material allowing its use in new productive processes;
- 2) the larger residues could be passed on to pre-registered institutions, or transferred to work and research in the creative space of the system;
- 3) the non-usable waste could be sent for energy recovery by burning.

To make the system replicable to other cities beyond Londrina, we propose to adopt a modular configuration, combined with a net configuration to expand and integrate the intelligence and strategies of the Bank with the other Banks in an "ecosystem" of Garment Waste Banks, based on the Distributed Economy concept.

Concept details

Provider: SENAI, Universities, FIEP, City Hall, Secretariat of Environment

Customer: Generating companies, collectors, social projects, universities, registered companies, and the community

Service offered: Transportation, waste control, storage, defibration, research development, transfer to institutions

Product involved: Clothing products, fabrics

DE characteristics: Potential for replicability, information networks, collaboration between actors and society





















Revenue model: Payment to receive waste, material sales, products

Sustainability benefits

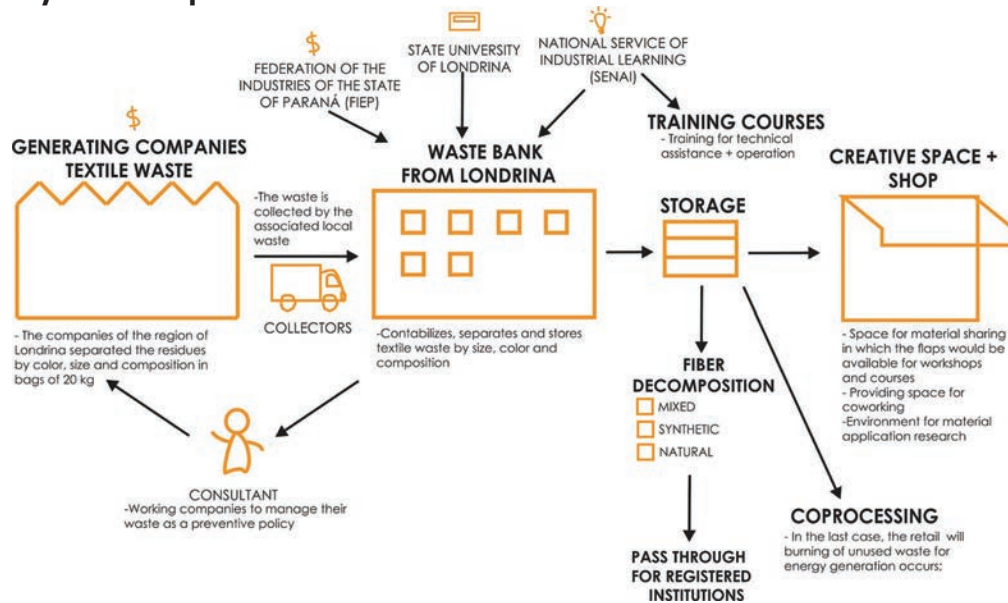
Social: Promotes collaboration between stakeholders, driving sustainable awareness; empowers the workforce of the actors and aims to include the workers that collect recyclable materials, usually marginalized by society

Environmental: Optimizes the life cycle of garment waste, extending the material lifespan by reusing it or by sending it for energy recovery, as well as its correct disposal

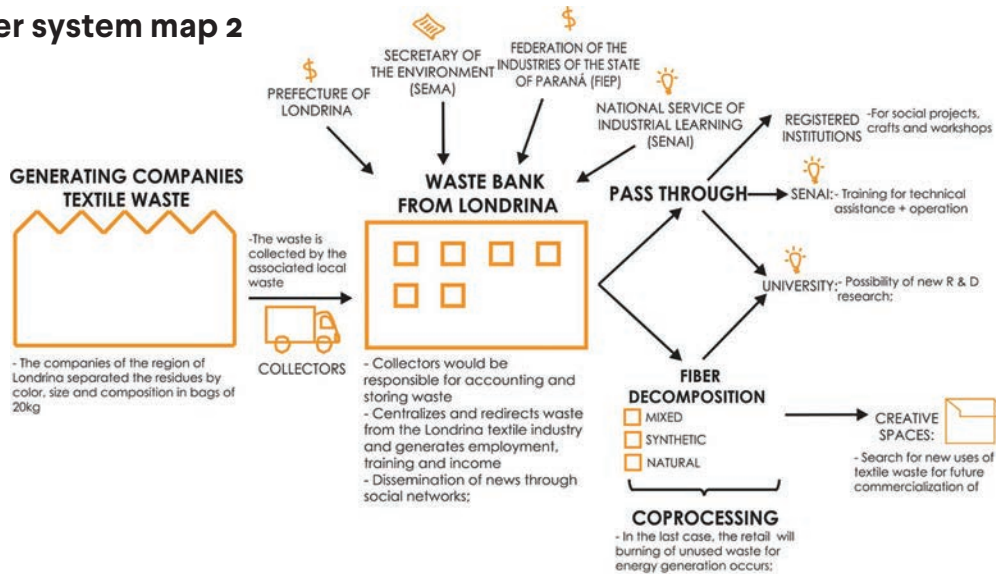
Economic: Revalues textile waste as material in new economic cycles; vendor companies can profit from new products and materials, and customers can receive quality and affordable material

SOLUTION ELEMENTS		Use the cells of this row to insert the physical and material elements needed to carry out each single action						
		1	2	3	4	5	6	7
 INDUSTRIES OF NEW MATERIALS AND PRODUCTS	Garment waste consumer							
	USER 01: Industries that produces new materials and/or products with the recycled garment waste							
 SOCIAL INSTITUTIONS OF ARTISANS	Garment waste consumer							
	USER 02: Social entities that receive garment waste for artisans							
 COPROCESSING INDUSTRIES	Garment waste consumer							
	USER 03: Coprocessing Industries							
 WASTE BANK FROM LONDRINA	Garment waste receptor and knowledge facilitator							
	PROVIDER: Garment Waste Bank							
 TEXTILE WASTE GENERATING COMPANIES	Garment waste generator							
	STAKEHOLDER 01: Industries that produces new materials and/or products with the recycled garment waste							
 COLLECTORS	Garment waste collector, transporter, accumulator and store							
	STAKEHOLDER 02: Cooperatives of waste collect workers							
 CREATIVE SPACES	New applications for materials, products and business models based on the garment waste							
	STAKEHOLDER 03: Designers & design students in a collaborative & creative space							
secondary stakeholder 1: ADMINISTRATION OF THE CITY OF LONDRINA	Infrastructure, legal and political support							
	secondary stakeholder 2: FEDERATION OF THE INDUSTRIES OF PARANA STATE							
secondary stakeholder 1: ADMINISTRATION OF THE CITY OF LONDRINA	Infrastructure, legal and political support							
	secondary stakeholder 2: FEDERATION OF THE INDUSTRIES OF PARANA STATE							

Stakeholder system map 1



Stakeholder system map 2





National
Winner!

Senseflo | Smart Water Management for Apartments

Upendra Shenoy

*National Institute of Design
Ahmedabad, India*

Problem addressed

One of the key UN Sustainable Development Goals aims at providing clean, accessible water for all, due to bad economics or poor infrastructure, every year millions of people, most of them children, die from diseases associated with inadequate water supply, sanitation and hygiene. With a population of almost 1.2 billion and growing, over-exploited natural resources, and inadequate or failing infrastructure, perhaps no nation faces a greater challenge in securing enough fresh water to meet the needs of its people than India. Senseflo aims to solve the issue of water mismanagement, fair pricing of water usage within multistoried residential buildings with a holistic view to build smart-cities, by enabling smart-communities.

Concept description

Senseflo is a subscription based service offering. Senseflo has 3 components in the system.

- Hardware components retrofitted on the existing plumbing infrastructure.
- Mobile application for the residents.
- Software tool for the building maintenance teams.

The hardware element has two components again.

The first unit is a Clamp-on, Non-Invasive individual metering device mounted on water pipelines, the installation has no-downtime, thus no interruption in water supply. The second unit is the display unit, which is mounted inside each residence, giving users details of water usage and control over individual water usage, residents can set water usage limits and compare their usage with other residents. The metering device uses Ultrasonic transducers to monitor the usage of water for individual residence, thus generating a fair bill and fair usage system.

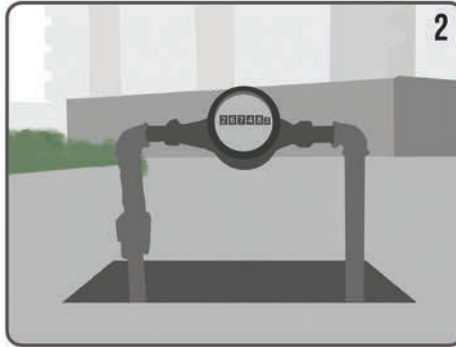
Studies have shown that individually metered pipelines bring down the water consumption by 50% on the long term consistently, as residents would have to pay for their own usage and not the average of the entire building, hence reducing the “taken for granted” behavior.

This helps conserve water and better water management within a building. The mobile application helps residents do the same, but remotely, which also has leak detection and access to remote water shut-off valve in case of leaks/ breakdowns when away from home.

Interaction storyboard



Brigade is a prestigious builder of apartments in the city, and have various upscale projects with amenities like gardens, club house, pool, play area, gym etc.



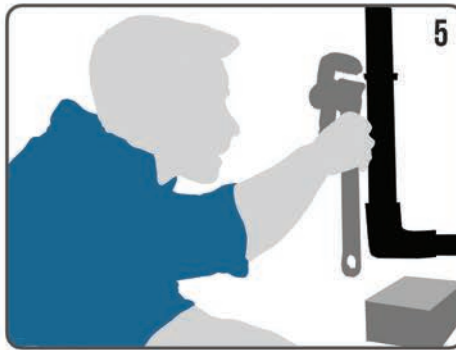
The local governance permits having only one official water meter per plot, hence the entire apartment complex has one device monitoring its water intake from the municipal source.



The estate management team finds it hard to keep a track of the water usage, the paperwork are a hassle and there are lot of human errors resulting in poor record maintenance.



Water consumption is always in the center of the welfare association meetings which happens monthly, and there are disputes and issues regarding water management within the apartment complex.



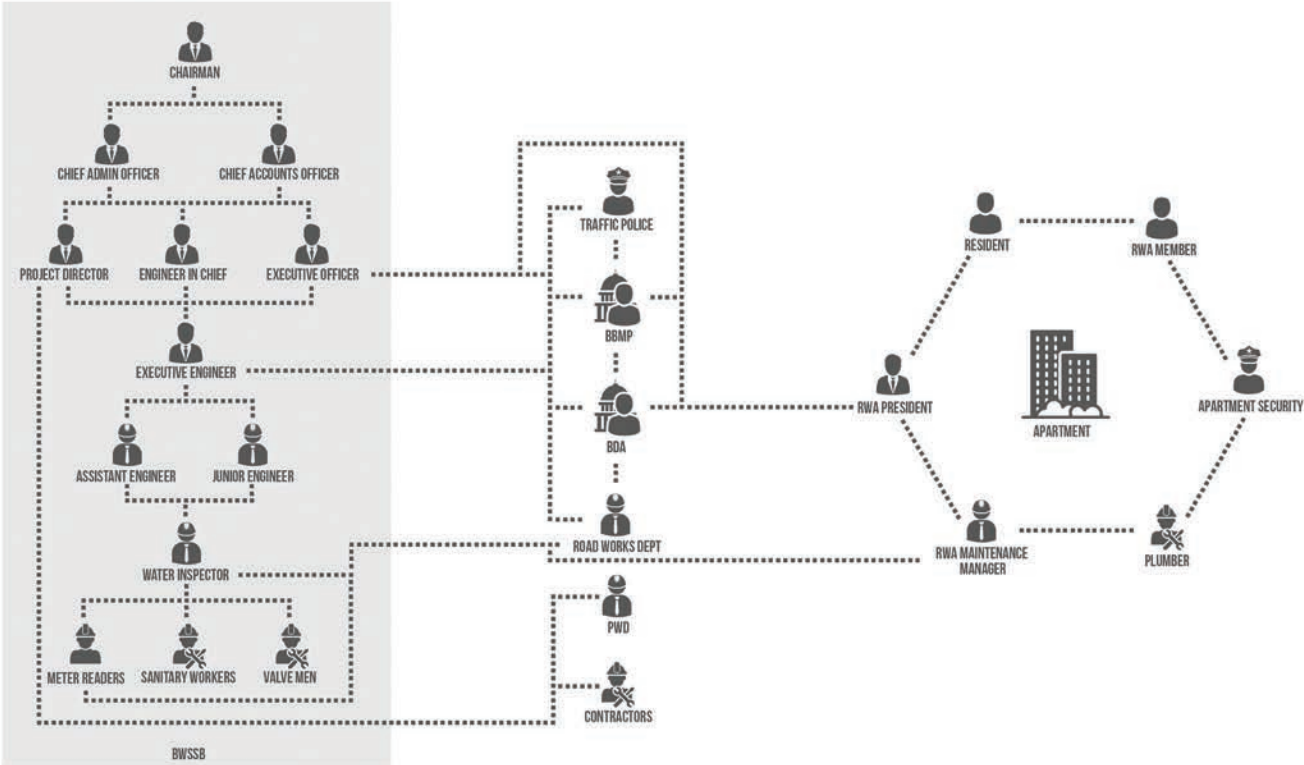
Brigade gets to know about the Honeywell Smart Water solution and installs at their apartment complexes.



Within days things fall in place, water consumption is tracked, water is better managed and records are maintained as per and provides complete peace of mind.



STAKEHOLDER MAPPING MUNICIPAL WATER SUPPLY



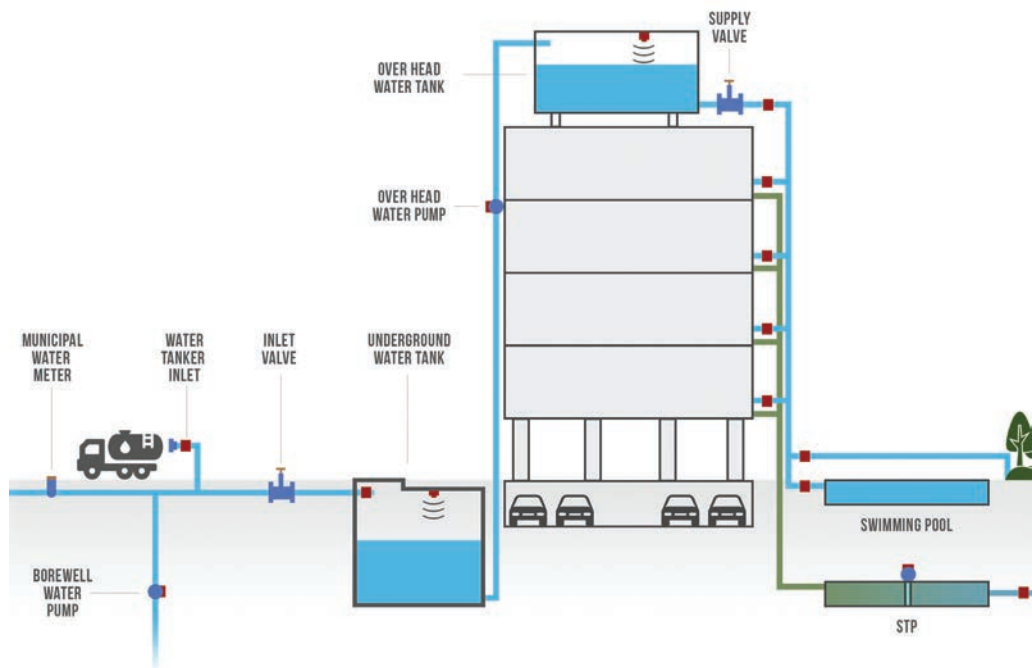
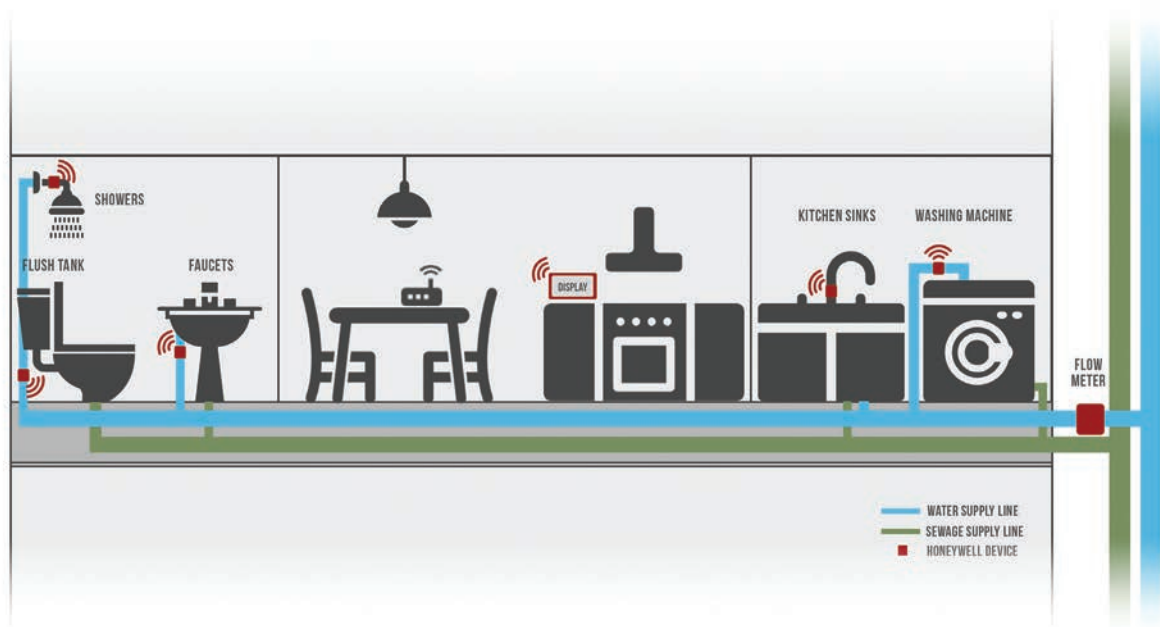
Concept details

- Provider:** A Public-Private Model would enable the infrastructure to be functional
- Customer:** Apartment builders and its residents/ occupants
- Service offered:** Tools and App to monitor and control water usage
- Product involved:** Display unit, Sensors (flow, quality, valves, water level)
- DE characteristics:** Gateway Unit, Mobile Application and Dashboard Software
- Revenue model:** The installation fee and initial sell-out will recover the partial cost; the ROI is recovered through subscription on Mobile App and Dashboard Software

Sustainability benefits

- Social:** Access to water, less diseases
- Environmental:** Reduced water consumption, water conservation
- Economic:** Reduced costs for water due to less consumption

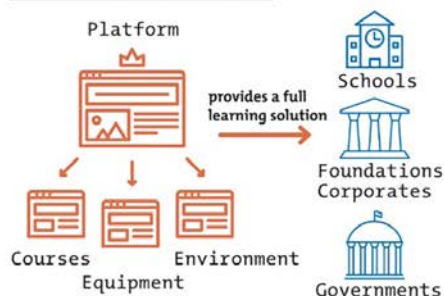
System elements





LOOOOOP LABS

CONCEPT



The PSS is a hybrid payment model with some customized equipment, additional services, and a recurring monthly payment for maintenance, etc.

21st century learning

21st century learning

MINDSET, SKILLS & COMPETENCES



LOCAL MATERIALS
local sourced materials and manufactured locally

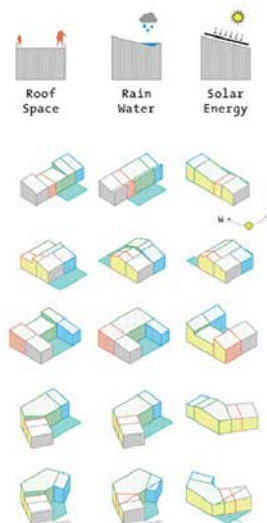


SOLAR ENERGY
Generates energy for interior lighting, water filtration, plant LEDs & irrigation

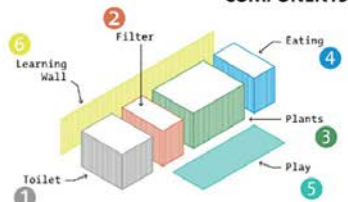
KINETIC PLAYGROUND
Generates energy for additional energy needs

SUPPORTED BY ONLINE PLATFORM
available online: building blueprints, educational content, equipment guides & plant resources

CONFIGURATION OFFERINGS



STRUCTURE COMPONENTS



INTERACTIVE LEARNING WALL: CIRCULAR SYSTEMS



National Winner!

LOOOOOP LABS

Bosen Wang¹, Shuai Chang¹, Gregory Benjamin Pepper², Johannes Michael Mutter²
Alexander Edward Davies²

1. Tsinghua University; Beijing, China

2. Imperial College London; London, England

Problem addressed

To respond better to future social and environmental challenges, primary schools in the less-developed regions need more innovative educational content and space to support pupils in the learning of 21st century mindsets and competencies. The pupils can learn and practice about basic knowledge of ecological science through the sustainable product-service system solution.

Concept description

The result-oriented S.PSS solution demonstrates circularity through a smart sanitation-to-food system. The pupils in the less-developed regions can learn and practice about the knowledge of substance circulation and energy exchanges in a modular building containing toilets, gardens and labs. An online platform offering structure blueprints, equipment options and course content in accordance with requirements of schools based on the local recourses (renewable energy and building materials, etc.).

The schools can collaborate with the licensed local manufacturing partners to finish the construction. Also, they can receive remote assistance and maintenance instructions through the online platform. Monitoring sensors in plant pots, water treatment systems, solar panels and in structure, which send feedback to the company and indicate end-of-life of products. The company assesses state of structure and equipment, and manages the recycling and disposal. Customers can obtain the data as well through the internet.

The PSS is a hybrid payment model with some customized equipment, additional services, such as the system blueprint, sustainable delivery, training and learning content and a recurring monthly payment for maintenance, repair, seedlings, plant monitoring and system updates, etc.

LOOOOOP LABS

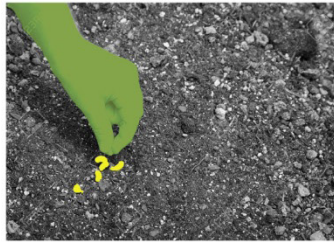
21st century
learning

Interaction



1 Toilets

Water purification



2 Seed planting

Learning biology actively



3 Makerspace

Learn fogponics technology



4 Vertical garden

Optimal growing & harvest



5 Learning environment

*Teach: critical thinking,
curiosity, problem solving ...*

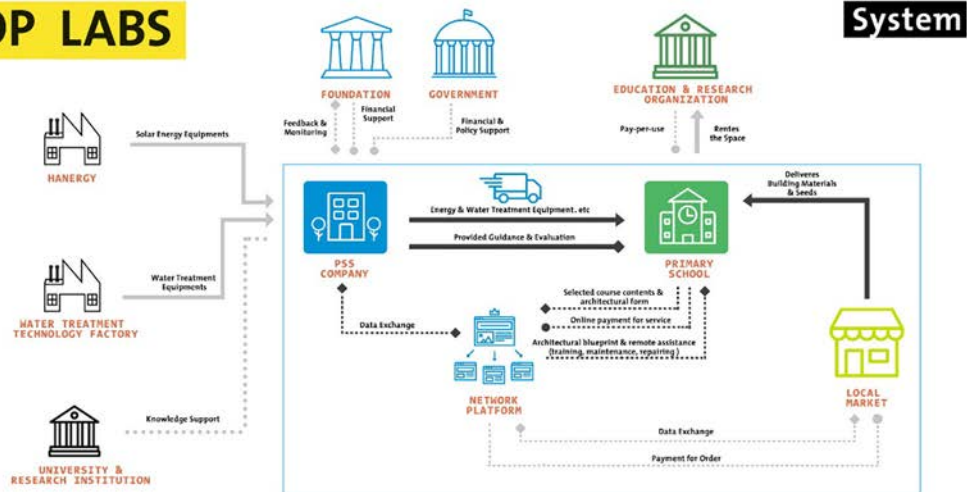


6 Plant monitoring

*App displays plant sensors
data via QR Codes to students*

LOOOOOOP LABS

21st century
learning



Concept details

Provider: Private company

Customer: Primary school in the less-developed regions

Service offered: Design blueprints, course content, remote assistance and disposal services

Product involved: Some electronic equipment and customized experimental apparatus

DE characteristics: Distributed design, distributed manufacture, distributed energy

Revenue model: Hybrid payment

Sustainability benefits

Social: Education of children and new learning content, local employment and skill transfer, sharing of knowledge and blueprints with local manufacturers

Environmental: Resource efficiency (water recycling, renewable energy, materials recycling), distributed manufacture (delivery, 3D printing, local materials)

Economic: Affordable learning solution and profitable at scale

LOOOOOOP LABS

21st century
learning

PROBLEM

To respond better to future social and environmental challenges, primary schools in the less-developed regions need more innovative educational content and space to support pupils in the learning of 21st century mindsets and competencies.



Problem solving



Collaboration



Creativity



Communication



Analytic thinking



Ethics, action, and accountability

Source: Literacy Is NOT Enough (Crockett, Lee et. al.; 2011)

LOOOOOOP LABS

21st century
learning

User Analysis

The pupils can learn and practice about basic knowledge of ecological science through the sustainable product-service system solution.



8-10 years old, lowerclass, live in the rural and urban junction of Jiang Su province, China.

Want to have fun, play, be accepted, get attention, have friends, and love from their family.

Read comic books, ebooks, watch reality shows and play video games.

Use of smartphones, QQ, QR Codes.

School 8am-3:30pm, tutoring on weekends.

Workshops teach how to transform discarded plastic bags into useful products.



National Winner!



Creatopía

Ericka López, Martha López, Luis García

*Universidad Autónoma Metropolitana
Mexico City, Mexico*

Problem addressed

In Mexico there is no recycling plant for plastic bags or a system that guarantees their correct disposal. Mexico City consumes enough bags to go around the world every 6 days. Mexico has one of the highest rates of unemployment in OECD countries. Creatopía is an S.PSS that generates jobs by training people for the design and distributed production of products made of discarded plastic bags.

Concept description

Creatopía offers free workshops during which it teaches environmental education and trains a technique that converts plastic bags into useful objects. Our production process is simple, sustainable and distributed. Those interested in becoming creators receive online design advice during the production process. The objects that comply with our production guidelines are published on our website.

Creatopía manages advertising, sales and distribution and charges a percentage on sales to feed the network. When the objects reach their end of use life, they are recovered and transformed into new objects.

Our system guarantees the reduction of the environmental impact of the plastic bags as the production contemplates the whole life cycle of the objects and makes possible a production from cradle to cradle. It creates jobs by training and making possible the sale of the creator's products. As more people join, the network grows and cells are generated according to the geographical position that guarantees the continuity of decentralized production and distribution.

Creatopia's interaction storyboard

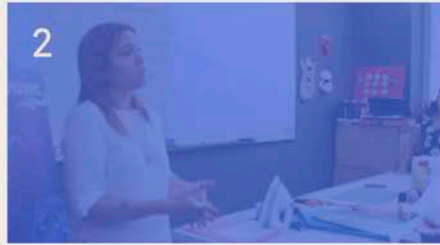


1

Promotion

From Creatopia and its activities through social media

- a) about us
- b) collection of plastic bags
- c) workshops
- d) sale of products



2

Invitation

Creatopia informs about its next workshop and invites the community to donate plastic bags that day



3

Collection

The community and those interested in taking the workshop carry plastic bags to the workshop



4

Training

Creatopia's instructors teach a sustainable technique that transforms plastic bags into objects and invite participants to become creators and sell with Creatopia



5

Production

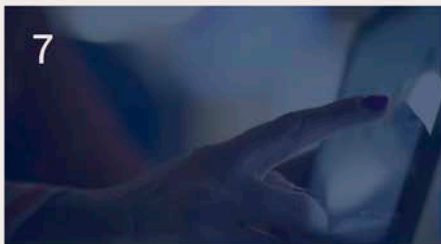
With support in the manual and online consultancies, the creators produce objects in the workshop-shop of Creatopia or in their houses



6

Publication

The first prototype is sent to Creatopia for approval and publication on the website. The product is added to the catalog and promoted through social media



7

Purchase

The customer buy the product

- a) In the shop
- b) In the online store



8

Distribution

The product is delivered according to proximity and comfort

- a) store-client
- b) creator-client
- c) client-creator

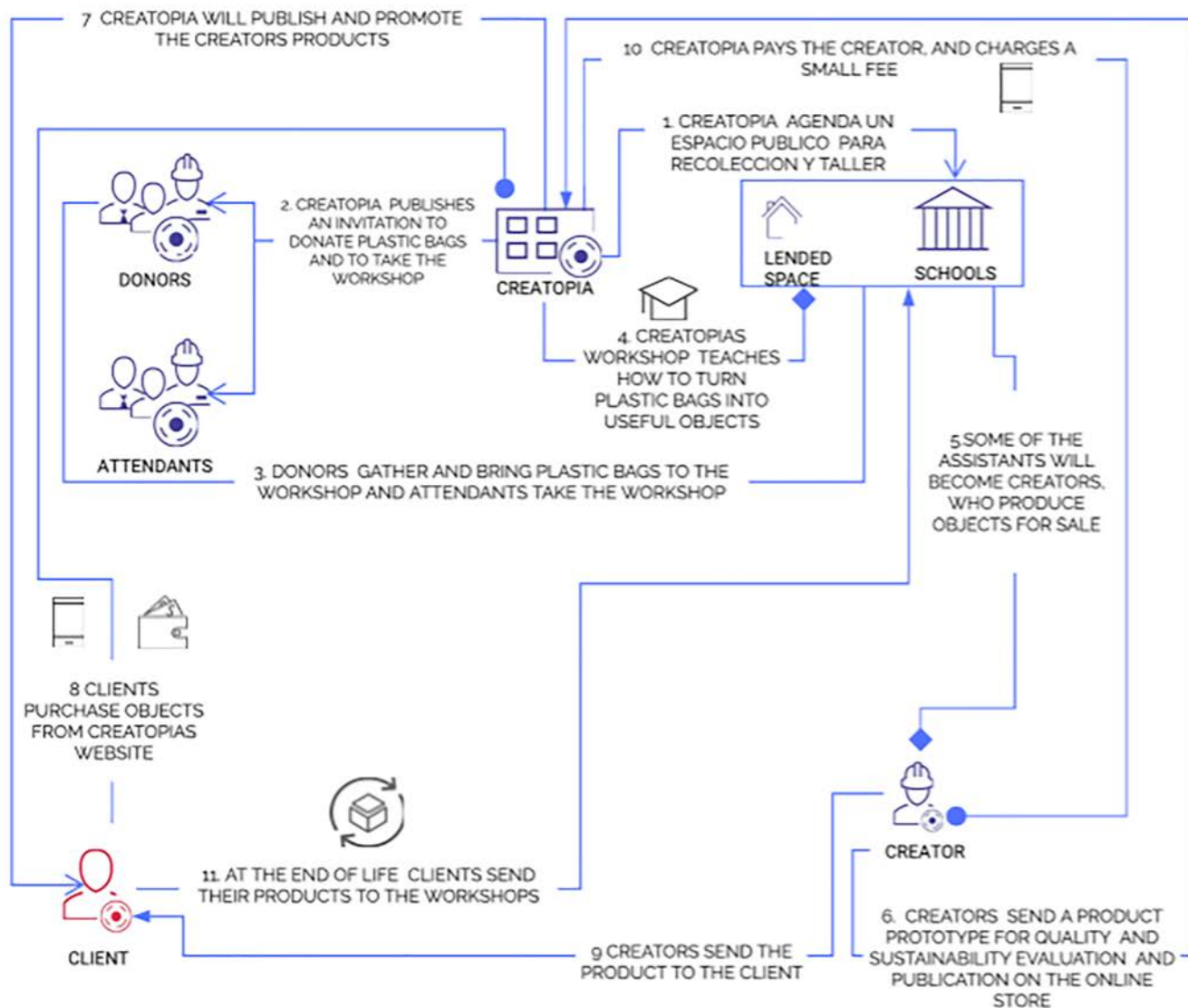


9

Product recovery

At the end of the product lifespan, it's returned to the workshops of Creatopia to be transformed into a new product

creatopía



Additional pictures

Concept details

Provider: Creators, donators of plastic bags, allies that lend their space

Customer: People that require a flow of money

Service offered: Workshops, design consultancy, promotion, sales and distribution logistics

Product involved: The ones generated by the creators

DE characteristics: Small scale, decentralized design, production and distribution

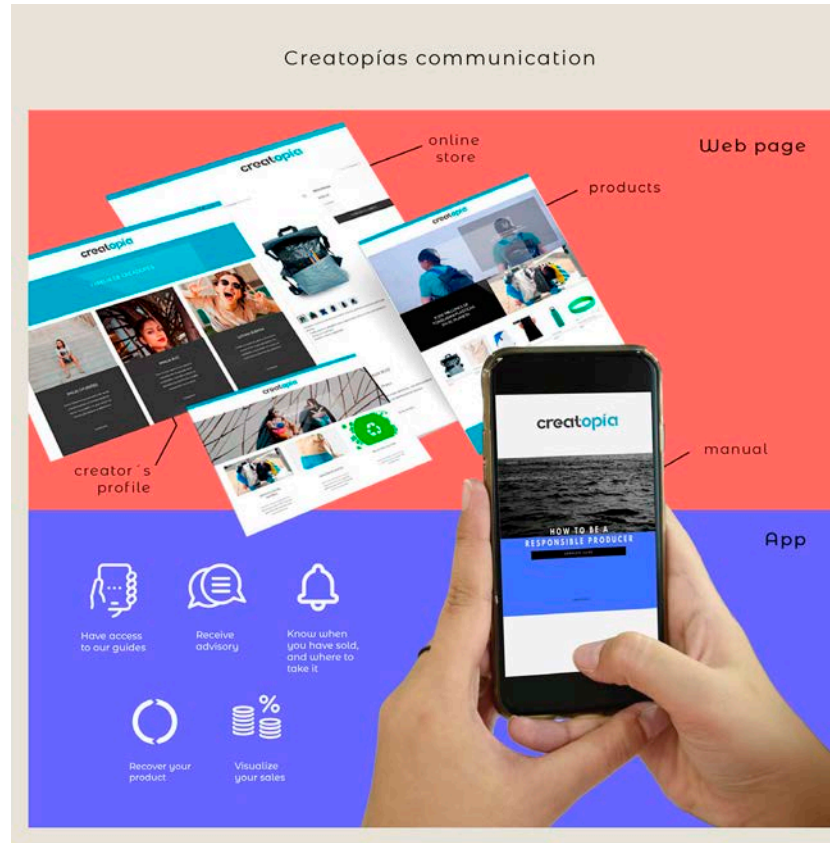
Revenue model: Distributed economy based on online sales

Sustainability benefits

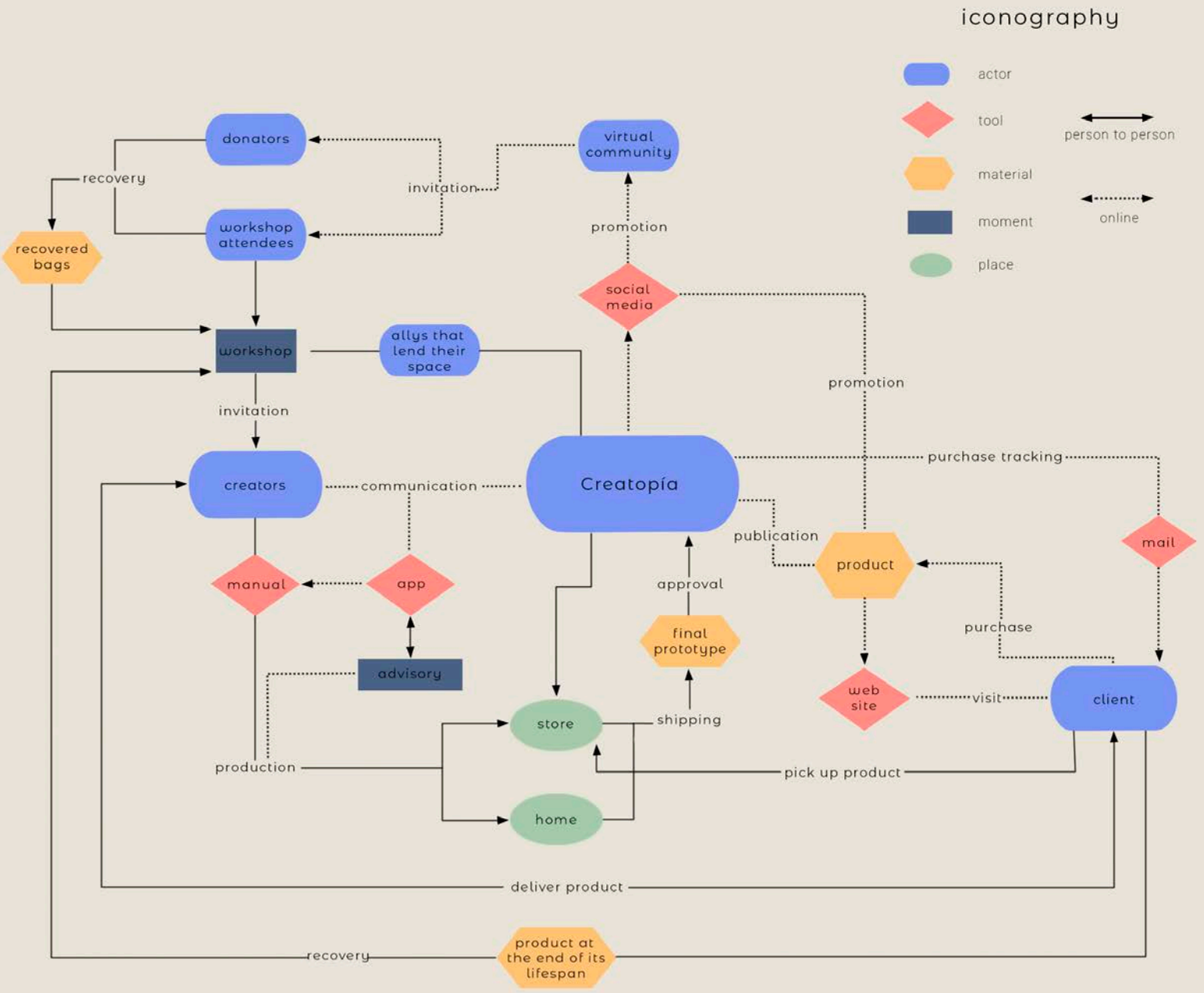
Social: We provide environmental education, train and advise people to create and sell their objects, allowing anyone to be a creator and generating an environmental network.

Environmental: We reduce the environmental impact of the plastic bags and guarantee a production from cradle to cradle. Our system revalues them and makes people aware of their excessive use.

Economic: The production technique is accessible, represents a minimum investment and provides a flow of money to the creators. Creatopia is replicable and meets the needs of an existing market.



Creatopías interaction map





ENSURES TRANSPORTATION OF
MEDICAL SUPPLIES AND PHYSICIANS

DRIVERS



ENSURES PATIENT'S WELFARE AND
RECOMMENDS MEDICAL SUPPLIES FIT
FOR THE PATIENT IF NEEDED

PHYSICIANS



ENSURES MAINTENANCE AND
SERVICE QUALITY OF MEDEX APP

APP MANAGERS



CUSTOMERS TO THE APP SERVICES
FOR MEDICAL ASSISTANCE

PATIENTS



ENSURES THE IMPLEMENTATION OF
MEDEX SERVICES IN PUBLIC AND
PRIVATE SECTORS

GOVERNMENT



ENSURES STABLE RELATIONSHIP
WITH MEDEX, GOVERNMENT AND
OTHER MEDICAL SERVICES

**TRANSPORTATION
SERVICES COMPANY**



ENSURES SUPPLY OF
MEDICATIONS FOR MEDEX

PHARMACEUTICALS



ENSURES STABLE RELATIONSHIP
WITH TRANSPORTATION SERVICES,
PHARMACEUTICALS AND GOVERNMENT

**HOSPITALS
(PUBLIC AND PRIVATE)**

INTERACTIONS OF



MEDEX

**External
Category
Winner!**

Medex (Medical Express)

Gabriel Lorenzo C. Yam, Michelle Ann Macoy, Frank Chiongson

*De La Salle University
Manila, Philippines*

Problem addressed

The problem Medex (Medical Express) aims to solve is the transportation and availability constraints for patients in need of medication attention. The target customers for this problem include people that need medical attention but have a difficulty in finding available pharmaceutical stores or hospitals that are not in their reach. This PSS solution is intended to address or promote better health services and job opportunities not just in the public transportation sector, but in the medical sector as well.

Concept description

Medex is a medical delivery-transportation system that makes use of an app which would allow its users to have medical professionals or medical supplies be brought to their location of choice for medical consultation or evaluation. It is a collaboration between transportation services and medical services to address environmental (increases system life optimization), socio-ethical (increases job opportunities for physicians and drivers),

and economic (physicians and drivers earn profit; user friendly affordability) problems.


The app will provide basic details such as an abridged list of available medications that are available for delivery and complete profiles (to increase trust and transparency) for each medical physician willing to participate, complete profiles of the drivers delivering or bringing the medical physician, car/van details (plate number, brand, color, etc.) and the time duration on how long it would take the driver and medical physician to arrive at the desired location. Patients are allowed to give a basic description of their medical situation to better assess what the medical physicians would need (medical supplies, medicines, etc.) to bring for consultation.

They are also allowed to rate the drivers and medical physicians per consultation provided, to further assess and improve said services. Forms of payment include cash, credit card, checks, and credits (the more you consult, the more discount points you get). Patients will be given a transportation fee, medical consultation fee, and medical supply/medicine fee (if patient avails for it). Health insurance would also be covered if the patient chooses to use it.




THE PHILIPPINES HAS SINCE UNDERGONE ISSUES INVOLVING THE OVERCROWDING OF HOSPITALS, THUS PROVIDING LESS MEDICAL ASSISTANCE FOR PEOPLE WHO ARE IN NEED OF IT. THIS ISSUE IS ALSO EXISTENT OR PRESENT IN THE PROVINCIAL AREAS IN THE PHILIPPINES.

PROBLEM/CONTEXT TACKLED BY 



OTHER ISSUES CONCERNED WOULD INCLUDE THE LACK OF MEANS OF TRANSPORTATION FOR THE PATIENT TO GO TO THE HOSPITAL OF THEIR LACK OF FLEXIBILITY IN THEIR PERSONAL SCHEDULES

PROBLEM/CONTEXT TACKLED BY 

Concept details

Provider: Physicians, drivers, app managers, medical institutions in partnership with Medex

Customer: Patients without transportation or who seek consultation at their location

Service offered: Medical consultation, delivery of medical supplies, transportation for physicians

Product involved: Medical supplies/medicine

DE characteristics: Blockchain aspects are involved since multiple interactions stabilize economic activity

Revenue model: Industry specific models will monitor multiple financial interactions in Medex

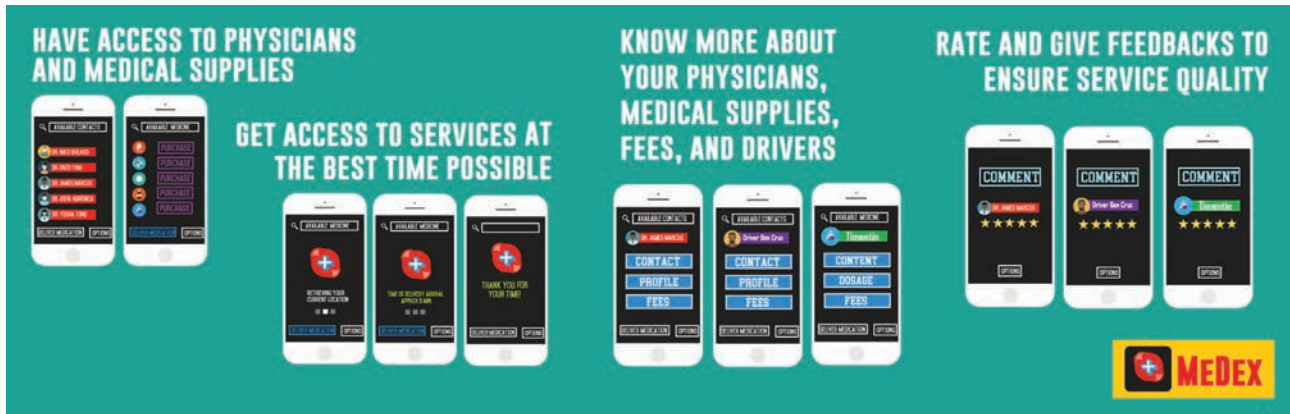
Sustainability benefits

Social: There would be an increase of job opportunities for physicians and drivers since physicians can now work outside the hospital and drivers can work with patients that need medical assistance.

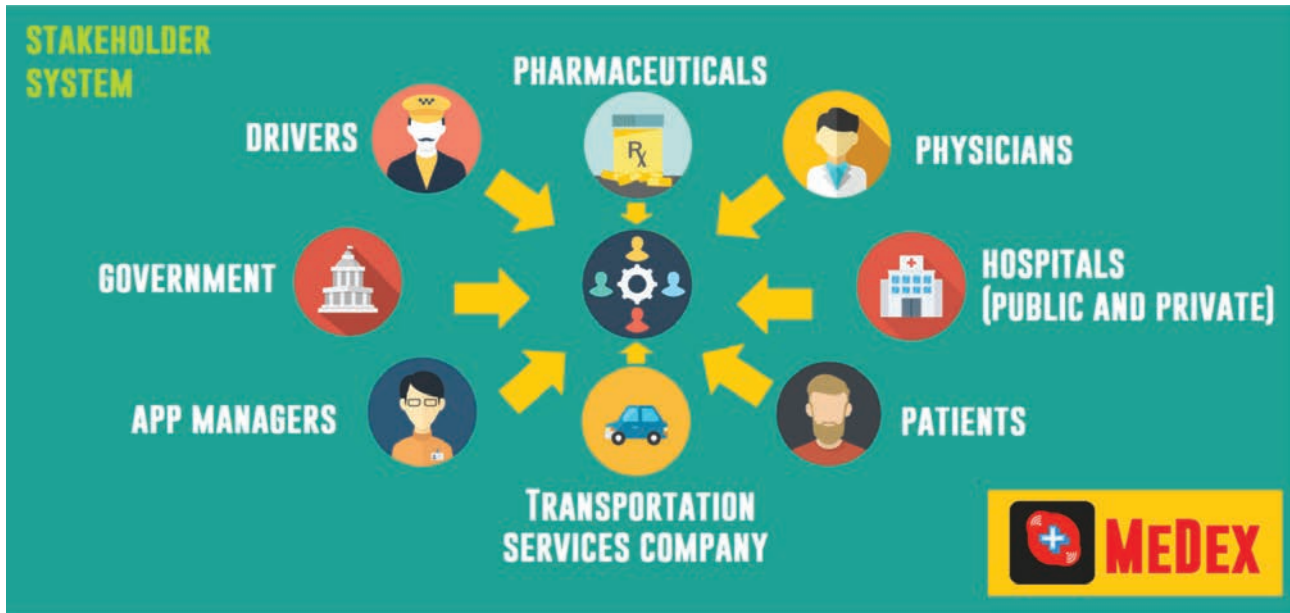
Environmental: System life optimization is based on design, testing, implementation (partnership with medical institutions), maintenance, modification or upgrading (user feedback of app and services), and retirement or replacement.

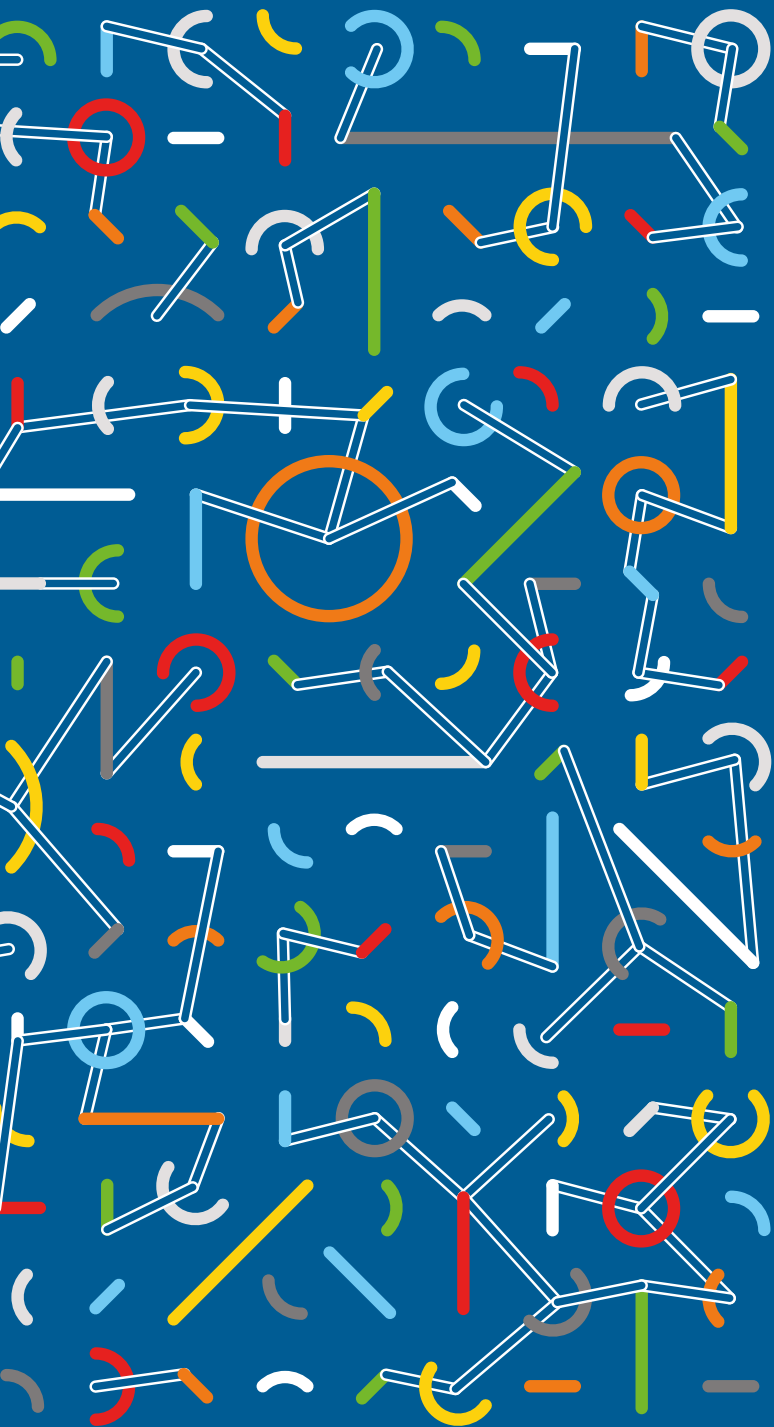
Economic: Physicians and drivers would be able to earn extra profit in their spare time, while patients would receive a user-friendly service because of the service's convenience and sense of availability.

Interaction storyboard

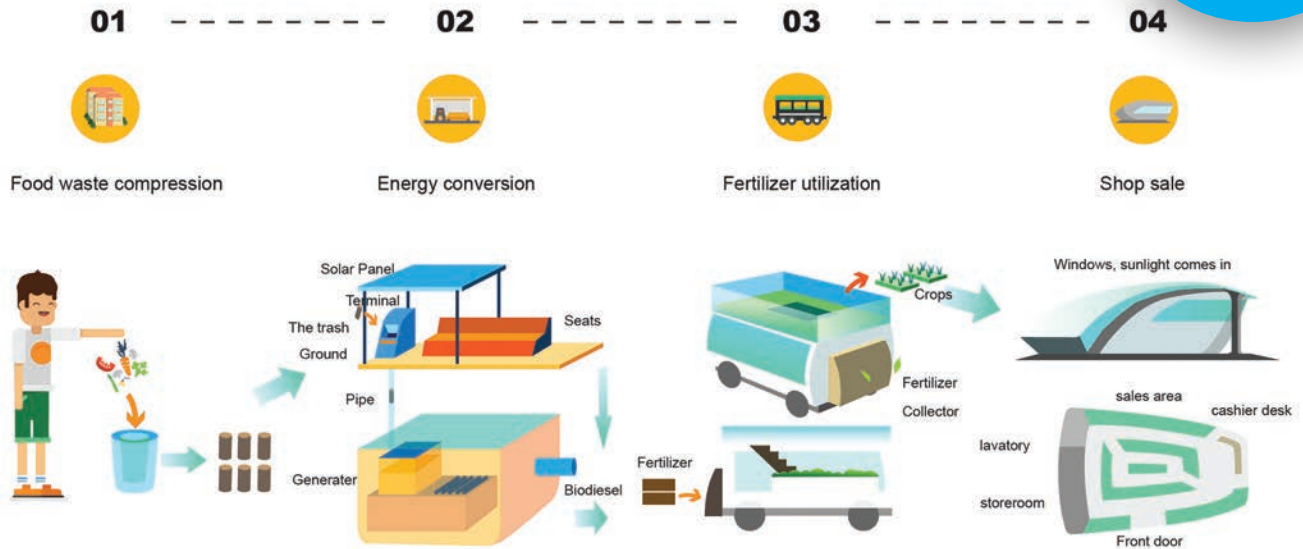


Stakeholder system map





Honourable Mentions



How it works?

The fertilizer created by the generator would be used to cultivated plants in the Eco-bus. Citizens can see these plants in their travels, making them aware of where food comes from, as well as raising awareness of green living. When the plants grow up, they would be gathered in the Eco-store. Residents living in the community nearby can come to see and buy in a discount.



Eco-Space

Qiaoling Cheng¹, Fan Wu¹, Biyu Zhu¹, Yeshuai Cheng², Winona Luk³

1. *Hunan University; Changsha, China*

2. *Tsinghua University; Beijing, China*

3. *Hong Kong Polytechnic University; Hong Kong, China*

Problem addressed

Many cities in China are studying and popularizing garbage classification. Kitchen waste accounts for a large proportion of household waste which causes great pressure on the urban environment. Among them, the difficulty and complexity of food waste recycling disposal is the highest. This study selected the community in the heartland of Shenzhen as the object, and based on the lifestyle of community residents, proposed a set of community-transportation recycling service systems. Using innovative waste sorting facilities in households, community and bus stop, combined with the mobility of urban public transport systems, and build a mobile green space connecting multiple community families.

Concept description

Based on the analysis of the existing municipal garbage classification and recycling system, this project studies how to integrate the kitchen waste recycling and energy utilization into the daily diet and travel of urban residents, which is the focus of the design and exploration of kitchen recycling service system. By using innovative nutrients compressors, the system turns classified dry kitchen waste from communities into unified crop nutrients.

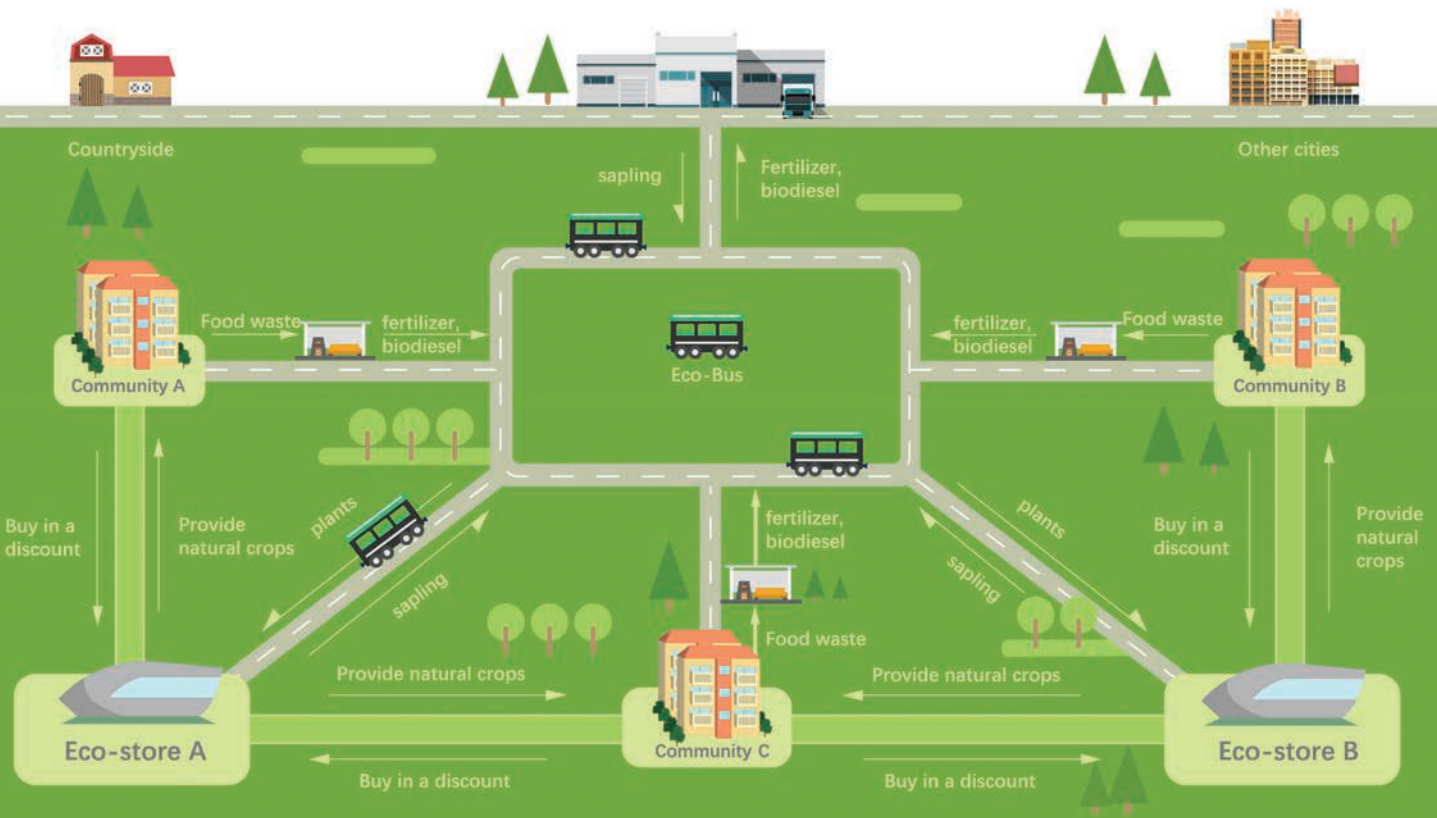
Combining with the mobility and publicity of the urban public transport system, a mobile space connecting multiple community families was built to cultivate crops, and the mature crops were gathered in specific community site. Moreover, it will be successively used for the development of urban landscaping and supply of fruits and vegetables for community residents. In China, many families think fertilizer produced by them has no utility value for them. This innovative recycling service system can cultivate the sustainable green diet concept of citizens from the source, and puts the environmental protection concept into practice not only in food selection but also in food treatment, consequently to reduce environmental pollution and improve resource utilization.

This is a product-oriented product service system. Community residents use solid-liquid separation and compression facilities to dispose of kitchen waste and deliver them to designated bus stations for discounts on car and vegetable purchases. For the government, the flow of buses promotes environmental protection; for the company, the fertilizer-fed vegetables will be sold in a concentrated manner and earned profits.

Interaction board



"Eco-Space" is a system to raise citizens' awareness of green living and recycling the food waste. By Eco-Box, we would be able to create a sustainable system that grow organic crops locally and make people close to nature.



● Main users



Citizens in Communities

● Products



Eco-Bus



Eco-Store



Eco-Station



Eco-House

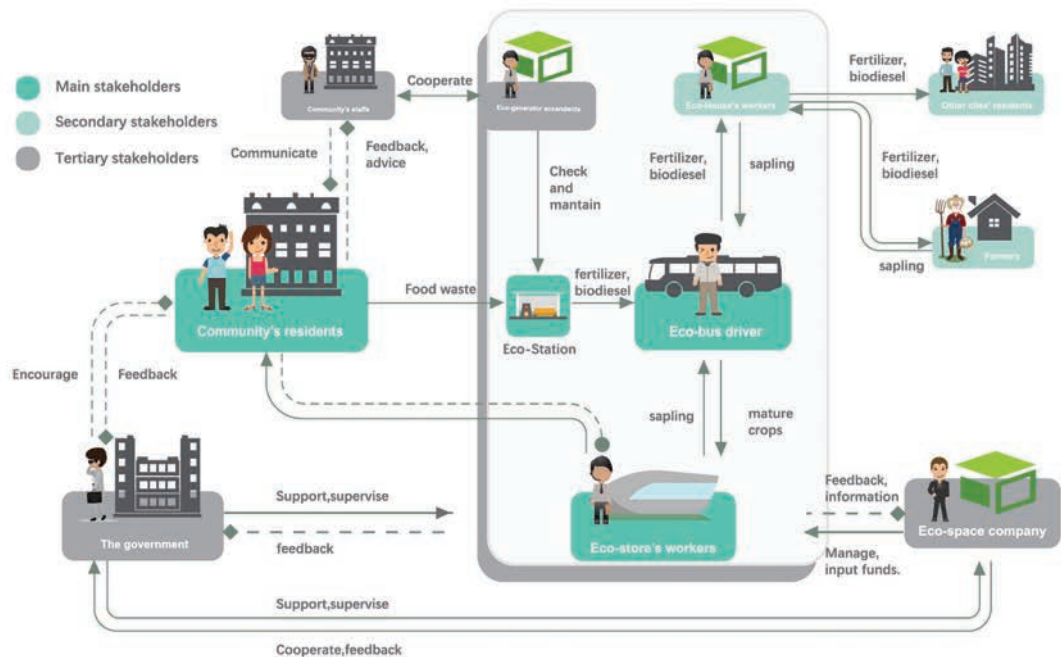
Stakeholders/System map

Key social problems

- 01. A large number of food waste in the city is hard to be disposed.
- 02. People lack the awareness of a green, healthy lifestyle.

Design blueprint

- 01. Distribute kitchen waste with range distribution instead of centralized.
- 02. The concentrated kitchen waste will be separated by solid and liquid, fermented into fertilizer or separated into diesel.
- 03. Combined with daily bus transportation lines, New green fruits and vegetables will be cultivated from these fertilizers.



Concept details

Provider: Eco-space company, Eco-Houses and Eco-stores

Customer: Community's residents, other cities' residents and farmers

Service offered: Food waste disposal, biodiesel, fertilizer and discounted vegetable

Product involved: Eco-generator, Eco-Station, Eco-bus and Eco-store

DE characteristics: Oriented, distributed position, concurrency, ecological benefits

Revenue model: Food waste disposal facility, selling vegetables, environmental-friendly bus travel

Sustainability benefits

Social: Integrates kitchen waste recycling and energy reuse into the daily diet and travel of urban residents and cultivates a green life concept

Environmental: Reduces the air, water, and soil pollution caused by kitchen waste incineration and landfill, and increases the urban traffic green area

Economic: Reduces the cost of transportation and reprocessing in the past; in addition, the food residue can be cultivated to continue to bring benefits to the system

PROBLEM SETTING—01



Food Waste in China

In recent years, as people's living standards improving, food waste tends to increase. The daily amount of food waste in China is more than **20,000 tons**. The proportion of food waste in China accounts for **37% -62%**.

The Source and Processing method

Catering Industry



The garbage disposal process of the catering industry is relatively professional

Vegetable Market



The kitchen waste in the vegetable market and household are mostly incinerated and landfilled. Incineration create harmful gases, and landfills produce water and soil pollution.

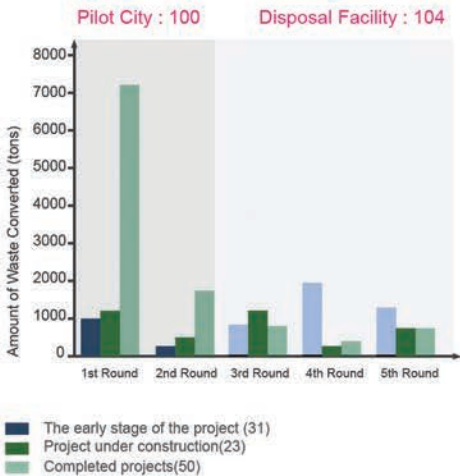
Household Waste



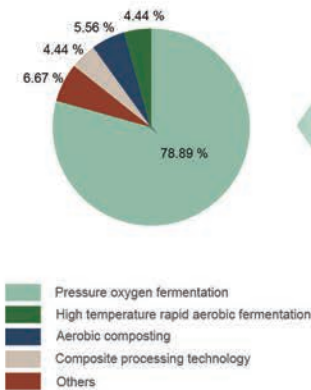
The treatment of food waste in existing households is not systematic enough, and Chinese families generally lack awareness of classification and reuse of food waste.

PROBLEM SETTING—02

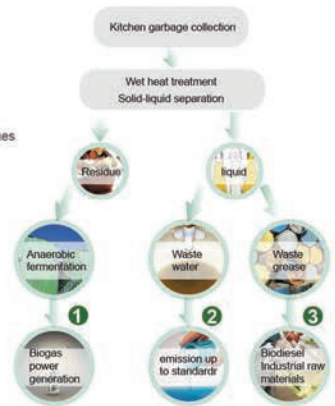
The situation in the construction of facility of food waste disposal (2010—2016.9)



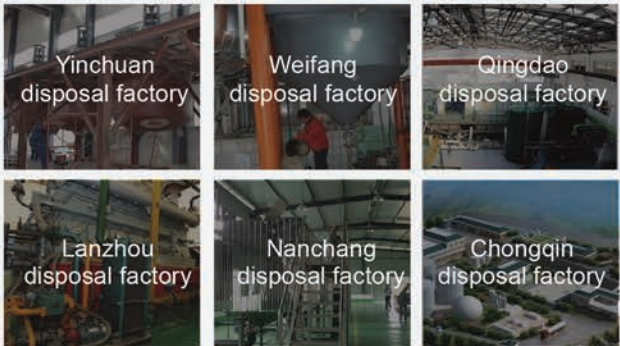
Technical statistics of food waste disposal facilities



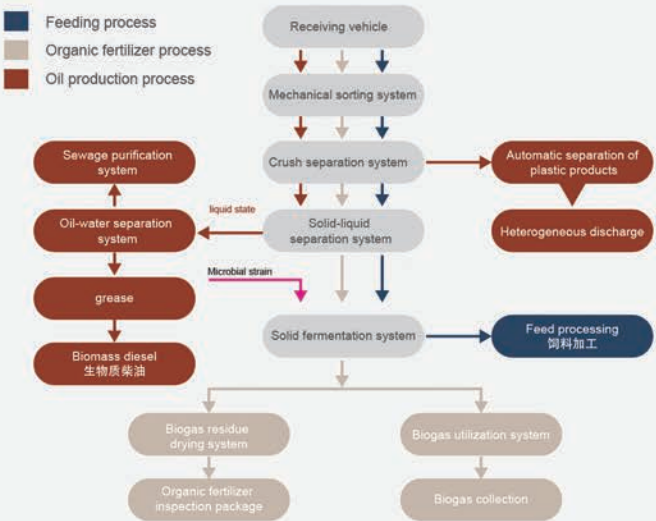
The treatment processes of food waste



Nowadays, the technologies and facilities related to food waste disposal are gradually improving, but there is still **no effective social operation system** to make more citizens participating in the **classification and reuse of food waste**.



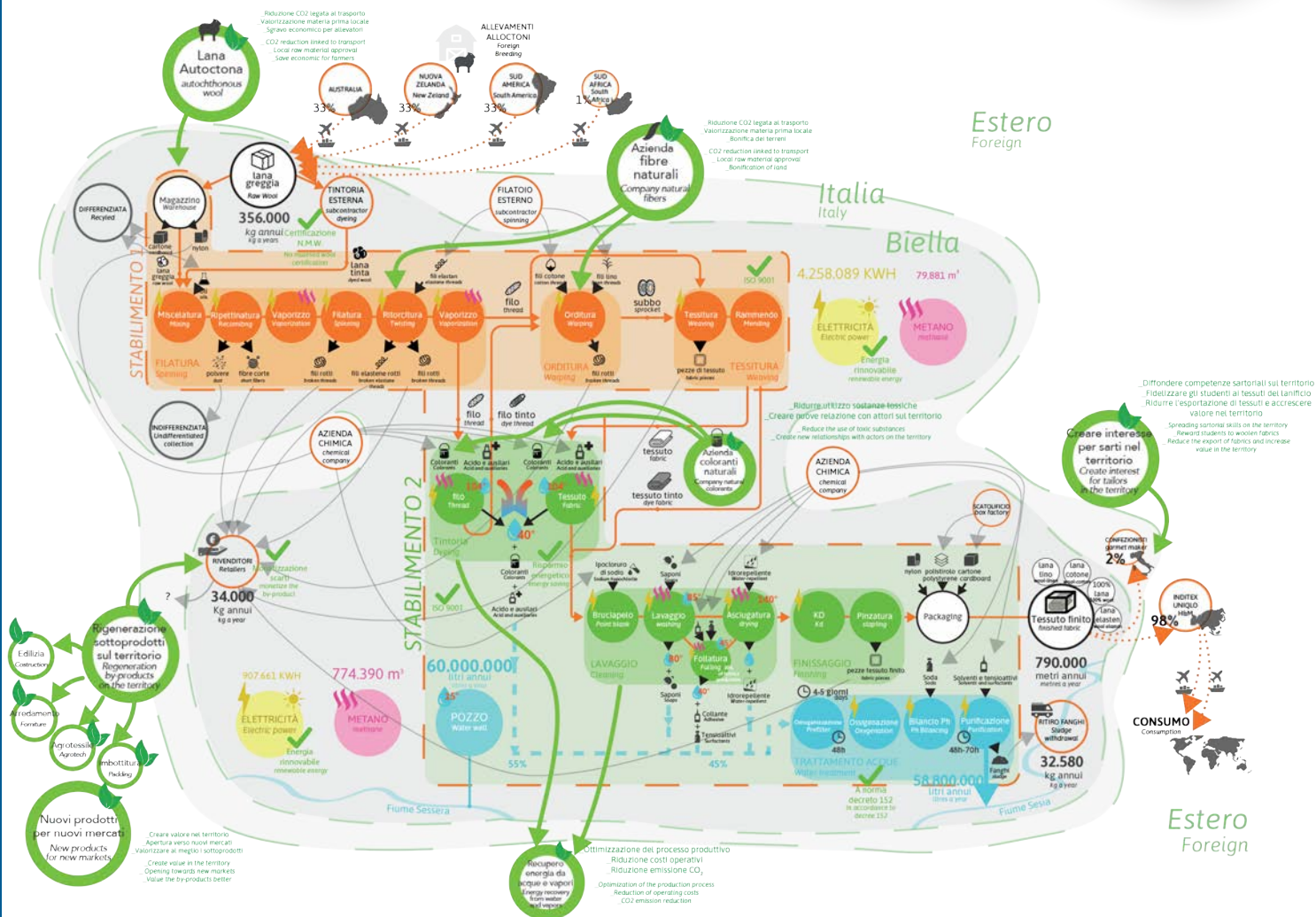
Flow chart for complete food waste equipment



ANALYSIS OF THE OPPORTUNITIES

WOOLEN MILL

**Honourable
mention**



Re-Design the production process of a woolen mill in Piedmont Region following systemic approach

Angela Aguirre, Marco Tetrao, Matilde Molari, Paolo Cardorani

Politecnico di Torino
Torino, Italy

Problem addressed

The fashion industry is one of the most polluting in the world, the large amount of water, energy and chemicals, in addition to the amount of waste discarded generates a high negative impact on the planet. The project is focused on the wool industry of the Piedmont region in Italy, creating a system based on the blue economy, shaping networks that benefit the region in an ecological, social and economic way and relating other types of neighboring industries that can give value to their waste and obtain profits for themselves and for the environment.

Concept description

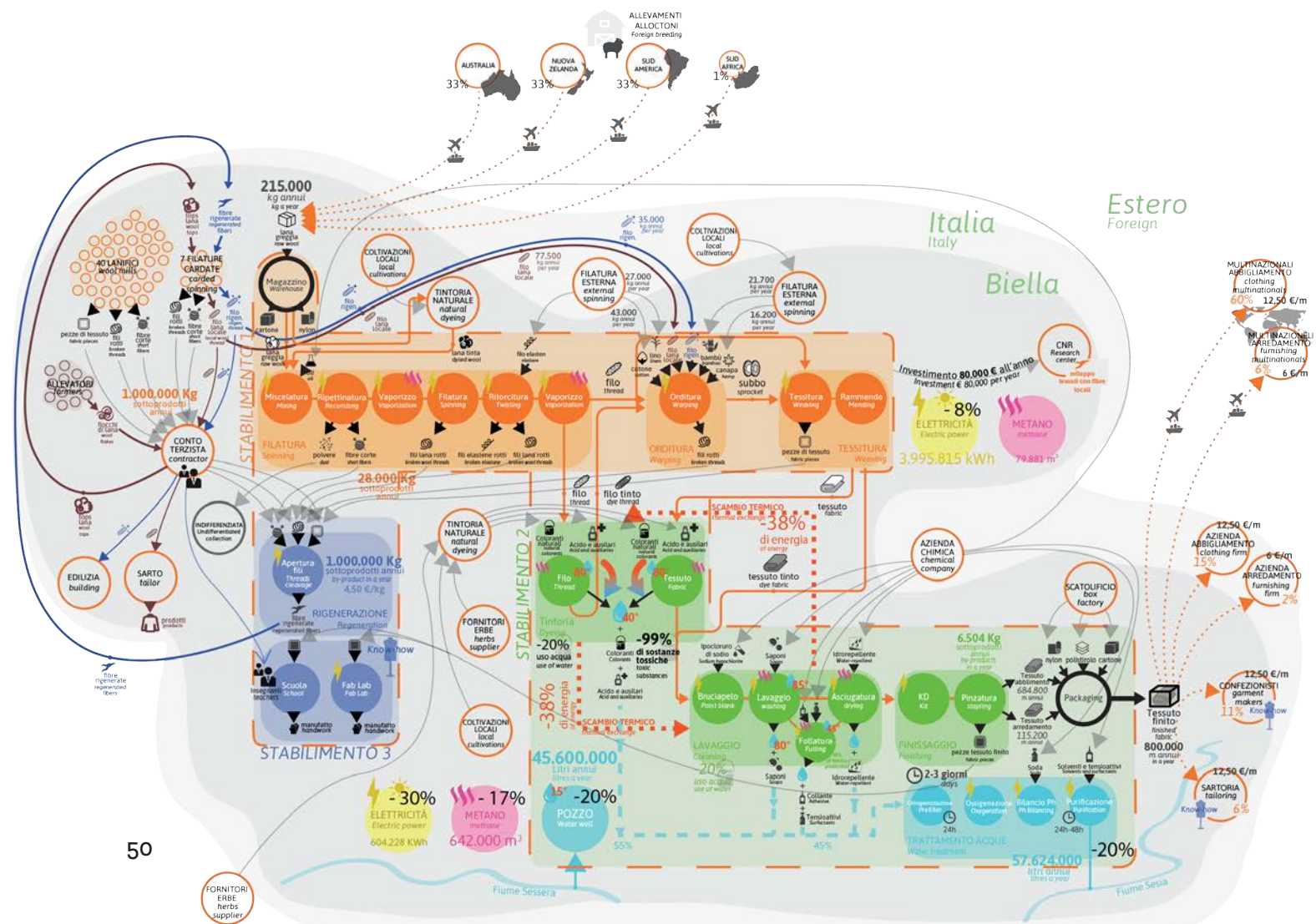
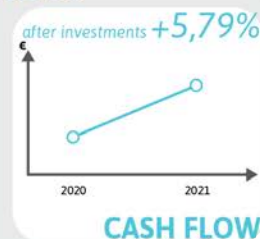
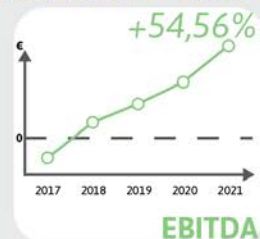
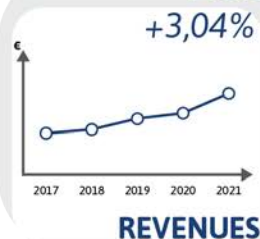
The project generates a system with different solutions to the main problems for the textile industry in the Piedmont region, in Italy, based on a wool company located in Biella. This includes increasing the use of local wool, reducing 40% import from other continents, mixed with fibers such as hemp and bamboo to improve its quality, changing the chemical dyes by natural dyes produced in the region, using 99% less of harmful substances,

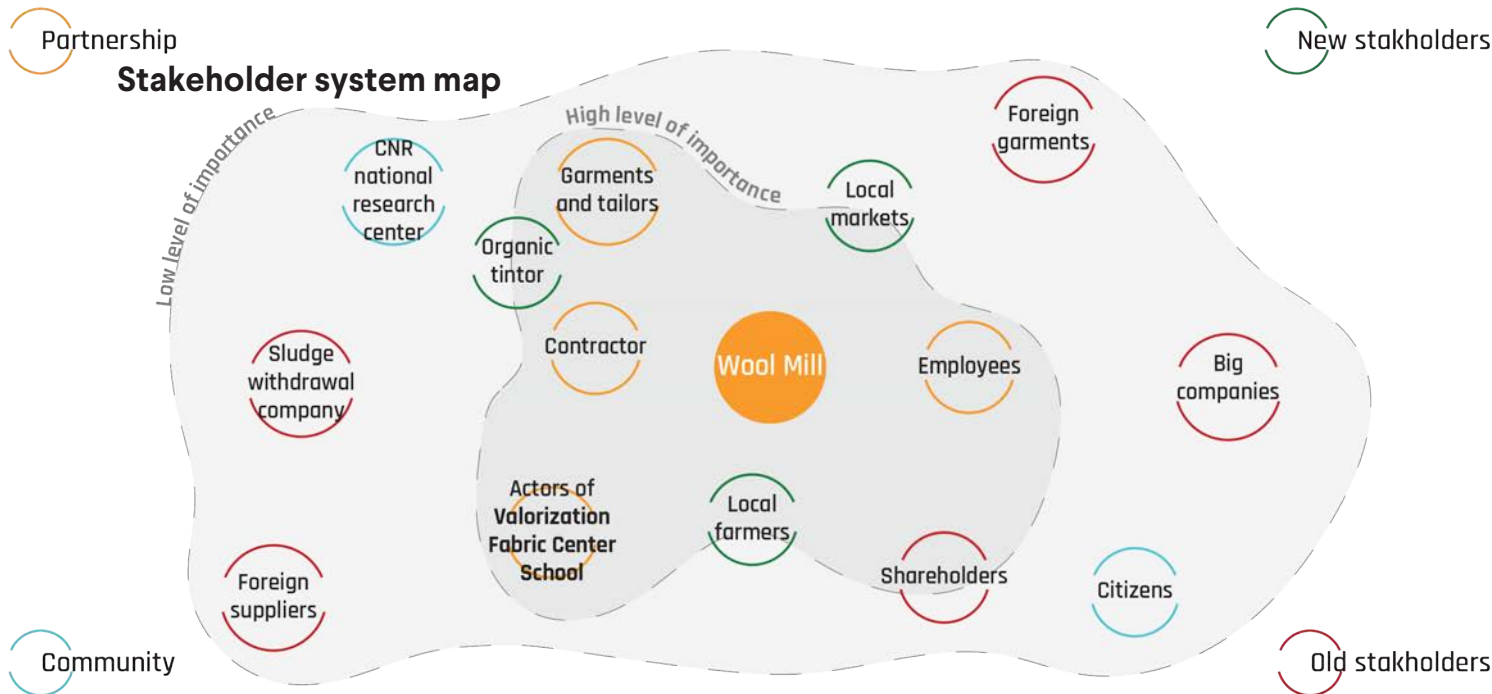
even though these increase the investment costs and technology, then it is balanced by the savings generated, because the amount of water needed for the washing phase of the textile can be reduced up to 30% with the use of natural dyes, and the waste is less polluting for the rivers of the region; so the amount of sludge that is discarded is lower and can be processed for the construction industry and other processes, as well as textile waste.

Another type of factor to solve is the use of energy, generating an exchange for the reuse of water temperature to heat recovery by the boilers steam that allows a reduction in methane consumption.

This holistic system promotes the increase of local sales by decreasing the transportation process and generating greater economic and industrial flow in the region; and as a final intervention the foundation of a school as a creative network between companies and students of the textile sector to generate learning practices and waste valorization for the development of new markets and a common welfare.

ECONOMY ADVANTAGES





Concept details

Provider: Local carded spinning, farmers and synthetic and organic dyeing, Italian and foreign textile suppliers

Customer: Local farmers and local or Italian companies and customers

Service offered: Woolen fabric production and regeneration wool service

Product involved: Fabrics in wool and mix of wool, vegetal fibers and regenerated wool

DE characteristics: Local procurement of materials, use of organic colorants, investments in professional training

Revenue model: Gradual change in material procurement and investment in production efficiency

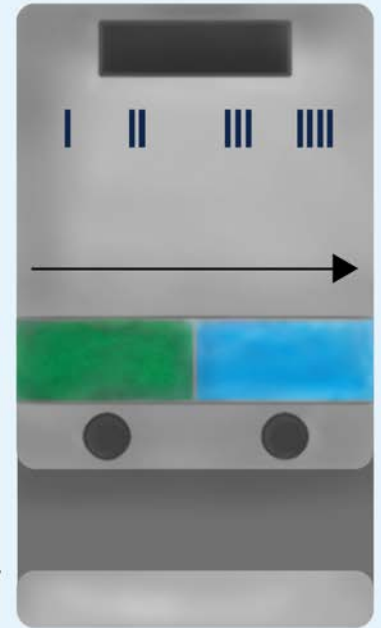
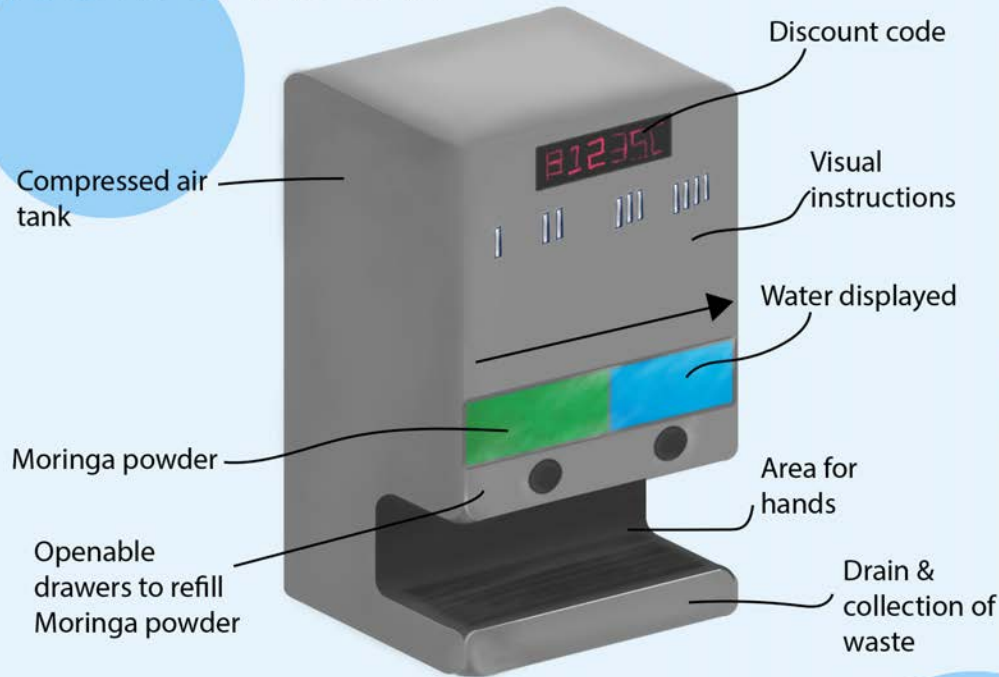
Sustainability benefits

Social: The company will be more rooted in the territory, both for the network that creates between suppliers and customers, and for the raw materials it uses in production.

Environmental: The new company strategy is oriented towards optimizing production, by acting on energy efficiency in order to generate less waste, fewer emissions and more clean water coming from production processes.

Economic: The company's propensity to produce fabrics destined for a foreign market will decrease, favoring the development in the territory of a network of actors that will be able to generate new local markets.

HANDWASHING UNIT



Press button to take Moringa powder on hands & rub together.



High pressurised water will flow. Rub and clean hands.



Put hands below blue area & compressed air will blow off Moringa powder.



Compressed air will dry hands.

ROUGH REPRESENTATION
OF MORINGA POWDER
PACKED IN BANANA LEAF



**Honourable
mention**

Sustainable Moringa Hand-washing

Karttikeya Kumar Singh, Muskan Gupta, Tanishqa Bobde

*Indian Institute of Information Technology, Design and Manufacturing (IIITDM)
Jabalpur, India*

Problem addressed

Urban and rural Indians don't know how crucial hand-washing is in sustainable healthcare and sanitation. The people who do, waste water and use soaps that are toxic for the environment. How might we solve this problem focusing on tap design, hand drying methods, soap dispensing techniques, the environment and experience? In India, Ayurveda and treatment through plants is a large industry – still people are using artificial soaps. The target customers are urban and rural Maharashtrians (a state in India). Context of use is I.T. parks and residential complexes in the urban areas. Secondary context of use is villages in rural Maharashtra.

Concept description

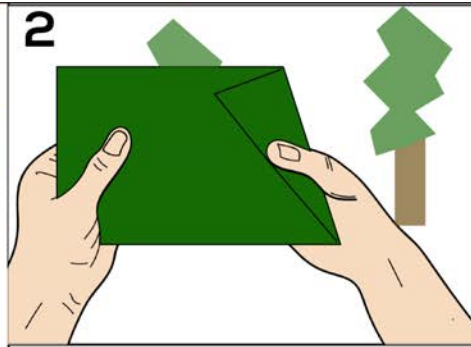
Four gram of Moringa leaf powder is proven to disinfect hands. Moringa grows widely in rural Maharashtra. Our project involves service providers (SP) going to rural areas and partnering with the Panchayat to educate villagers on how Moringa powder can be created, packed with Banana leaves (also available abundantly in the area) and used for hand washing.

These villagers will in turn become local small scale manufacturers of Moringa powder for the service. Then, the SP will partner with heads of community areas in cities to install and maintain hand wash units (HWU). The Moringa powder will then be transported to these HWU's (retained ownership of the SP). These HWU's are manufactured by the SP and cost about 2000 rupees. In the HWU – urban people first rub Moringa powder on their hands, then compressed air blows it off; 30-40 ml of pressured water jet cleans hands and then compressed air will dry hands through the same outlet. These HWU's will provide users with discount codes for the SP's website which sells the Moringa powder packaged by the villagers. The HWU's, once established, will switch to a pay per use model & be transported from 1 I.T. park to another (resource minimisation, product lifespan extension & use intensification).

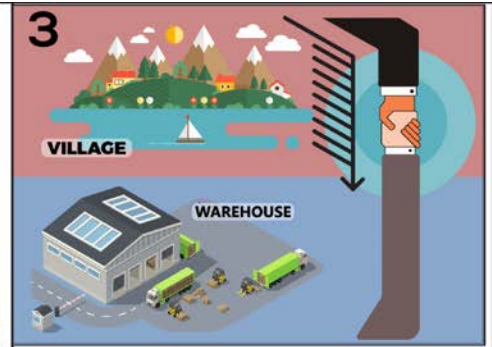
The packaged Moringa powder can replace paper soap that Indians use widely while travelling; use 40-50 ml water as opposed to avg. 2 liters & educate rural & urban Indians while using local resources & centralised production.



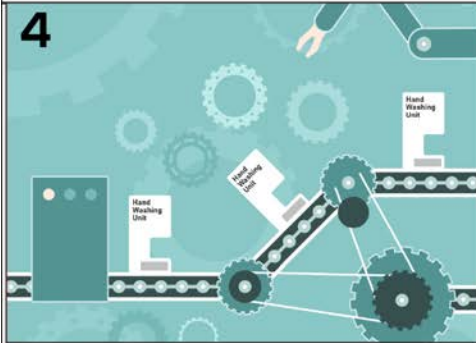
Service provider partners with Panchayat in villages in rural Maharashtra to teach making of Moringa powder, packaging with Banana leaves & using Moringa powder for hand washing.



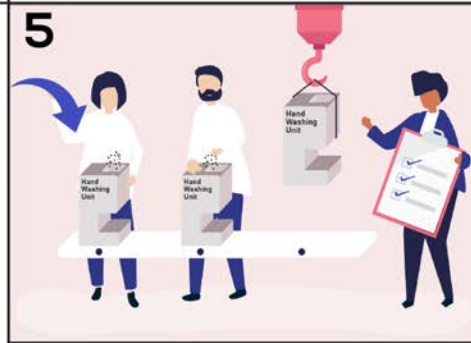
Localised rural partners manufacture & package Moringa plant powder for the service provider.



Moringa powder is transported from rural Maharashtra village to the closest warehouse.



Small sets of hand washing units are manufactured.



Moringa powder, compressed air containers, nozzles for compressed air & high pressure water release all organized into the hand washing unit.



Service providers partner with urban partners who foresee, manage & maintain the hand wash units in communities in urban cities (egs: I.T. Parks)



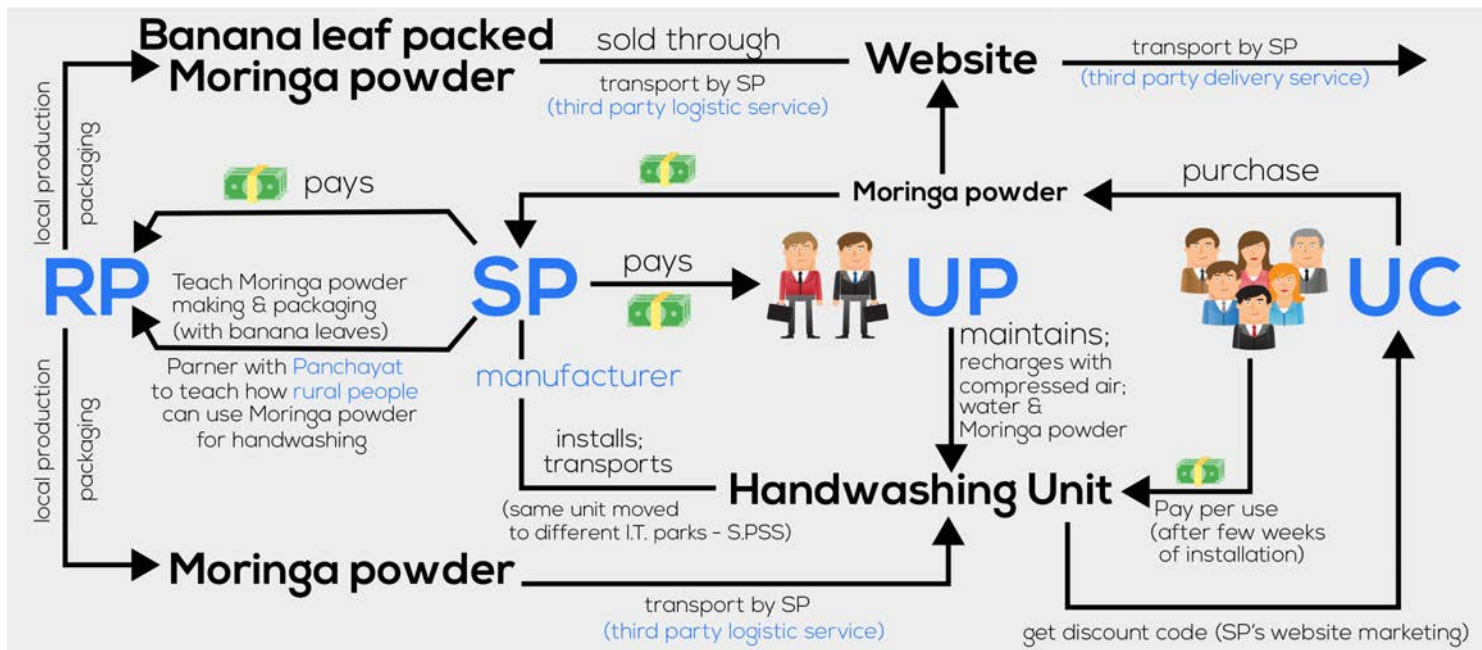
Hand wash units are installed in urban communities.



Urban customers use handwash units & get a discount coupon code as per use.



Urban customers go to the hand wash service website & buy Moringa handwash packets based on size, need & use .



Concept details

Provider: Service designers, rural Maharashtrians & urban partners (community heads)

Customer: Primary - urban Maharashtrians, secondary - rural Maharashtrians

Service offered: Transport & delivery of Moringa powder; education about sustainable hand washing

Product involved: Hand-washing unit; Moringa powder packaged in banana leaves

DE characteristics: Distributed manufacturing; local, sustainable resources & packaging; empowering local communities

Revenue model: Money paid to partners; retail markup model for urban customers

Sustainability benefits

Social: Enhance employment in marginalised rural Maharashtra (regardless of gender); responsible use of local resources - Moringa and banana leaves; advantage and equity to every stakeholder involved and creation of connection between rural and urban people

Environmental: Distribution reduction due to localised close-by production; resource and toxicity reduction due to zero soap use; conservation of water; biocompatibility of Moringa powder and banana leaf packaging; spread of awareness

Economic: Benefit to all stakeholders: no loss for provider since though they pay rural producers, urban customers pay for powder bought via the website and per use of hand wash unit



Honourable
mention

IXHUA

Fabiola Elena Zambrano Orpinel, Diana Sofía Barajas García Cano, Sharon Granados, Karen Granados, Yoshua Escobar Maitrett

*Autonomous Metropolitan University, Campus Cuajimalpa
Mexico City, Mexico*

Problem addressed

The book clubs are a project initiated by the Ministry of Culture of Mexico City. It is currently self-managed by citizens and cultural spaces, and can be found in parks, houses, cultural centers, etc. Among its functions are book loans and cultural activities related to reading. Having a network with more than 300 book clubs over Mexico city can present many challenges, so the mobile book club “Ixhua” aims to resolve the lack of diffusion of the Book Clubs, the limited hours of these and the lack of time of the attendees bringing it closer to their assistants.

Concept description

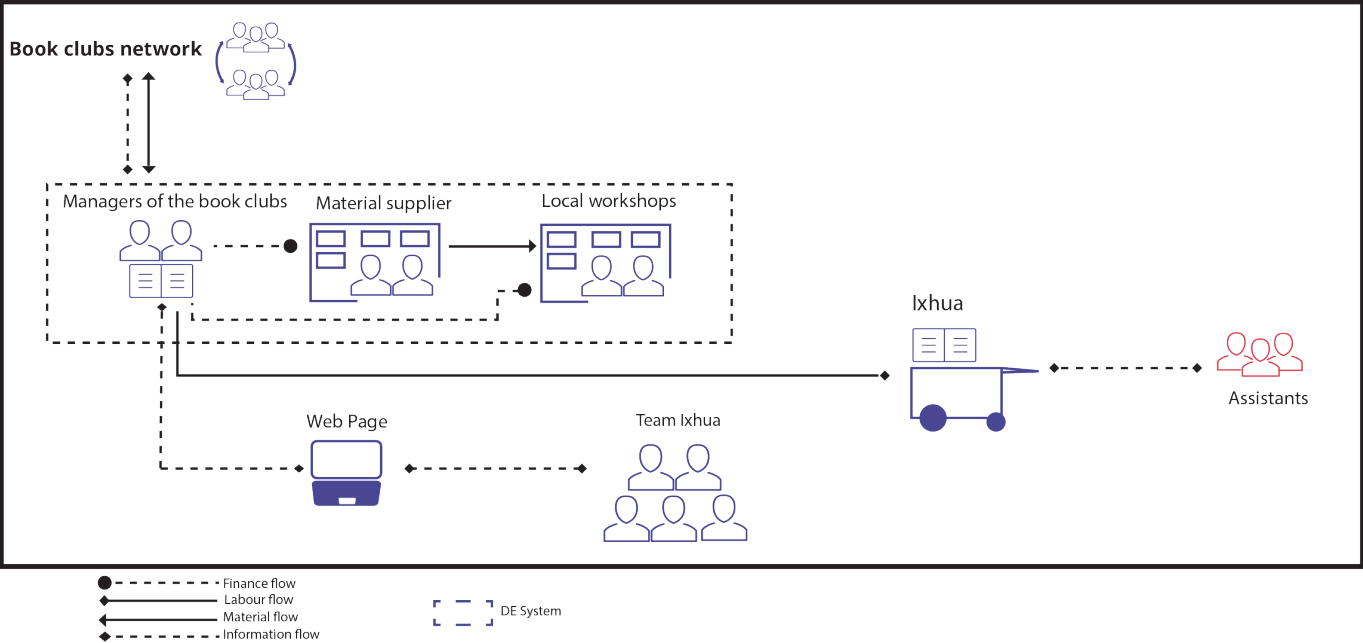
The concept of Ixhua (from the Nahuatl “sprout the seed”) is born from the metaphor of a Living Being, so the assistants and managers of the book clubs, must take care and nourish it so that it grows and bears fruit thanks to the experience that comes from sharing the reading and the diverse activities that are planned according to the public and the place to which it is directed.

Ixhua is a wagon with a seed shape in which you can carry out various activities such as: reading aloud, storytellers, writing workshop, board games, crafts, etc. You can transport up to 60 paperback books, material for activities, 4 collapsible banks and “Huacalli” (furniture of the book clubs network developed by another team). It can be pushed by a person or towed by bike and adapted to the space in which it is located. It can be used open or closed and has two sliding tables. Solves the problem of diffusion by going to various places where there is a greater influx of people, in addition, the shape of the wagon draws attention. By not being in a fixed place, has more flexibility of schedules that are adapted to the needs of people and their occupations.

Ixhua is a Self-Managed Product-Service, created from the needs of those in charge of book clubs and their assistants, being a non-profit organization managed by and for the community. The plans, files and production specifications can be downloaded for free from the website “Painani” (website created for the book clubs by another team) can be manufactured in local workshops. The materials described are low maintenance and cost.



Stakeholders system map



Concept details

Provider: Team Ixhúa, web page Painani and local business

Customer: Assistants and managers of book clubs

Service offered: Provides an itinerant and mobile space in which the activities of the book club can be carried out

Product involved: Ixhúa wagon and material for the activities of each session

DE characteristics: It is a distributed economy because each manager chooses his suppliers

Revenue model: It is a non-profit project that is maintained from the participation and support of the community

Sustainability benefits

Social: Promotes the interaction of the community, the appropriation of public space, cultural activities and a healthy recreation; offers a safe place to share experiences

Environmental: Contemplates resistant and durable materials that can be recycled, recyclable and / or of low environmental impact; needs little maintenance and has a long product life

Economic: Promotes distributed economy by strengthening local businesses

Description of LeNS network and LeNSin project

LeNS network connects together a multi-polar network of Higher Education institutions, adopting and promoting learning-by-sharing with an open ethos.

LeNS network connects a multi-polar network of Higher Education Institutions adopting and promoting a learning-by-sharing knowledge generation and dissemination, with an open and copyleft ethos.

LeNSin, the International Learning Network of networks on Sustainability (2015-2019), is an EU-supported (ERASMUS+) project involving 36 universities from Europe, Asia, Africa, South America and Central America, aiming at the promotion of a new generation of designers (and design educators) capable to effectively contribute to the transition towards a sustainable society for all.

LeNSin aims to improve the internationalisation, intercultural cross-fertilisation and accessibility of higher education on Design for Sustainability (DfS). The project focuses on Sustainable Product-Service Systems (S.PSS) and Distributed Economies (DE) – considering both as promising

models to couple environmental protection with social equity, cohesion and economic prosperity – applied in different contexts around the world.

During the three and half years of operation, LeNSin project activities have involved five seminars, ten pilot courses, the setting up of ten regional LeNS Labs, and of a (decentralised) open web platform; any student, designer and teacher can access the platform to download, modify, remix and reuse an articulated set of open and copyleft learning resources, i.e. courses, lectures, tools, cases, criteria, and projects.

LeNSin also promoted a series of diffusion activities targeting the design community worldwide. The final event was a decentralised conference in 2019, based simultaneously in six partner universities, organised together by the 36 project partners from four continents.

All materials developed during the LeNSin project such as course materials and tools can be found and downloaded from:

<http://www.lens-international.org>

The LeNS conference 2019 webpage:

<http://lensconference3.org>

LeNS manifesto

A new ethos for a design community: towards an open source and copy left learning-by-sharing attitude/action.

We, the undersigned, aware of both the **urgent changes** required by sustainable development, the potential **role of design** (and design thinking) in promoting system innovation in the way we produce, consume and interact, as well as the opportunities offered by the ever more **interconnected society**, propose the adoption and diffusion of a **new ethos** within a worldwide **design community**.

To view design as a unique multi-polar learning community promoting, enabling and activating any possible learning-by-sharing process aiming at effective knowledge osmosis and cross-fertilisation in design for sustainability in an open and copy left ethos.

We, the undersigned, **commit ourselves** in such an ethos, trying our best to apply this in our daily life as individuals or representatives of institutions in the **design community**.

In relation to our competencies and possibilities we will make our **acquired** knowledge to be, as far as possible, freely and easily accessible in a **copy left** and **open source** modality (while safeguarding our authorship and scientific recognised publication activity), that enable others in the design community to acquire them free of charge, with the possibility to replicate, modify, remix and reuse, through e.g. adopting creative commons licences.

- As researchers, this knowledge includes our acquired **research knowledge** base (e.g. papers, books, etc.) and **knowhow** (e.g. methods and tools).
- As educators, this knowledge includes our **educational resources** (slideshows, texts, videos of lectures, educational support tools, etc).
- As designers and design thinkers, this knowledge includes the design for sustainability **concept proposal** of products, services, systems and scenarios, as well as knowhow used to design them.

We commit ourselves to seek the commitment of other **individuals** or **institutions** in such an ethos within the design community. In relation to our competencies and possibilities we will:

- do our best to commit individuals such as researchers, educators, professional designers and design thinkers as well as institutions such as research institutions, design schools, and designer's associations to adopt the same **ethos**.
- do our best to generate and/or enable **open learning networking of sustainability** of design researchers, design educators, professional designers and design thinkers.



With the support of the
Erasmus+ Programme
of the European Union

