# EMERGING RESERVIST CULTURES

*From stories of resilience to network preparedness*

Edited by **Reservist**

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*From stories of resilience to network preparedness*

**By Marion Real and Vikrant Mishra**

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# Contents

BRIEF

# DO WE FEEL PREPARED FOR THE CRISES WE WILL FACE?

Crises have been an essential element in shaping our lives and experiences for centuries. They have evolved the ways we inhabit, work, make and interact. While crises provoke material, economic and physical distress, they also affect our ways of processing, reacting and making informed decisions. In such situations, it is important to find ways to deal with complex emotions while building strategies and concrete actions for resilience. When a crisis occurs at a communal, national, or international level, it becomes a shared experience and requires a collective effort from municipalities and companies to civilians and makerspaces to overcome it. Similarly, it is important for people to feel connected to their communities and to act with care, trust, solidarity, and respect for others during a crisis. Planning for the basic needs of everyone in the community is essential for timed recovery.

# 1.1 Introduction

During the Covid-19 pandemic, we saw firsthand how our production systems and the knowledge we have gained through years of innovation, globalization, and outsourcing are being put to the test. Some companies have had to stop or pause their operations, while others have been able to diversify and adapt by transforming their manufacturing lines to produce critical items like respirators. The maker movement has also sprung into action, quickly producing face shields and other needed items through global and local cooperation. The pandemic highlighted the impact of national policies on certain markets, such as masks, vaccines, and medication, and the role of the digital world in connecting, educating, delivering and entertaining.

Important gaps were observed concerning the coordination of the production and delivery of basic necessities during a crisis, especially when traditional markets might be closed or overwhelmed. It raises questions from various perspectives:

- How could local and national governments facilitate the provision of needed resources - while strengthening local production capabilities?

- How could everyday citizens, industrial manufacturers, makers and creatives contribute to a collective effort of production when needed?

- How could citizens be engaged and trained to help local production systems in times of crisis?

It is in this context that the idea of creating a Reservist network for quickly manufacturing products in demand emerged inside a small community of researchers, manufacturers, makers, and certifiers. By applying the concept of Reservist to the supply-chain, we envisioned opportunities to create a network of small, flexible manufacturing centers that could adapt their production to meet the urgent needs of the population and support territorial resilience with international solidarity.

In the initial stages, some sort of naiveness was sensed in the enthusiasm for the Reservist network. It was quickly realized that coordinating such a network would not be simple, as it would require a significant mindset shift and a lot of cooperation from all stakeholders involved. As we continue to delve into the concept, we are seeing the complexity inherent in it.

Fortunately, the ability to use a design-mindset and tools helped us in navigating this complex topic. We learned from many initiatives in the humanitarian sector, civil protection policies, and resilient communities, as well as from innovative ecosystems that supply critical items. We identified good practices and current concerns, and sought more opportunities for peer exchange in political, economic, industrial, and civil spheres. This helped us feel more empowered to tackle the challenges ahead.

Crises can be unpredictable and can take many different forms, so it is impossible to be fully prepared for every possible scenario. However, by learning from past crises and continually improving our response strategies, we can work to become more resilient and better equipped to handle future challenges as they arise.

## HOW TO FOSTER THE EMERGENCE OF RESERVIST CULTURES IN THE UPCOMING DECADES?

This book encourages stakeholders, policy-makers, industry leaders, researchers, makers, and the general public to be better prepared for emergency situations. It is a collection of inspiring stories of resilient practitioners, alongside a speculative design tool to help envision and plan for the future development and consolidation of reservist networks.

Join us on a visual journey to better understand what Reservist cultures might look like. This book is part of a collaborative European project titled Reservist. We are sharing the results of an action-research project conducted by the team at Fab Lab Barcelona in collaboration with a wide range of partners.

# 1.2 Context

**The Reservist Project**

In response to the COVID-19 pandemic, the EU commission funded a series of projects to support the *Repurposing of manufacturing lines for providing medical and other products and services in case of spiking demand times*[1]. One of these projects, called Reservist, brings together companies, research centers, and industrial clusters with the goal of creating a *reservist manufacturing network to provide personal protective equipment, medical devices, and services during pandemics and unusual emergencies.*

**Reservist**
/rɪˈzəːvɪst/
origin: latin
"servi" means 'to serve, to serve up, attend, assist, help.'

The concept of "Reservist" takes its origin in the military context - which refers to **a group of people who are ready to respond to emergencies** as they are declared. Military reservists are typically coordinated at the national level by the army.

This concept has been applied to other sectors, such as sanitation, healthcare and education at various scales, from cities to international organizations. Let's zoom in three examples:

**City scale**: Citizens can assist municipal authorities to improve resilience, prevent and manage local disasters by joining the communal citizen reserves, by informing the population, diffusing emergency kits and good practices, and organizing collective prospective interventions. Take a look at the FF72 toolkit[2] for french communes. Local engagement is generally active through the network of local associations.

**National scale**: Citizens can engage in national reserves to support their country. As an example, in France, French citizens can join 5 types of national reserves: military, sanitary, police, civil, education, cyberdefense. Each reservist has a particular status that helps them to be available for taking actions.  Discover the platform

jeveuxaider.gouv[3] (*'I want to help'*) developed by the civil reserve, as another way to find volunteering missions.

**European scale**: The EU commission is supporting the civil protection act, by coordinating efforts through knowledge exchange platforms and other resources - to help countries in dealing with local disasters and emergency situations. Discover the RESCEU reserve[4]: https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/resceu_en.

Past crises have demonstrated that access to basic necessities can be restricted during emergencies, making it more important than ever to have collective production and logistics capabilities to provide safe products and services to vulnerable people. This includes ensuring that people have access to food, shelter, clothing, and medical care during times of crisis.

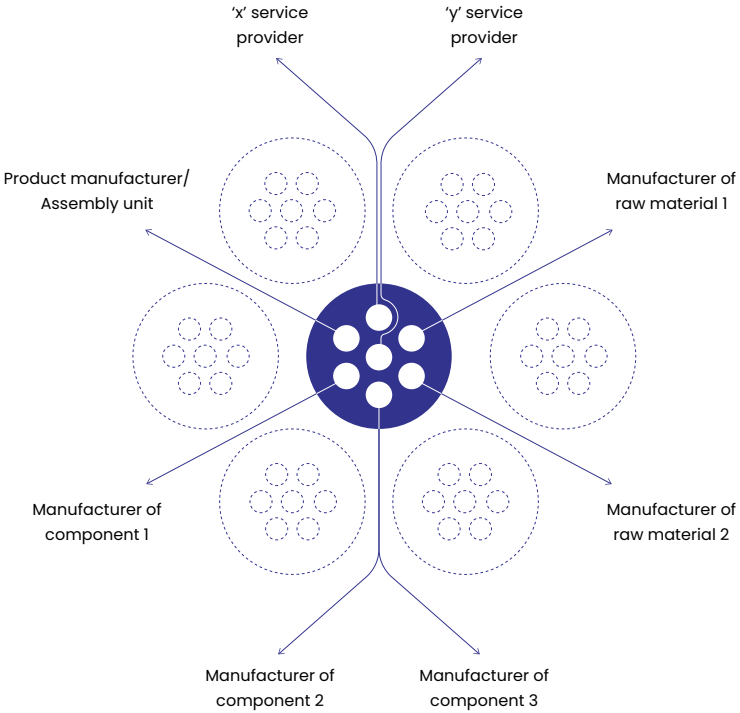
**THE IDEA OF A RESERVIST MANUFACTURING NETWORK WAS IMAGINED TO BE A GROUP OF PEOPLE WHO ARE PREPARED TO DESIGN, MAKE, MANUFACTURE, CERTIFY, AND DISTRIBUTE NEEDED PRODUCTS AND RELATED SERVICES WHEN EMERGENCIES ARE DECLARED.[5]**

Using the Reservist concept to identify and engage manufacturers with the knowledge, equipment, and resources to produce needed products during emergencies can help reduce the damage caused by supply chain disruptions.

Reservist networks should consider future manufacturers who may be able to contribute when an emergency is declared. In addition to manufacturers, the Reservist network should also engage with all stakeholders involved in the classic value chain for products, as well as strategic external stakeholders who can repurpose their activities by modifying their manufacturing lines, using digital fabrication tools, or temporarily hosting equipment to act as suppliers.

# THE PRODUCTION OF SPECIFIC PRODUCTS AND SERVICES REQUIRES THE INVOLVEMENT OF A GROUP OF STAKEHOLDERS, THAT GROUP IDENTIFIES AS A RESERVIST CELL.

Each cell is independently managed inside the network. Here is what a cell 'n' could look like amongst a network of other entities:




Visual 1.2.1: Diagram of a Reservist cell

## How did we make it operational?

For two years, multiple partners have been engaged in refining and consolidating a three layer model for Reservist:

**Network**: Using the metaphor of cells to build an agile network of suppliers.

**Platform**: Developing a collective digital infrastructure to connect stakeholders and optimize the supply before, during and after the emergency situations.

**Manufacturing**: Redesigning and prototyping a series of products and services by tweaking manufacturing processes: from face masks and respirators to aprons and emergency hospitals.

Two functioning modes were defined:

**Active mode**: Reservist partners coordinate to supply products and services in time.

**Sleeping mode**: Reservist partners run their classic activities and get prepared for emergency situations through training, planning, simulation and a minimum of product storage.

Across the book, we'll expand on the first results of the Reservist project, how the Reservist approach could be applied to other emergency situations and how to involve a wider range of stakeholders, including alternative innovation ecosystems like the Maker movement.

### Envisioning multiple scenarios

Collectively examining what a reservist network looks like and how it could respond to various situations can help clarify the expectations of partners and identify future opportunities to strengthen the concept and expand the network's scope and reach.

**Zooming In**: The COVID-19 pandemic was just the beginning for the Reservist community, so it is important to reflect on what happened from various perspectives, including what was happening before the pandemic, a detailed account of what

occurred during it, and an examination of how this affected or did not affect current manufacturing practices.

**Zooming Out**: There is an almost endless range of potential critical situations that could arise. Science fiction books and movies offer many examples of dystopian and utopian scenarios that challenge our imaginations and help raise awareness about what the future might hold. But it's not just about imagining future situations: from 2020 to the present, the world has unfortunately witnessed numerous natural disasters, wars, and other political conflicts. Climate change is also more evident than ever. Have we thought about what products and services are needed in the event of natural or man-made disasters, wars, or other emergencies? How do production and supply chains organize to deliver these products to the population? Do we know what roles we could play when such situations arise?

**Opening-up industrial ecosystems**

Industrial sectors strive to satisfy customers by producing high-quality products and services that meet timing, cost, and socio-technical constraints. Managers and technicians are typically focused on short-term goals and strict quality standards. Innovation is used in a variety of ways to increase efficiency or diversify markets. Global supply chains are still the norm, while efforts to move production closer to consumers face many challenges. Sustainability, corporate social responsibility, eco-design, and risk management are slowly being adopted through various practices such as strategic action plans, internal training programs, and external consulting. Open innovation is becoming more common, but there is still a lack of transparency and a tendency for industrial stakeholders to keep certain information secret.

There is a great need to open up industrial ecosystems and create conditions for collective action. Doing so will help us to better understand current supply chains and shape the future of production, particularly when this cooperation is expected to be reliable in responding to emergencies.

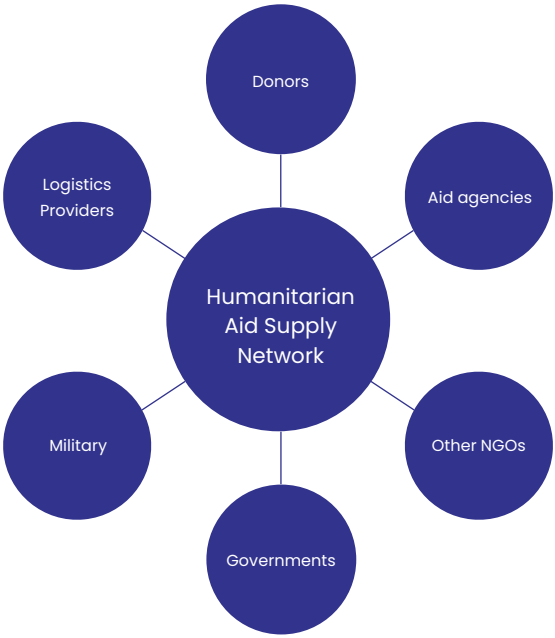
**Understanding the complexity of management in an emergency crisis**

Complex policy frameworks and solidarity networks have been consolidated throughout the years to frame the interventions in case of emergencies. The most recent United Nation policy plan, the *Sendai Framework for Disaster Risk Reduction 2015-2030* was built upon 30 years

of experience and listed a set of measures "that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience"[6].

At the EU level, policy instruments and knowledge platforms are developed by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) to raise awareness about current emergencies, partnerships and supporting mechanisms[7,8]. An Emergency Toolbox was also created to access EU funding for sudden-onset humanitarian crises[9].

One example of a prominent NGO in the humanitarian field is the International Federation of Red Cross and Red Crescent. They have been engaged in preparedness measures, creating a series of pedagogical videos to explain their actions and process of engagement[10].




Visual 1.2.2: Actors in the supply network of humanitarian aid[11]

If you look to supply products for supporting a population, locally or in affected regions, getting to know which public institutions or humanitarian associations are involved and how they usually work with the affected people, the suppliers and donors is a necessary step to frame, guarantee and sustain your action.

While it is important to contextualize and build strong partnerships, it is also possible to create new forms of interactions and to build more direct relationships with people and local organizations, co-designing, co-producing with them. This is even more relevant when you are present locally and actively taking part in a local community.


Visual 1.2.3: Supply Chain in the Humanitarian Context[12]

## From global to local: Embracing the diversity of production places

Manufacturing a train does not require the same process as making a pair of shoes, and producing 1 million masks is not the same as building 20 respirators. Manufacturing processes are sized according to the type and the quantity of products to be made as well as the type of technologies used and the level of expertise of the team running the process. Besides, the quantity of products to be made will differ according to the geographical scale targeted by the company. It is not the same to produce for an international market than for a city or village market or even for one specific client.

The example of the masks during Covid-19 illustrates well the diversity of places and people that could be involved in the production stage. While some home sewers or makers in Fab labs were locally delivering hundreds of basic masks to health organizations, textile companies were using and tweaking their large infrastructure to provide millions of (certified) FFP2 masks for governments, hospitals and wider markets. Thus, an **extended network of production needs to consider a large variety of infrastructure (from large and small-scale manufacturing sites to third-places, abandoned or temporary empty sites, public open spaces or homes) as well as a large panel of stakeholders able to contribute to the making (from classic industrial operators to craftsman, makers and prosumers)**. Cartographies and matchmaking platforms appeared to be a great tool to facilitate the identification and coordination of production capacities at different scales, especially in locally situated contexts[13, 14].

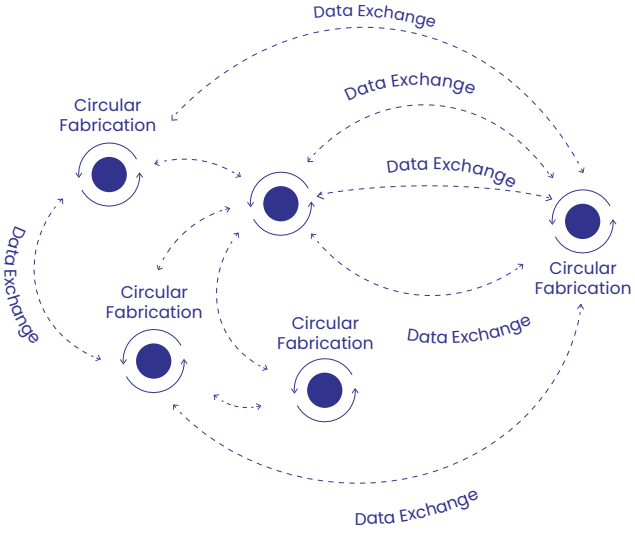
The challenge initiated by the Fab City network[15] in 2014 aimed to envision how cities can produce everything they consume is already moving one step forward in featuring more local and self-sufficient models of production. As an example, the Centrinno project[16] is supporting the urban regeneration of old industrial sites reviving cultural heritage, mapping and connecting local resources and offering infrastructure for sustaining onsite circular manufacturing. On top of projects, the Fab City Collective has developed the Fab City Full Stack model to unfold the transformation towards productive cities in strategic layers, grounded by the fabrication infrastructures. By making cities more autonomous in terms of production, citizens could be more resilient to external crises, and more skilled to recover from onsite disasters. In such a distributed manufacturing scenario, it is crucial to mention the importance of connecting cities and more isolated places through reciprocity exchanges and solidarity actions that would anticipate the supply of products for their neighbors in case of emergencies.

Local production capabilities are also discussed in other urban transformation narratives: they are found in the concept of proximity[17] and

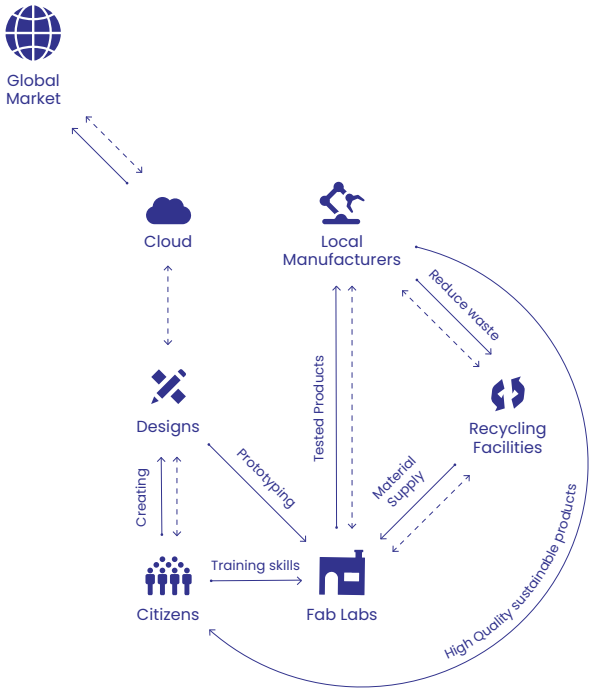
the 15-Minute City"[18], the idea of cosmolocalism[19] and were already present in inspiring fiction narratives from radical ecology such as PM's text of *Bolo Bolo*[20].

**What is Fab City?**

Fab City is an innovative urban model that looks for relocalizing production to the cities and their bioregional context, by empowering communities with the technology to build their own resilient, and regenerative urban futures. It relies on the model of PITO to DIDO that aims at shifting how localities source and use materials from ´Products In - Trash Out´ (PITO) to ´Data In - Data Out´ (DIDO), creating locally circular fabrication nodes that are connected through data exchanges.




Visual 1.2.4: Data In Data Out model




Visual 1.2.5: Distributed design in practice: The Fabchain ecosystem

It defends the idea of emphasizing local production capabilities with distributed design infrastructures. The maker community plays a strong role not only in promoting and experimenting this new model but also acting as an interface where new designs are prototyped, and shared with both local stakeholders (citizens, local manufacturers, recycling facilities) and the global network of practitioners and researchers.

Get to know more about Fab City and how to engage:
https://fab.city/

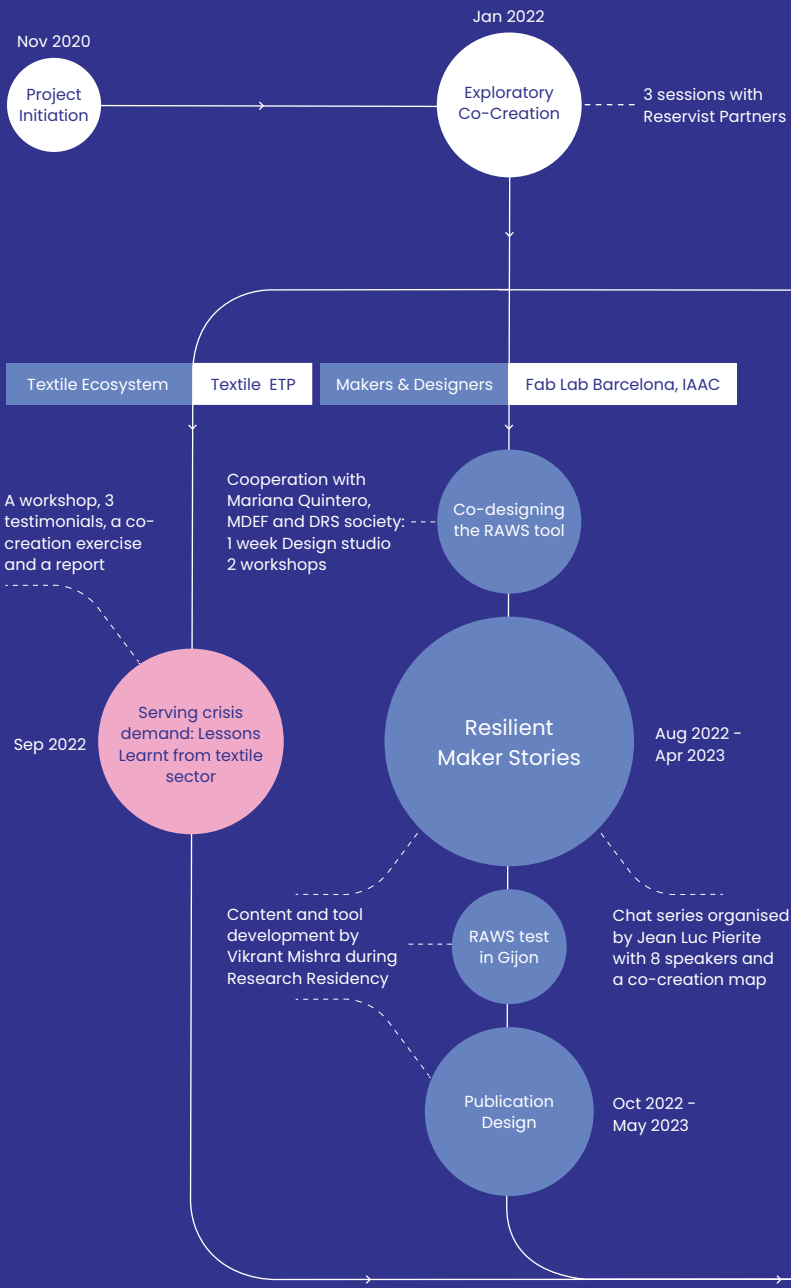
## 1.3 Design Research Methodology

**A HYBRID APPROACH AT THE INTERSECTION OF SYSTEMIC, DISTRIBUTED, PROSPECTIVE & TRANSITION DESIGN BASED ON CO-CREATION WORKSHOPS, LIVE CONVERSATIONS AND VISUAL NARRATIVES.**

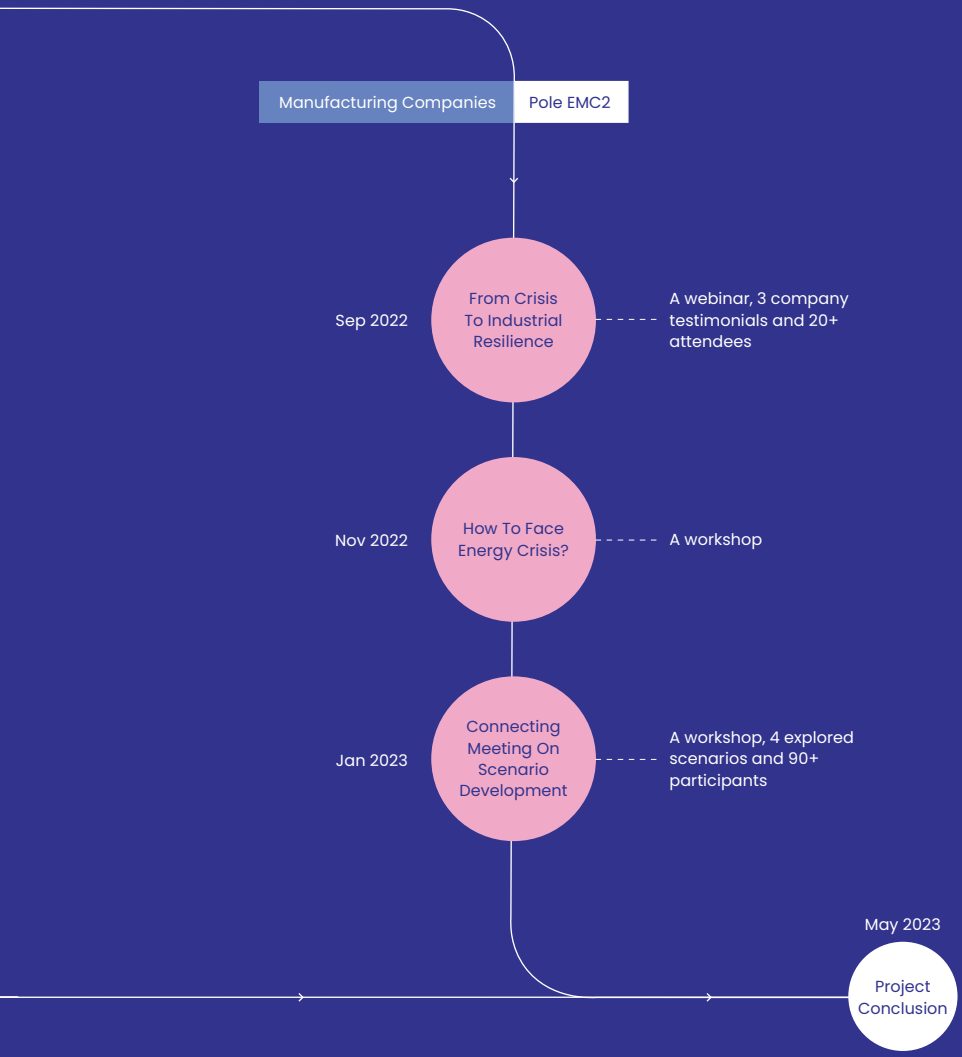
Design and designers can play an important role in opening up innovative ecosystems, facilitating the dialogues between disciplines and shaping ideation processes. Design practices have evolved a lot in recent years, from products and services to socio-technical systems. Additionally, many designers have begun to align their practices with current societal transitions by engaging with a sense of responsibility and activism. At the intersection between art, media, technology, engineering and science, designers can propose interventions that help to envision possible futures while giving an emotional flavor to it. Yet, designers are not acting alone or inside a company to find the best solutions or offer the best experience. More and more designers are creating "safe" spaces for co-designing with a large panel of stakeholders, looking for the most appropriate options, developing skills for researching, conceptualizing, sketching, prototyping, communicating, inspiring, facilitating design sessions, planning and mediating. Industrial ecosystems as well as civil protection and humanitarian sectors would benefit from designers that could cultivate more practices and small-scale interventions centered on co-creation.

By applying systemic design approaches like these, Reservist cell members can be more prepared to respond to emergency situations. Doing so can help actors to leverage their expertise and creativity to address the pressing needs of affected communities alongside current societal transitions in the midst of a crisis.


Atlas of Weak Signals
INNOVATION HUBS, R&D NETWORKS
Stakeholders
Atlas of Weak Signals
DISTRIBUTED DESIGN NETWORK & PLATFORMS
Stakeholders
Atlas of Weak Signals
DESIGNERS, MAKERS & OPEN-SOURCE PLATFORMS
Stakeholders


Nov 2020
Project Initiation
Jan 2022
Exploratory Co-Creation
3 sessions with Reservist Partners
Textile Ecosystem
Textile ETP
Makers & Designers
Fab Lab Barcelona, IAAC
A workshop, 3 testimonials, a co-creation exercise and a report
Cooperation with Mariana Quintero, MDEF and DRS society: 1 week Design studio 2 workshops
Co-designing the RAWS tool
Sep 2022
Serving crisis demand: Lessons Learnt from textile sector
Resilient Maker Stories
Aug 2022 - Apr 2023
Content and tool development by Vikrant Mishra during Research Residency
RAWS test in Gijon
Chat series organised by Jean Luc Pierite with 8 speakers and a co-creation map
Publication Design
Oct 2022 - May 2023

## The Project timeline



# 1.4 People

Discover the organizations and people who contributed to the project, research and this publication.

**Fab Lab Barcelona**[21]

Fab Lab Barcelona was in charge of supporting the network to engage with co-creation and speculative design to envision multiple scenarios of replication engaging with various ecosystems in the Reservist approach, including the maker movement.

**Maker spirit:** Love for fabrication, prototyping in real context, hands-on workshops and human-scale interventions. Fab Lab Barcelona was created in 2007 and is a benchmark in the powerful network of over 1800 Fab Labs in over 100 countries.

**Co-creation cultures:** With open source and community engagement as DNA, Fab Lab Barcelona is contributing to diversifying co-creation approaches and mindsets in various contexts. Discover it with Citizen sensing toolkit[22] and the Siscode project blog post[23].

**Design for Emergent Futures:** The Master in Design for Emergent Futures (MDEF)[24] is a multidisciplinary course that focuses on turning ideas into prototypes, platforms, actions and interventions to transform the current state of society. The method is to propose small-scale interventions to approach large-scale challenges, in order to dissolve wicked problems, instead of solving them with single moonshot solutions. In the second year, students are offered to participate in research residencies where they could practice their learning in research contexts. Two research residency positions were nurtured by MDEF students during the Reservist project.

**Distributed Design:** Connecting local makers and designers through common platforms. Co-funded by the Creative Europe programme of the European Union, the Distributed Design Platform[25] is composed by 17 members across 13 EU countries that

develop a yearly program of activities including Summer Schools, residencies, publications, conferences, exhibition, awards and documentary. The Viral Design book[26] is a publication and collection of testimonies by designers and makers across the globe, gathered during the COVID-19 pandemic.

**Research team**

**Marion Real** Marion Real is a systemic design researcher at Fab Lab Barcelona, focusing on circular economies and localism. She coordinates the Reservist project, works on productive cities and textile research, and is also part of the faculty of the Master in Distributed Design and Innovation. She is an associate researcher at ESTIA and the Centre for Circular Design in London.

**Vikrant Mishra** is a multi-disciplinary designer and researcher who uses storytelling to spark important discussions and explore the many possibilities of the future. He has a background in Industrial design and research practices alongside organizations like SELCO and the British Council. He recently procured a Master in Design for Emergent Futures at Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia and is currently a Resident Researcher for the Reservist project at Fab Lab Barcelona.

**Jean-Luc Pierite** is an Indigenous activist and designer focused on education networks, racial and climate justice advocacy, and philanthropic diversity. He is the President of the North American Indian Center of Boston and has managed digital fabrication lab inventories for The Fab Foundation. He earned a Master in Design for Emergent Futures and supported the design of the Reservist Atlas of Weak Signals tool and Resilient Maker Stories during his research residency.

**Pôle EMC2**[27]

EMC2 cluster, created in 2005, is the European manufacturing technology cluster. EMC2 gathers a network of 400 members, composed of large enterprises, research & technical organizations and more than 200 SMEs. EMC2 aims to foster the emergence of collaborative projects and to reinforce the innovation territorial ecosystem by structuring 5 sectors (equipment goods, energy, aeronautics, shipbuilding and ground transportation) in a common and transversal approach: the advanced manufacturing.

**Océane Lebot** is the Reservist Project manager at EMC2.

**Textile ETP**[28]

The European Technology Platform for the Future of Textiles and Clothing (Textile ETP) is the largest European network dedicated to textile research and innovation. Its main objectives are to ensure the long-term competitiveness of the EU textile and clothing industry through collaborative research across national borders in Europe and a rapid translation of research results into industrial innovation.

Its services and activities include strategy and policy development for European textile research, information provision about EU textile research funding opportunities, brokerage of partnerships for EU research funding applications, dissemination of results of EU-funded textile research projects, organization of conferences and seminars on textile innovation trends and new technology developments and networking among its members and other organizations interested in textile research and innovation in Europe.

Textile ETP currently has about 300 member organizations from industry, research and higher education with a total of over 1200 registered individual experts.

**Kamilla Drubina** is the Community manager at European Technology Platform for the Future of Textiles and Clothing (Textile ETP).

**Reservist partners**[29]

An industry-driven consortium of 17 partners from seven EU countries.



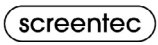










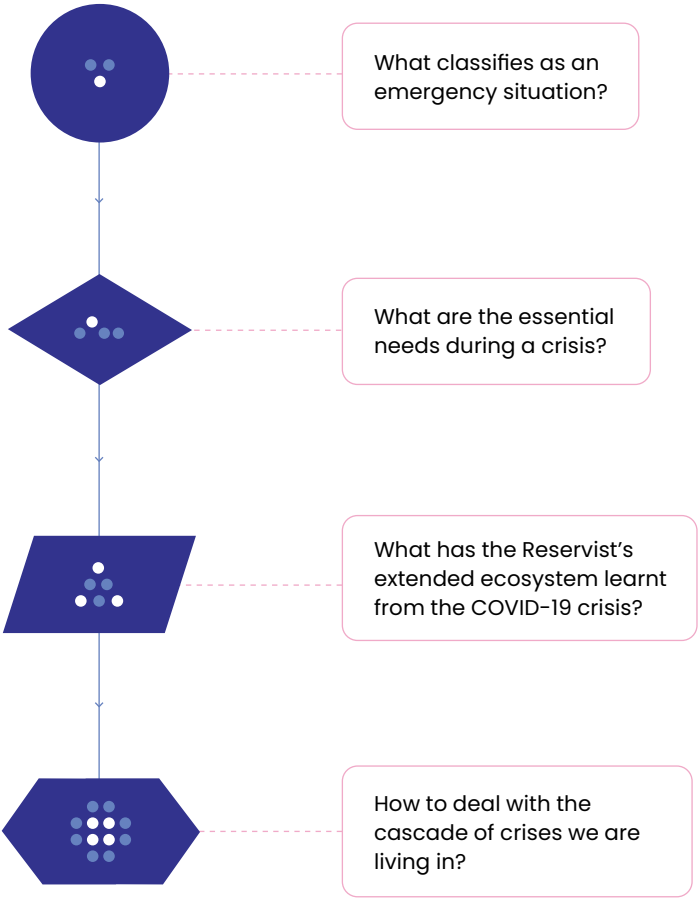



2

# NAVIGATING THROUGH CRISES

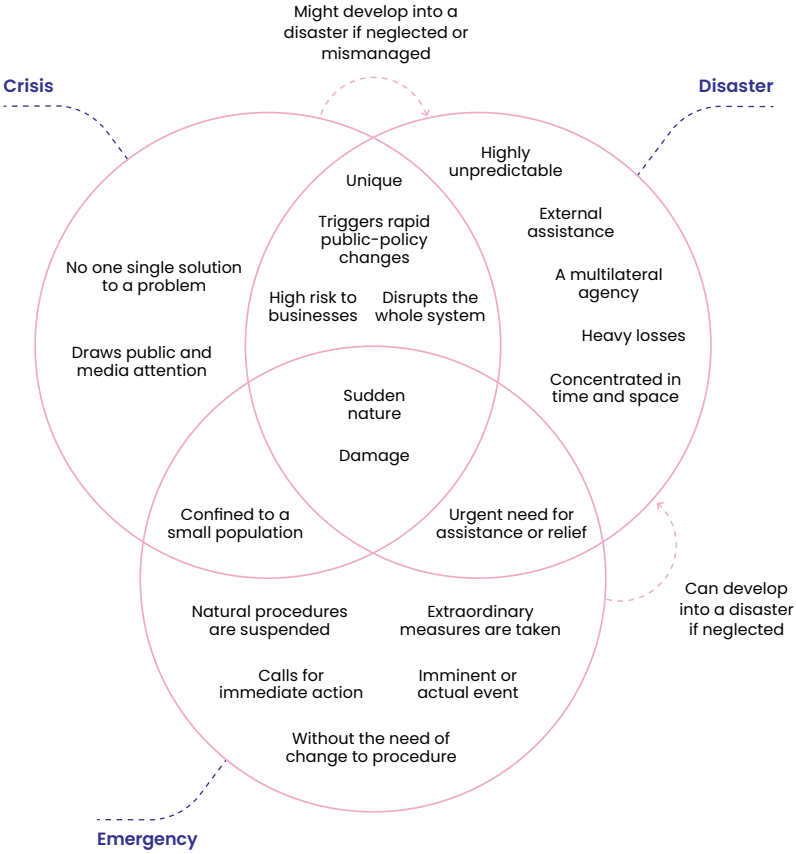
Crises and emergency situations are not new. Throughout history, populations have faced many dramatic events. Some people are more affected or prepared than others. The COVID-19 pandemic, Ukraine wars, and other climate-related crises have shown that we need to better understand these situations and how to prepare for them. What we generally refer to as “emergencies” will not have the same impact on people depending on their context and culture, the experiences they have had, and the type of work or voluntary activities they are practicing or engaged with.

This section begins with providing fundamental knowledge on emergency situations and real-life examples from recent years. We also examine the various needs that arise during crises, opening up possibilities for supplying essential items and deploying interventions to support affected communities. As we explore the ways one responds to different crises, it raises a few simple but important questions:



# 2.1 Zooming in into urgent situations

The terms disaster, crisis, and emergency are closely interconnected and overlap significantly, despite their differences in meaning. Literature often uses these terms interchangeably and in combination, such as 'disaster crisis management' and 'crisis and emergency management'. Emergencies are situations that require urgent attention and pose a serious risk to health, life, or the environment. They can be caused by natural or people-made hazards and are often associated with disasters. Emergencies can arise from a single sudden incident or from more complex phenomena and causal chains of events.




Visual 2.1.1: Relationship between Disaster, Crisis and Emergency[1]

In order to better understand the types of emergency situations that can arise, it is important to unpack the five major categories of emergencies in further detail. In the following sections, we will elaborate on each of these categories and provide real-life examples of how they have impacted communities in the past.

## Natural Disasters

They are defined as environmental phenomena that have the potential to impact societies and the human environment.

### Earthquakes in Syria and Turkey in 2023

06 February 2023

A series of large earthquakes hit southern Türkey and northern Syria, followed by hundreds of aftershocks. Thousands of lives were lost in the initial earthquakes and thousands more are at risk given the destruction of infrastructure and freezing temperatures in the affected areas[4].

### European drought and wildfires in 2022

31 October 2022

Wildfires severely affected Europe's Natura 2000 protected sites: the total area burned in 2021 was 102,598 ha (about 20% of the total area of all Natura 2000 sites), less than the last 2 years and slightly below the average of the last 10 years[2, 3].

## Industrial/Man-Made Disasters

These result from industries due to accident, negligence, or incompetence and can cause significant damage, injury, or loss of life.

### A massive explosion in the port of Beirut

03 August 2020

A large amount of ammonium nitrate stored at the Port of Beirut in the capital city of Lebanon exploded, causing at least 218 deaths, 7,000 injuries, and US$15 billion in property damage, as well as leaving an estimated 300,000 people homeless. The blast was so powerful that it physically shook the whole country of Lebanon. It was felt in Turkey, Syria, Palestine, Jordan, and Israel, as well as parts of Europe, and was heard in Cyprus, more than 240 km (150 mi) away[5].

## Epidemics and Pandemics

First is a quick transmission of a contagious illness within a specific population, while the other refers to its widespread occurrence across multiple regions, continents or worldwide, affecting a significant number of people.

### COVID-19 virus's deadly global outbreak

24 February 2020

The COVID-19 pandemic is a global outbreak of coronavirus, an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus. The first cases of novel coronavirus (nCoV) were detected in China in December 2019, with the virus spreading rapidly to other countries across the world. This led WHO to declare a Public Health Emergency of International Concern on 30 January 2020, and to characterize the outbreak as a pandemic on 11 March 2020.

From March 2020 to February 2023, the pandemic has caused more than 674 million cases and 6.86 million confirmed deaths, making it one of the deadliest in history.

## War, terrorisms and other crimes

War is a state of organized armed conflict between nations, while terrorism and other crimes are intentional acts of violence or harm committed by individuals or groups for political, ideological, or personal gain.

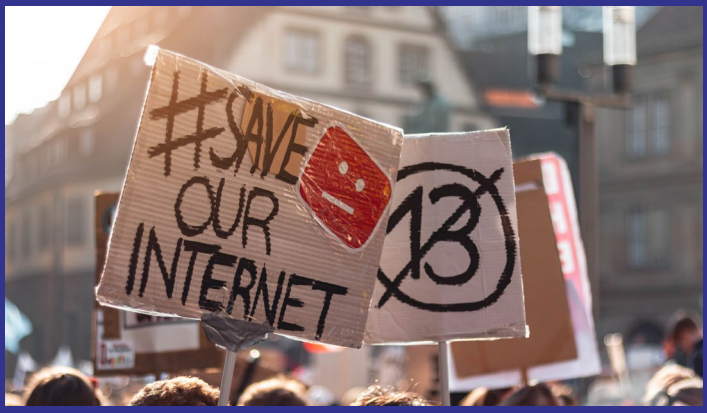
### Rising tensions and violence in Ukraine

24 February 2022

The Russo-Ukrainian War[6], with Russia and Russian-backed separatists against Ukraine, has caused intense hostilities, leading to a grave humanitarian crisis with millions in danger. This includes refugees and internally displaced individuals within conflict areas and around. As of 2 January 2023, the Office of the United Nations High Commissioner for Human Rights (OHCHR) has reported a total of 17,994 civilian casualties in Ukraine since the war began, of which 6919 were killed and 11,075 were injured[7].

## Black-outs and Outages

Power and internet outages refer to a temporary disruption or loss of electricity or internet network supply, which can occur either intentionally or due to system failures.



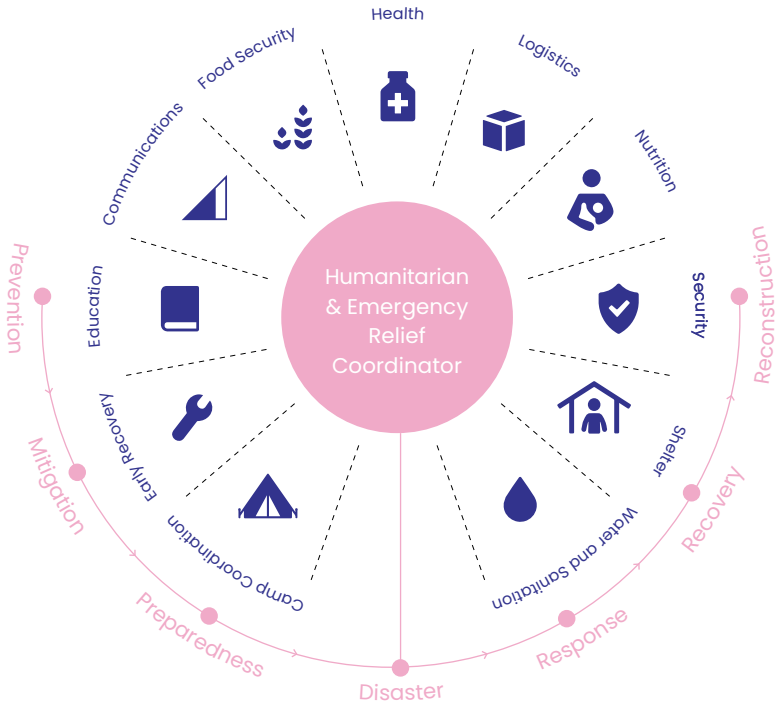

### Venezuela pushed into darkness for 10 days

15 March 2019

In March 2019, Venezuela experienced a series of concurrent nationwide blackouts[8] due to the failure of the Simón Bolívar Hydroelectric Plant, leaving most of the country in darkness for at least 10 days. While government officials blamed sabotage, experts pointed to aging infrastructure and insufficient maintenance. The blackout caused at least 43 deaths, with the last nationwide outage occurring on July 22, 2019.

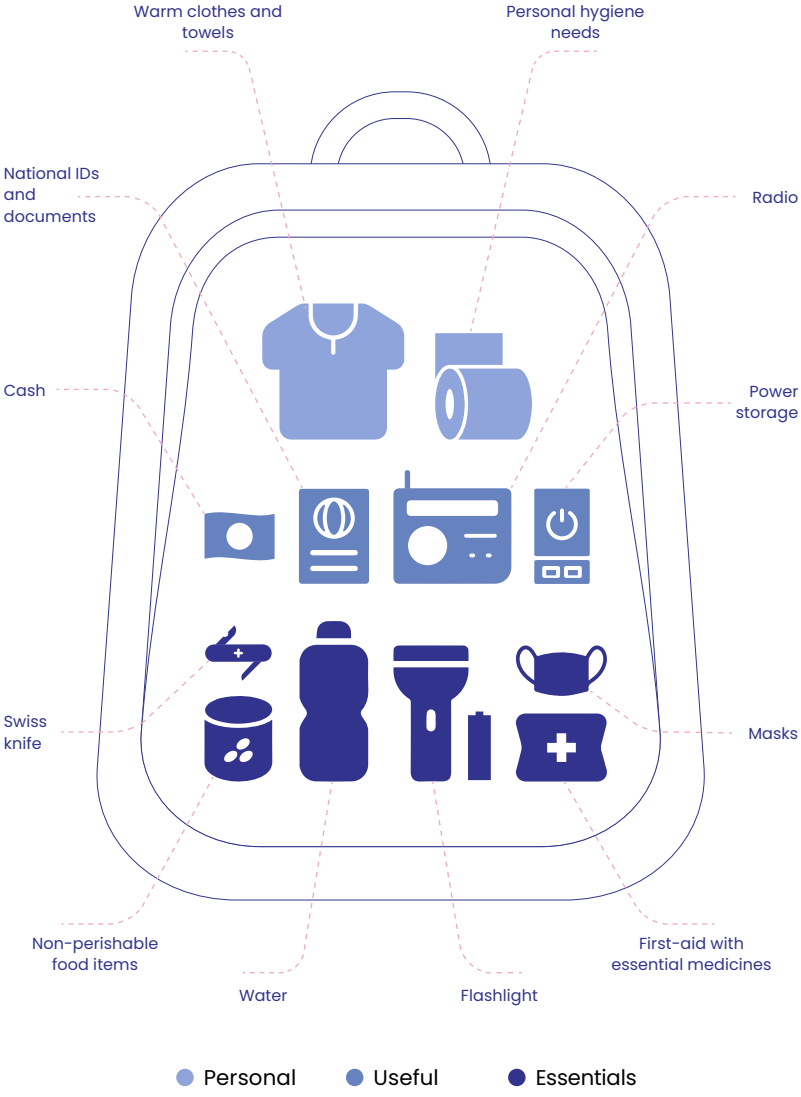
## What would one need during a crisis?

During different stages of a crisis, individuals and communities have various needs that arise. In the initial stage, the focus is on immediate safety and survival needs, such as shelter, food, water, and medical attention. As the crisis progresses, psychological and emotional support becomes increasingly important, including mental health services and counseling. In the recovery stage, the focus shifts towards rebuilding and restoring communities, which involves infrastructure and economic support. In order to effectively respond to a crisis, it is essential to identify and meet these evolving needs in a timely and appropriate manner. The following visual illustrates the 11 sectors of possible actions that could be coordinated by groups of organizations having clear and designated responsibilities.




Visual 2.1.2: 11 Sectors of Humanitarian actions[9]

An emergency kit is a crucial set of supplies to have in case of a crisis or disaster, containing essential items such as food, water, first aid, and tools.




Visual 2.1.3: Basics of an emergency kit

Public health authorities and humanitarian organizations issue a list of needs, which are comprehensive inventories of essential items, services, and resources that are required during crises or emergency situations. The list typically includes items such as food, water, medical supplies, shelter, and communication equipment, among other necessities, and is used to guide relief efforts and ensure that the needs of affected individuals and communities are met in a timely manner.

| Strategic Priorities/Activities | Türkiye | Syrian Arab Republic: WHO response led in Damascus | northwest Syria cross-border response |
|---|---|---|---|
| Provision of essential medicines and supplies (trauma emergency surgical kits (TESK), interagency emergency heath kits (IEHK), noncommunicable diseases (NCD) and ICU kits, Anesthesia medicine, Cholera drug and lab diagnostic kits) | 15 500 000 | 5 440 500 | 6 700 000 |
| Assessment and rehabilitation of health facilities affected by the earthquake | 8 270 000 | 52 650 | 500 000 |
| Replace damaged specialized medical equipment and ambulances | 8 000 000 | 5 850 000 | 300 000 |
| Meeting urgent trauma care needs and emergency health care via deployment and coordination of Emergency Medical Teams and mobile clinics | 3 600 000 | 772 200 | 700 000 |
| Mental health and psychosocial support, including mental health supplies | 1 200 000 | 1 126 128 | 840 000 |
| Support continuity of essential health services and health operations, including management of severe acute malnutrition (SAM) with complications | 3 500 000 | 883 350 | 4 150 000 |
| Surveillance, early warning, alert and response and health information management, including oral cholera vaccines | 2 500 000 | 1 955 655 | 990 000 |
| Critical infection prevention and control and water, sanitation and hygiene-related activities, water chlorine | 2 600 000 | 387 270 | 470 000 |
| Emergency coordination, health information system, duty of care, deployment of staff, enabling functions, field offices and operating costs | 2 500 000 | 1 352 520 | 667 000 |
| Risk communication and community engagement | 600 000 | 127 998 | 280 000 |
| Prevention of sexual exploitation and abuse | 50 000 | 58 500 | 150 000 |
| Support for implementing partners | 2 500 000 | | |
| **Sub-total** | **50 820 000** | **18 006 771** | **15 747 000** |
| **Total WHO funding requirement** | | | **84 573 771** |

Visual 2.1.4: Report of health situation and lists of needs shared by WHO concerning the earthquake emergency in Syria/Turkey[10]

## 2.2 Takeaways from the Reservist ecosystems during COVID-19

Since 2020, COVID-19 has significantly affected the worldwide population, with spikes of demands for certain products, inducing temporary delays in certain sectors and effective changes to lifestyles for many. It is worth exploring in detail how companies and makers have adapted and diversified their production activities to comply with the new emerging demands for medical equipment and related products.

In this section, we invite you to dig into the practices of the Reservist extended ecosystem during the pandemic COVID-19.

? What are the main cells of products from the **current Reservist network** and how do companies have transformed their current capacities of production to manufacture protective and medical equipment such as masks, gowns, ventilators and ephemeral hospitals?

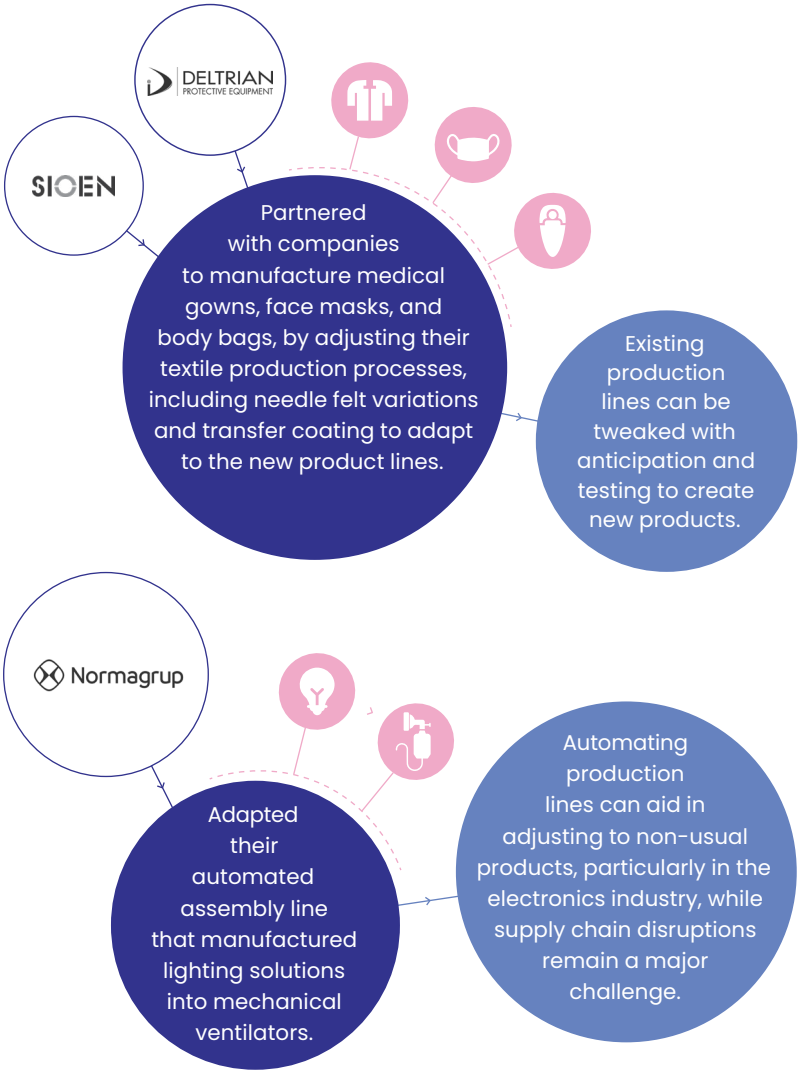
? How has the **textile sector** been affected by Covid-19? Discover 3 good practices and reflections from a co-creation session organized by European Textile Platform (Textile ETP).

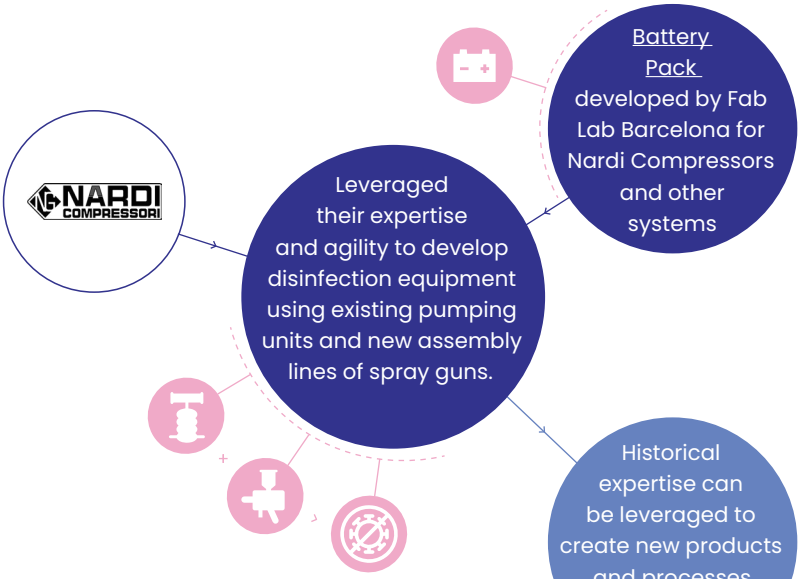
? How were **other manufacturing sectors** affected by Covid-19? Discover 3 good practices from a webinar organized by the Pole EMC2 with a bunch of french manufacturing companies.

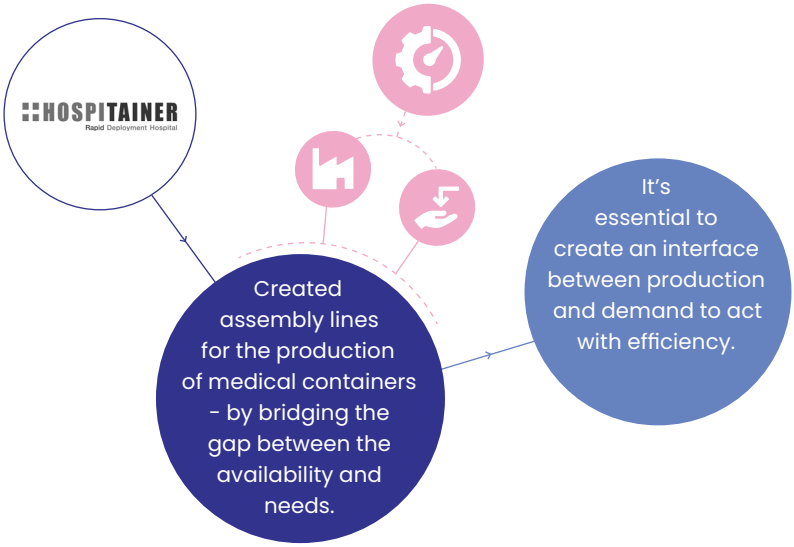
? How did **makers** react to Covid-19 ? Discover good practices collected inside the Viral Design book produced by the Distributed Design community.

## 1 Active Reservist cells

The Reservist network consists of four types of cells focused on producing medical equipment: textile protective gear, respiratory systems, disinfection equipment, and ephemeral hospitals. These cells have been developed and optimized over a two-year project period, with insights from experts. In the upcoming section, we will explore how selected partners customized their manufacturing lines and share their key learnings.



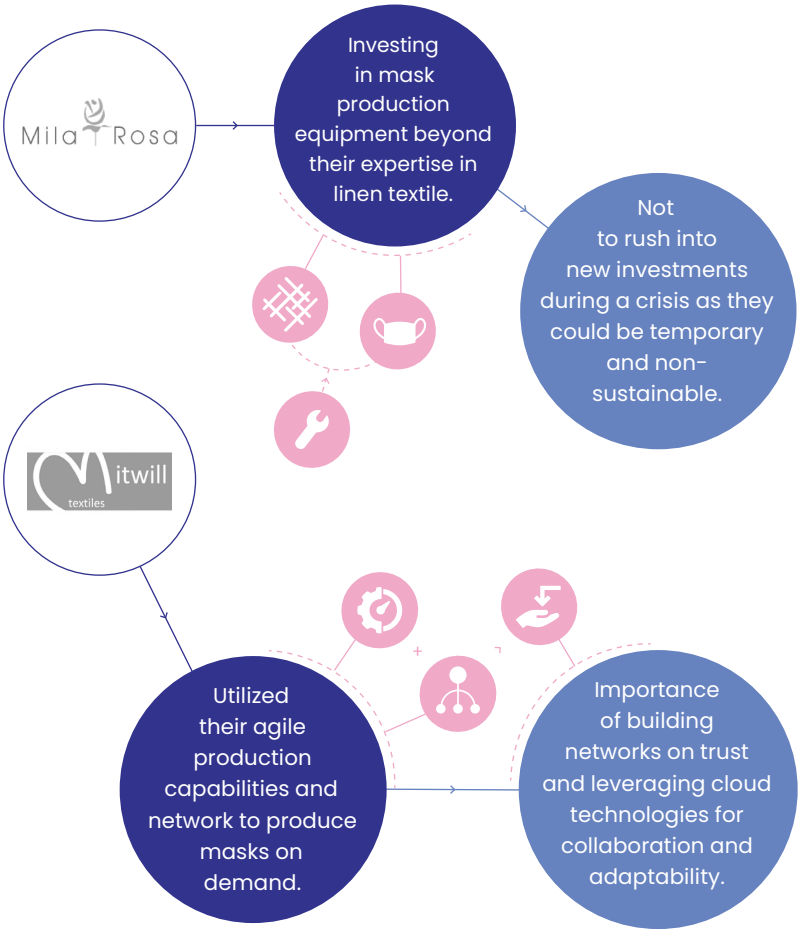

NARDI COMPRESSORI
Leveraged their expertise and agility to develop disinfection equipment using existing pumping units and new assembly lines of spray guns.
Battery Pack developed by Fab Lab Barcelona for Nardi Compressors and other systems
Historical expertise can be leveraged to create new products and processes quickly.

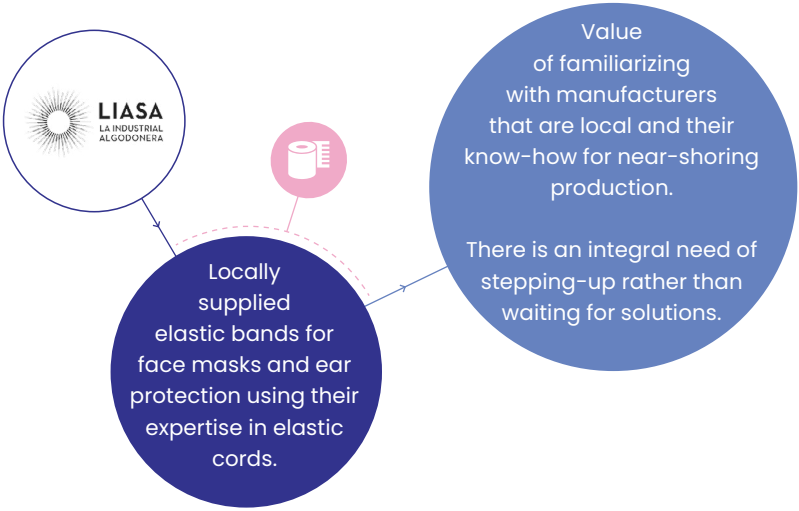

HOSPITAINER
Rapid Deployment Hospital
Created assembly lines for the production of medical containers - by bridging the gap between the availability and needs.
It's essential to create an interface between production and demand to act with efficiency.

## 2 Investigated Ecosystem I: Textile sector, and the Eldorado of Masks

The European textile sector suffered significant losses and supply chain disruptions due to the urgent need to produce PPE and other medical textile products, and the overwhelming demand for testing and certification services.

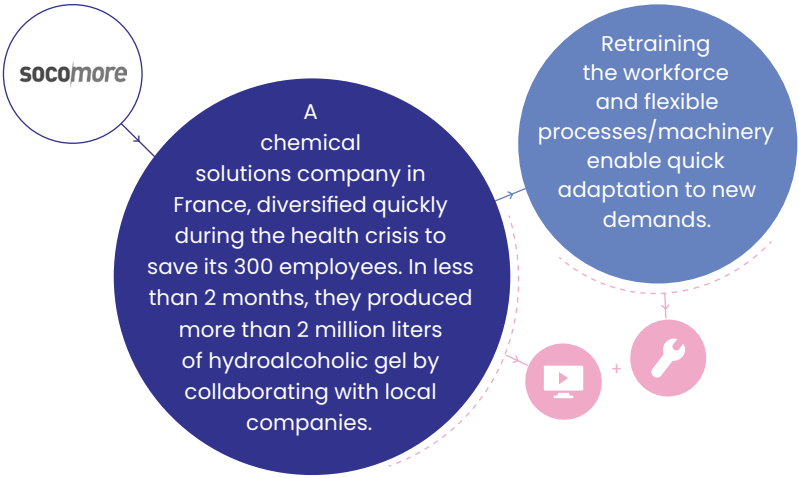
Textile ETP organized a webinar where key stakeholders, including CEOs of three textile SMEs from Spain and France shared their experience, challenges on the market and good practices that helped them through the pandemic.

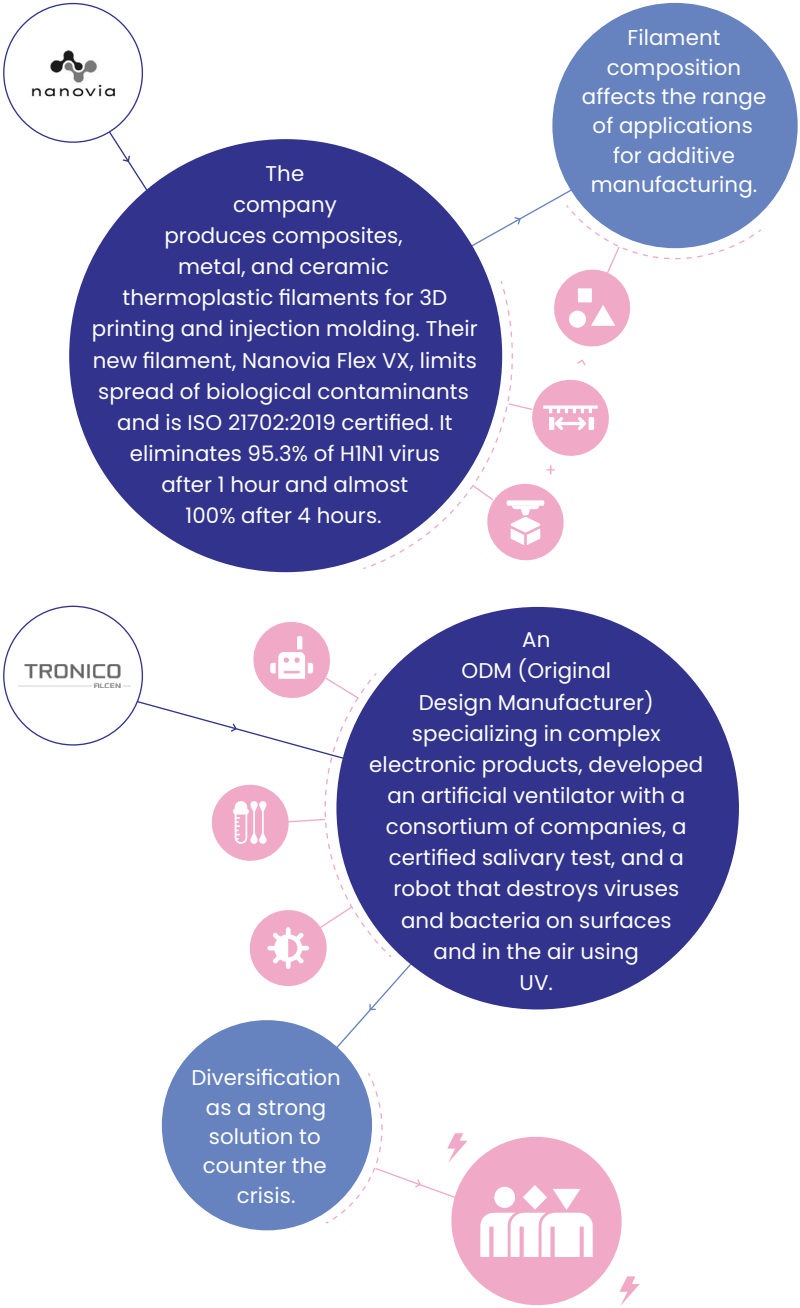





### 3 Investigated Ecosystem II: Other manufacturing companies

Pole EMC2 organized an event where three companies (Socomore, Nanovia, and Tronico) shared their innovative adaptations during the pandemic, including the production of hydroalcoholic gel, development of new filaments, and boosting innovations.




nanovia
The company produces composites, metal, and ceramic thermoplastic filaments for 3D printing and injection molding. Their new filament, Nanovia Flex VX, limits spread of biological contaminants and is ISO 21702:2019 certified. It eliminates 95.3% of H1N1 virus after 1 hour and almost 100% after 4 hours.
Filament composition affects the range of applications for additive manufacturing.
TRONICO
ALCEN
An ODM (Original Design Manufacturer) specializing in complex electronic products, developed an artificial ventilator with a consortium of companies, a certified salivary test, and a robot that destroys viruses and bacteria on surfaces and in the air using UV.
Diversification as a strong solution to counter the crisis.

## 4 Investigated Ecosystem III: Distributed Design community

During Covid-19, especially during the months of lock-downs, the makers and their environment have reacted quickly to propose solutions for a diverse range of products, medical and protective equipment included. In a survey of the Fab Foundation[11] reaching out to 65 labs, 43 product designs have been registered, among them 23 face shields, 2 gowns, 3 mask clips, incubation boxes, facemasks, a door opener, a valve for ventilation machines, a mask holder, an acrylic partition board and a stretcher respiratory connector.

The combination of locally distributed equipment of fabrication sharing designs through global open-source platforms and the solidarity inside the community has shown an important capacity of resilience for this type of emergency crisis.

Thus, fab labs and maker spaces have contributed to the provision of local design and manufacturing services. Makers and designers have contributed to the local productive ecosystems, responding to local urgent demands using their connected infrastructure to manage productions and logistics in cooperation with other stakeholders, from hospitals to public/private institutions.

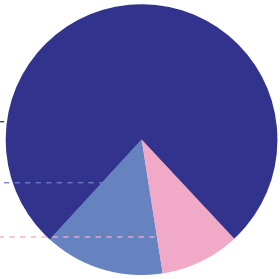
**Fab Labs were asked if they were making any personal protection equipment (PPE), diagnostics supplies or other medical equipment in response to COVID-19:**

The survey was sent out to roughly 65 labs in the Global Fab Lab Network, all of which were involved in the Fab Academy and Fabricademy distributed educational programs.

**76%** were making PPE through a distributed network Lab

**14%** were making PPE at the lab

**10%** were not making PPE or other medical devices currently



What were they manufacturing?

**29** Face shields

**03** Gowns

**12** Surgical Masks

**06** Respirators

**19** Other gears like ear savers, door stops and handles, intubation boxes etc.

Photo from makerscovid.paris collective at Fab City Store, Paris, during COVID-19, Quentin Chevrier (2020).

Viral Design is the third in a series of four books developed within the Distributed Design Platform, co-funded by the Creative Europe program of the European Union. Distributed Design allows creatives, designers, makers and innovators to participate in the creation of a new model of production and consumption, in which "bits travel globally, while atoms stay locally".

The title of the book was inspired by the rapid mobilization of designers and makers during the crisis. As the virus spread, designs of personal protective equipment (PPE) were globally distributed, designed and produced. This book collects observations and reflections from the Distributed Design Platform and extended community. It aims to give shape to the experiences of designers and makers across Europe and throughout the globe during the COVID-19 pandemic. This book compiles 27 contributions from 18 countries. Some articles are personal reflections, written by multiple authors, whereas other articles are more academic. This book was written in a distributed manner during the pandemic, embodying the concepts and discussing the societal and sociological practice of Distributed Design. We hope this book questions, inspires and emboldens you. You can dip in and out of the different articles, it is not intended to be followed cohesively. To get to know more about other initiatives and stories around the maker community's response to the pandemic, please read the book "Viral Design", available as a digital download.

Other platforms and initiatives in the maker movement were created during Pandemic, such as the book 'Home-made'[12], analyzing the setting up of informal networking between FabLabs, makers, tailors and citizens in their garages in the Nouvelle Aquitaine region of France.

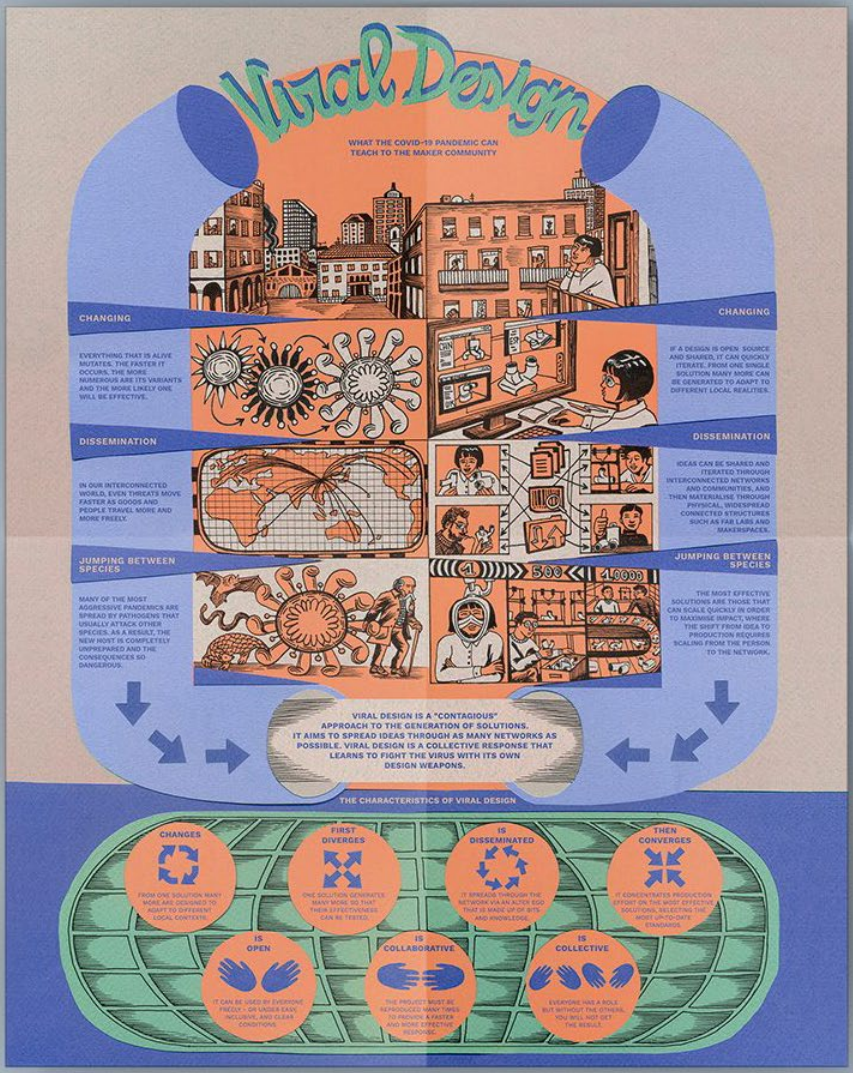



Illustration by Cecilia Valagussa

# Emerging concepts

**What is Viral Design?**

Viral design, then, has a number of features that make it particularly effective in responding to quickly evolving situations, making the most of various actors who can contribute to achieving excellent results.

**Viral Design changes**:
It generates many solutions from a single one, even if it's just to adapt to different local realities.

**Viral Design first diverges**:
One solution generates many so that their effectiveness can be tested.

**Viral Design is disseminated**:
It has an alter ego made of bits and knowledge that is easily disseminated through networks and platforms.



**Viral Design then converges**:
It concentrates production effort on the most effective solutions, selecting de facto standards.

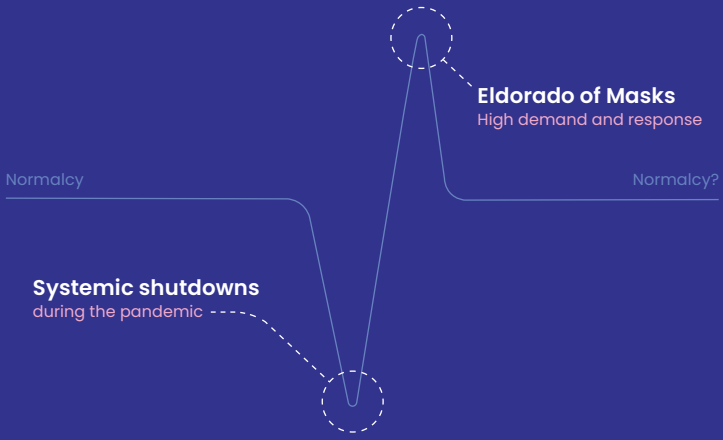
**Viral Design is open**:
Everyone must be able to use it freely - or under easy, inclusive, and clear conditions - in order to enable the development of other features.

**Viral Design is collaborative**:
Each stage has an actor who can undertake that stage better than others; the project must change hands many times to provide a faster and more effective response.

Viral Design is collective: everyone has a role; without others it would not reach a conclusion or it would not reach that point. It is difficult to identify an author, but it's not anonymous. It is the result of a team that has to divide the efforts and benefits that the project brings.

**What is the 'Eldorado of Masks'?**

One of the participants from a session with Textile ETP used the phrase 'Eldorado's of Mask' to remark **the phase in which the demand for masks reached it's peak or "golden age"**, during the 2019 global pandemic. It raised our attention. Why?




During the COVID-19 pandemic, there was a significant surge in demand for masks. As a result of the lockdowns, many companies had to reduce their productive activities, which led to a slowdown in the economy. To address the shortage of masks, various sectors, particularly the textile industry, focused on local production of masks, with many textile companies getting involved. At the height of the demand, companies were able to increase their profits by taking advantage of public support for local procurement and equipment investments. However, this resulted in overproduction of masks, which led to a significant amount of environmental waste. Eventually, global procurement returned to normal, and many companies were unable to capitalize on the invested equipment anymore.

Eldorado, beyond its spanish origin (el dorado: golden), is also a mythical country supposed to be full of gold - located in South America, according to the conquistadors of the 16th century. At the end, the conquistadors did not find the Eldorado, but they snatched heaps of gold from the *Incas* and the *Chibchas*.

## 2.3 Looking away from a singular crisis

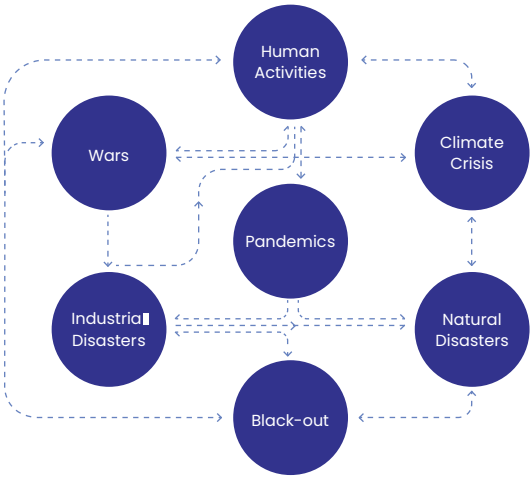
The occurrence of crises, disasters, and emergencies are often the culmination of a complex web of interrelated factors. The World Health Organization has acknowledged that "natural and man-made emergencies and disasters rarely occur in isolation, and their cascading impacts continue to be an increasing concern."[15] The fragments from one crisis can trigger a sequence of events leading to the emergence of additional crises that can overwhelm communities, regions, or even entire nations.

### HOW DOES A SINGLE PHENOMENA TRIGGER A SYSTEMIC CRISIS?

As a previously discussed example, COVID-19 pandemic caused major health and economic crises across the globe. Alongside that, it also exacerbated existing social and political conflicts by highlighting inequalities in access to healthcare, education, and job opportunities. It also exposed the vulnerability of marginalized communities, such as the elderly, the poor, and the refugees. In many ways, it strained the social fabric of many countries, leading to increased local and global tensions, polarization, and mistrust.

As we have learnt, such issues require international cooperation and collective action to mitigate their impacts. The response to the global pandemic has shown that rapid and coordinated action can be taken, providing hope for similar action on one of the most complex and biggest issues of our time, the climate crisis. *The term "climate emergency" has been used in protests against climate change since before 2010, but gained more prominence in recent years with the adoption of measures like the Darebin Climate Emergency Plan and the presentation of the Climate Emergency Plan by the Club of Rome in 2018. The rise of movements like Extinction Rebellion and Fridays For Future has brought the issue to the attention of various governments*[16].

This topic pertains to the disruption of ecological processes caused by human activities, which can result in periodic natural disasters, conflicts, and other crises. The effects of climate crises, such as rising sea levels, more frequent and severe natural disasters, and prolonged droughts, can exacerbate social, economic, and political problems. Climate crises can possibly lead to displacement, migration, and conflicts over currently-shared resources, such as water and land. It can also trigger poverty, food insecurity, and health problems, particularly in developing nations and communities.




Visual 2.3.1: Interdependence of different crises on each other

Natural and man made disasters do not logically fall within one single category which can be addressed through a single sector-specific approach. Rather, they are "hybrids" involving complex socio-ecological processes[17], bringing together many stakeholders and fields of actions such as civil protection, environmental protection, health, security as well as territorial cohesion. **This complexity shows that crises are not just isolated events but a series of happenings intricately embedded in our social, economic, political, and environmental realities.** Therefore, addressing them as such requires a holistic and integrated approach that takes into account the interdependence of various factors and their long-term consequences. The Global Risk report[18] showed an illustration of such a systemic approach, visually mapping current and future scenarios of global crises.

3

# RESILIENT MAKER'S STORIES

*Millions of lives, billions of people's futures, and trillions of dollars depend on whether we act collectively in the face of crisis or instead polarize when under threat. The response can also be centralized or distributed. In the rapids, does the captain steer the ship alone or do they also empower everyone to row?*[1]

Observing past engagements can provide inspiration for future actions. The "Resilient Makers Stories" consisted of a series of public conversations with practitioners from diverse backgrounds, who shared their personal experiences of responding to crises. In this section, we have visually synthesized what we learned from each speaker to create an international creative ecosystem of local makers and designers who can anticipate and react to current and future crises.

## 3.1 The stories

# HOW DO WE CULTIVATE A RESILIENT AND RESPONSIVE DISTRIBUTED DESIGN COMMUNITY?

To cultivate a resilient and responsive distributed design community, Fab Lab Barcelona organized 'Resilient Maker Stories' which is a chat-series consisting of nine conversations with makers and speakers around the globe. These explore crisis response practices and distributed design approaches within the maker movement. The research methodology involved desk research, initiative mapping, communication campaigns, and the creation of interview guides and facilitation tips to gather meaningful stories.

The first edition of Resilient Maker Stories ran from August to October 2022 featuring weekly online chats facilitated by Jean Luc Pierite. The second edition took place in March and April 2023, led by Vikrant Mishra to bring in a more diverse range of speakers.

| You can find all the episodes here: | You can find the Miro board activity here: |
| --- | --- |
|  |  |

**How to write your story?**

1. Give a brief summary of your story in the center of the space.
2. Select an emergency scenario card(s) that aligns with your story and position them at the bottom of this page.
3. Elaborate on your story by exploring various dimensions, from the **self, us, land** and **now** with notes, references, post-its or illustrations.

Story of self

Story of us

Your Story

Story of land

Story of now

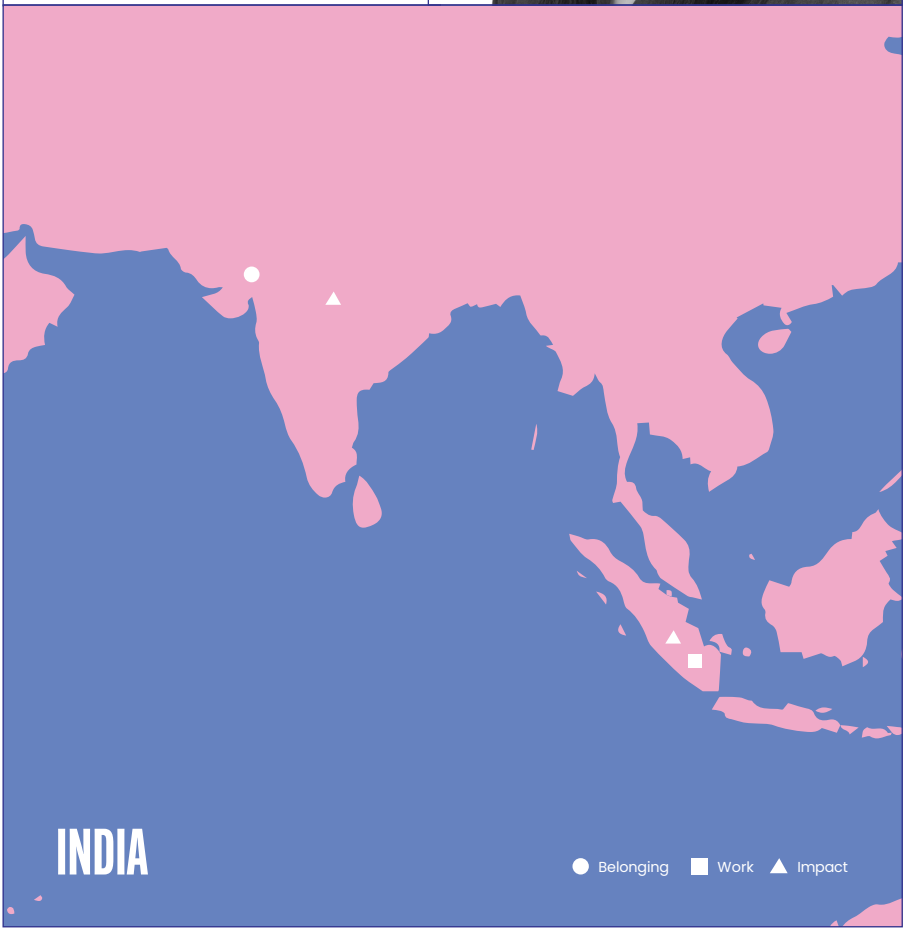
# RESILIENT MAKERS WORLDWIDE


Enrico Bassi
Italy
Ohad Meyuhas
Israel
Lemuel Velasco
Philippines
Mitalee Parikh
India
Richa and Vaibhav
India

RESILIENT MAKER 1

# MITALEE PARIKH

Multidisciplinary Designer from Gujarat - MDEF alumnus - Network developer at Fab City Foundation - Committed to creating small actions with global impact.

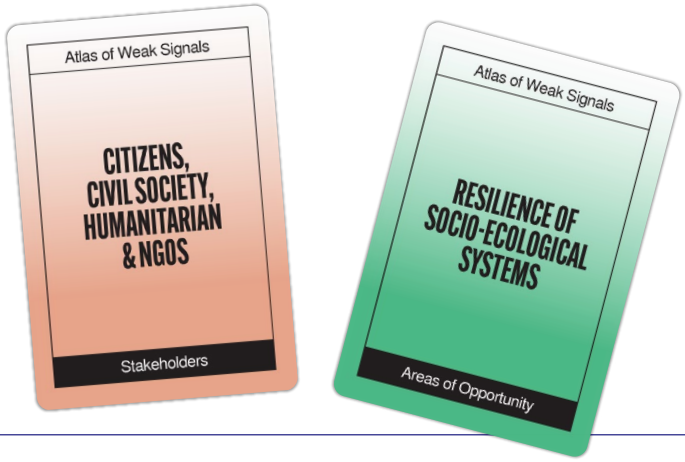


**Acknowledging the harmful effects of consumerism and capitalism, as well as the mindless habits and patterns of consumption, can help redefine how we make and use things.**

Mitalee is a multi-disciplinary designer with a background in architecture, speculative design, and digital fabrication. As an alumnus of MDEF, she is committed to creating small actions that can have a global impact. During the Covid-19 crisis in India, she led impressive interventions and worked with the Fab City Foundation as a network developer.

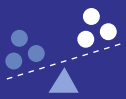
Mitalee's work during the pandemic emphasized the importance of self-sustainability and local production. With the failure of global supply chains and logistics, the need to be self-reliant, especially for necessities, became increasingly apparent. She collaborated on the Hyper Domestic x Hyper Global research project, which focused on daily life, social interactions, ethics, and initiatives in the context of the pandemic.

One of Mitalee's notable contributions was the AMD Shield, an open-source face shield designed to provide an added layer of protection to frontline workers. She studied available open-source projects from around the world and prototyped several designs, ultimately settling on one that was feasible given the available materials, assembly time, reusability, cost, and manufacturing time. Mitalee coordinated with local vendors and fabricators to produce the face shields, and worked with the police to distribute them to the most affected areas of the city.



# HIGHLIGHTS

Designing and making for the long term must not only balance its own systems but also make amends for the past.



Gender fluidity and inclusion challenge traditional social constructs, opening up possibilities for more equitable and diverse communities and systems.

The circular economy, including circular data systems and carbon-neutral life cycles, is an essential approach to reducing waste and continually using resources.

If we design for necessity, question the necessity. No necessity is fake, because things have different meanings to everybody. Necessity is relative. Necessity is subjective.

# SHARED RESOURCES

Fab City Hubs: Interfaces for community building and playgrounds for new innovative urban actions

Publication | Creative Hubs | Community

The Fab City Full Stack: A Multiscalar Framework for Distributed Production Strategies in Cities and Regions

Publication | Manufacturing

Future of Manufacturing

Blog | Consumerism | Convenience

Let My People Go Surfing: The Education of a Reluctant Businessman

Book | Entrepreneurship

RESILIENT MAKER 2

# EMILIO VELIS

Industrial Engineer at Appropedia Foundation - interested in the convection of disaster & resilience creating toolkits, games and electronics.

## Why re-invent the wheel when you can just redesign it?

As the Executive Director of Appropedia Foundation, a nonprofit that promotes sustainability and development, Velis has dedicated his career to advocating for the open movement, open licenses, environmental sustainability, and appropriate technologies to improve the state of vulnerable communities. The discussion led by Emilio Velis centered on resilience and community empowerment.

Velis often wonders why we only consider disasters urgent when they affect humans. He then highlighted the significance of critical thinking and the importance of co-creating solutions that are appropriate for the targeted community. He believes that empowering communities through conversation and listening can create validating narratives that can later be embodied into better solutions. Additionally, he stressed that innovation often involves failing repeatedly, which invites the capacity for critical thinking.

To seek appropriate solutions and use appropriate technologies, Velis suggests strategic steps such as asking questions, distributing power, and co-creating with the people. There is an obvious state of normalcy before a disaster occurs. However, once a disaster strikes, people become extremely vulnerable and are in need of humanitarian relief. This sequence of events may not necessarily occur in a predetermined order and can vary depending on the nature and severity of the disaster. His perspective emphasizes the need for predetermined disaster preparedness measures - to mitigate the risks and reduce the sudden vulnerability of communities.

In such situations, he emphasized the need to diversify roles instead of disrupting and questioning the existing systems in place. In the current day and age of shared-knowledge and collaboration, he believes in the concept of redesigning the wheel, over reinventing it. In any community-driven project, finding micro-leaders and knowledge keepers is crucial. Velis suggested finding meaning in building and approaching a culture through co-creating and using their embedded and local knowledge of making to foster a sense of belonging, familiarity and relevance.

# HIGHLIGHTS

Before a disaster there is the everyday life & normalcy; after that is extreme vulnerability & the expectance of 'Humanitarian Relief'; Why does it have to happen that way?

How to stop disruption and promote diversification in communities?

Innovation is really focused on failing a lot - but how may times is one really gonna reinvent the wheel? Instead, let's redesign.

How to ask questions, distribute power, co-create with the community, seek appropriate solutions, use appropriate technologies and validate the narrative?

# SHARED RESOURCES

Home-Made Disaster Kit:
Plan Ahead With This Game!

Card game | Strategy | Response

Principles for an Equitable and Effective Crisis Response by Appropedia foundation

Publication | System Design

Gamification for social perception: Introducing scientific literacy to dabblers in citizen science

Community mapping | Gamification

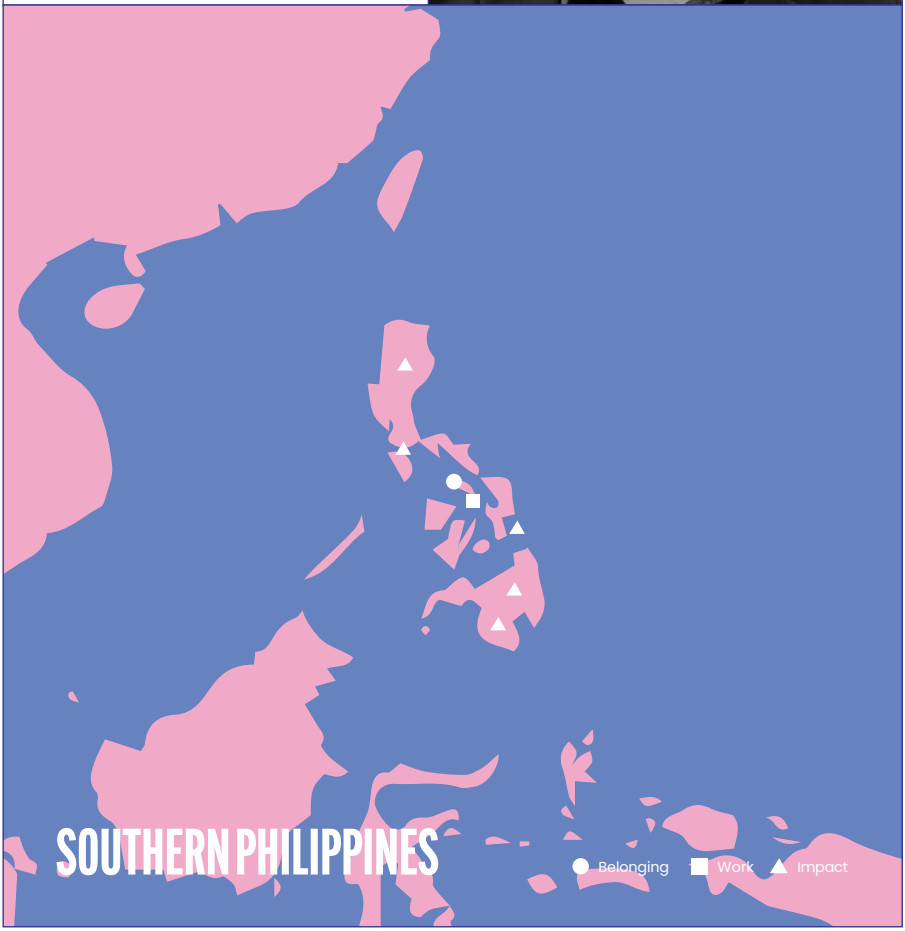
Mappings (El Salvador)
An interview with Emilio Velis

Podcast | Mapping | Documenting

RESILIENT MAKER 3

# LEMUEL VELASCO

Associate Professor - Mindanao State University - specializing in Innovation systems and collaborative community building in Fab Labs.



**Relationship with makers is based on trust and collaboration, hence it should be existent without a crisis or an emergency situation.**

Archie Lemuel Clark Velasco is an associate professor of information systems at the Mindanao State University-Iligan Institute of Technology, specializing in innovation systems and collaborative community building of Fab Labs. He managed the first open makerspace in the Southern Philippines, Fab Lab Mindanao, from 2015 to 2022.

Archie raised the question of how to resolve borders built by disciplinary differences among makers and citizens during emergencies and disasters. One of the challenges for scholars and practitioners in such situations is to acquire, and actively promote, an understanding of the processes through which conflicts and borders can be opened, and how they can be crossed with greater ease[2]. He believes it is essential to have an upward resilience or reverse-engineering resilience model that fosters a relationship based on trust and active collaboration between makers and citizens.

Moreover, he criticizes how the role of makers is very limited during local disasters. Therefore, it is important to define the role of makers during efforts towards developing preparedness, response, recovery, and mitigation. He believes the key to creating a more sustainable and resilient supply chain in Fab Lab networks is to localize material resources and build relationships with local suppliers. This involves analyzing the current supply chain, identifying bottlenecks and vulnerabilities, and encouraging the use of locally sourced materials and resources. Maintaining relationships with multiple local suppliers, developing contingency plans, and implementing in-house production capabilities are also crucial to building a more sustainable and resilient supply chain.

# HIGHLIGHTS

Fab Lab learnings needs to flow from developed nations to developing nations.

In developing countries, the loss of a doctor is not only a personal tragedy but also has far-reaching implications for the entire community.

Sustainable collaboration facilitates a sustainable research between makers and specialists

How to resolve borders built by interdisciplinarity amongst citizens and communities when urgencies or disasters hit?

# SHARED RESOURCES

The Use of Commercially Available Non-Medical Grade USB Cameras for Physician Guided ENT Out-Patient Self-Examination During the COVID-19 Pandemic

Research | Virtual Examination

Preliminary assessment of solid waste in Philippine Fabrication Laboratories

Research | Digital fabrication

Makers without borders

Platform | Webinars

Lesstics

Environmental service | Community

RESILIENT MAKER 4

# VANEZA CAYCHO

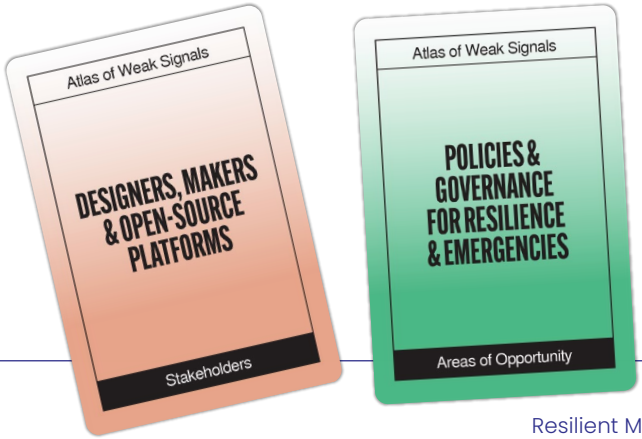
CEO & Founder of iFurniture - Traditional Carpenter - Fab Academy Alumnus - works with social development & non-gendering makerspace roles.

**Integration of community is essential; from local bits to testing, then to social calls for volunteers, then to testing and then finally to proposing.**

Vaneza is an architect, carpenter, and digital fabricator who has been involved in various projects and roles in the maker community. At the chat series, she emphasized the importance of creative outlets that affirm cultural backgrounds and positionality, as well as the integration of local bits, testing, social calls, and volunteers through social media networks. She also highlighted the power of open-source and how the gendered roles in maker communities are being disrupted through roles in leadership and digital fabrication.

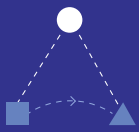
According to Vaneza, creating an open and welcoming environment, encouraging collaboration and knowledge-sharing, providing access to a diverse range of tools and resources, highlighting the work of women makers, and offering training and support for all makers are some of the steps that can be taken. By leveraging the power of open-source and promoting inclusivity and diversity, maker communities can create a more welcoming and supportive environment for all makers, encourage women to participate in traditionally male-dominated areas, and break down gender barriers.

Vaneza noted the shift towards digital fabrication and stressed the importance of incorporating technology into existing environments while preserving craft and heritage. As the CEO of iFurniture Digital Carpentry, she proposed revitalizing the carpentry industry through innovative design engineering and the application of new technologies.



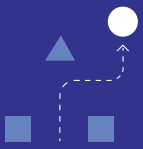
# HIGHLIGHTS

Shift from traditional to digital ways is necessary through provision and exposure of technology in the existing environments and maker spaces.



Empowering women through craft & digital fabrication is the need of the hour.

Your way of making is guided by where you come from, in terms of culture and availability.



Embracing local challenges can help the community of makers in exploring how their skills can contribute to social causes.

# SHARED RESOURCES

Women in the Fab Lab ecosystem (2008-2021): From Fab Academy to the Fab Lab Research Conferences

Gender parity | Analysis

iFurniture

Platform | Digital Carpentry

Shelter 2.0: Improving local communities by promoting open innovation in housing

Housing | Digital fabrication

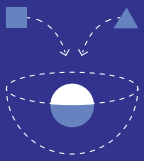
Fab Craft

Fab network | Latin America

RESILIENT MAKER 5

# OHAD MEYUHAS

Architect, Educator and head at Stratasys Inc. - MAA alumnus at IaaC - exploring how digital fabrication could make maker spaces supply-chain independent.



**Our kitchens are one of the most essential and powerful maker spaces.**

Ohad Meyuhas is an architect, educator, and the head of innovation labs and CSR operation at Stratasys, Inc, a 3D printing company. In his chat session, he discussed various topics related to digital fabrication, including supply-chain independence, the role of maker spaces in fostering relationships, the importance of implementation, and the use of meta-materials and composite materials in additive manufacturing.

Ohad emphasized the importance of local DIY production, and the need to make machines more reliable and products more precise to facilitate its adoption. He also spoke about the role of parametric design in customization, and the need for economic shifts to support changes in manufacturing.

Additionally, he discussed the use of fast design challenges to create solutions and skills for reacting to crises, and the importance of future thinking, particularly with regards to climate change and collaborative design for multiple species.

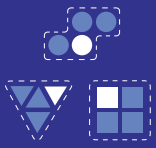
Ohad's research projects explore the relationship between digital fabrication, education, and social impact, and how these technologies can shape our daily lives and the manufacturing industry. He established and runs the Israeli Fab Lab network, and is an instructor for the global Fab Academy Diploma course for digital fabrication.

# HIGHLIGHTS

Parametric design is really a revolution to customize and solution more adaptable for everyone.

Maker spaces unite people, without caring about differences and social conflicts.

For a better adoption to local production systems, machines need to be more reliable and products more precise.



Product design is essentially aligning technology with it's applications. Customers are the key, and hence opening design to researchers and other experts could really help everyone.

# SHARED RESOURCES

Right to Repair

Community | Self repair | Activism

A Design Oriented Workflow to Prototype Functionally Graded Designs based on Solid Finite Element Analysis

Publication | Additive manufacturing

4D Printing

MIT | Fabrication | Smart materials

The [amazing] Maze

Project | Gamification | Collaboration

RESILIENT MAKER 6

# ENRICO BASSI

Industrial Designer - Fab Lab Manager at Opendot - Instructor at Fab Lab and Domus Academy - talks about the role of open source solutions in health and wellness.

**One shouldn't ignore what people from outside the maker movement can bring inside it.**

Enrico Bassi, a design engineer and product designer, shared his insights on various topics related to the role of technology and design in addressing global challenges. He addressed the need and involvement of scaling up Fab Labs in the areas of health, care, economy, and education. He envisions these labs as digital manufacturing laboratories that could play a crucial role in providing customized and adaptive solutions to various challenges.

During a crisis, all situations that occur on a global scale are not usually met with effective responses in the industrial production systems. The production and development of solutions could be approached in a similar way to the distributed mobilization during the Covid-19 crisis. These solutions could be the next testing ground for developing a synchronized international response utilizing a global network.

According to Bassi, the impact drives contribution in a community. He stressed the need to minimize risks and optimize outcomes during emergencies. In addition to having a solid plan, it is essential to have access to relevant information and resources, including up-to-date directories, real-time information on the emergency situation, and access to emergency supplies and equipment. This can be achieved through partnerships with local emergency management agencies and other relevant stakeholders. Contingency plans can then be refined through regular reviews, post-incident analyses, and feedback from team members and stakeholders.

He acknowledged the complexity of scaling out maker-based solutions and the challenges of accessing markets due to certification and policy-making processes. Bassi called for makers to be supported and trained to certify products. He also recommends that policy makers collaborate with makers to overcome the obstacles to certification and enable them to participate in crisis responses on a wider-scale.

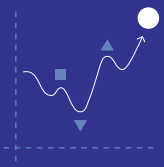
He believes in encouraging people to explore the unknown and build trust in making. He underscored the need to work with complexity, learn about new areas of knowledge, and not overthink design.

# HIGHLIGHTS

Global crises can be addressed through the distributed mobilization model seen in the COVID-19 crisis, serving as a testing ground for a synchronized global response.

Impact drives contribution in a community.

It's crucial to minimise the risk and optimise the outcome during crises.



Scaling up distributed design solutions requires a supportive system to overcome the complexity of certification and policy-making, which are necessary to ensure safety but often become inaccessible.

# SHARED RESOURCES

Viral Design

Book | Distributed Design Platform

FabCare

Global Network | Open Healthcare

Opendot

Community | Makers | Research

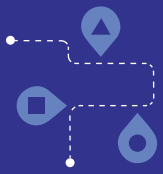
What does it mean to Decolonize Design?
Dismantling design history 101

Publication | Design History | Culture

RESILIENT MAKER 7

# ANDREW LAMB

Chair at Internet of Production Alliance, London - CEO at Massive Small Manufacturing - talks about making pre-crisis and post-crisis manufacturing effective.



**In any crisis scenario, minimise on design while maximising on production - hire local labour and manufacturers because they know what their supply chains look like.**

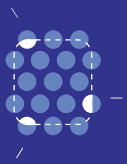
Andrew Lamb, the Chair of the Internet of Production Alliance and CEO of Massive Small Manufacturing Ltd, spoke about the benefits of distributed local manufacturing in crisis situations. He emphasized that it is better, cheaper, and easier to manufacture locally and that refugee communities can be empowered through local manufacturing. Crisis situations offer opportunities for local economic development, and local labor and manufacturers should be hired to provide a better understanding of supply chains. Lamb stressed that quality assurance and safety standards are critical factors to consider before providing aid.

In order to prepare for crisis situations, he suggests licensing pre-crisis or using free IPs and open hardware. He also stressed the importance of designing for actual problem-solving rather than designing for abundance. At such a crucial time, traditional supply chains may not work or be overwhelmed, and mapping local capacities and networking can help match local demand with supply. Large networks of local producers that respect designs can respond to demand. Simplifying the complexity of products and working with local teams can also aid in successful local manufacturing.

With COVID-19, there has been a shift towards resilient and local production. Overall, Lamb advocates for more networks, local procurement, and open hardware design in order to make local manufacturing a viable way forward. He emphasized the need to include values from organizations like mAkE[3], which believe in strengthening collaboration between makerspaces at national, regional, and even intercontinental levels. Finally, he believes that while making should be practical, it should also be fun to ensure continuous learning.

# HIGHLIGHTS

Sometimes the most effective solutions are not the most fun to make.



A crisis can be looked upon as an opportunity for local economic development.

Do not design for the solution, design for solving the problem. Minimise on design, maximise on production.

Enabling impacted people to take charge of development and resilience can be instrumental in realizing long-term, fair solutions.

# SHARED RESOURCES

Learnings from COVID-19 for managing humanitarian supply chains

Publication COVID-19 Collaboration

Field Ready

Collective Disaster response and relief

Internet of Production

Collective Decentralized manufacturing

NeedsList

Software Collaboration Stakeholders

RESILIENT MAKER 8

# ADRIANA CABRERA

Innovation manager at shemakes.eu - Innovation and Product Development at Matrix GmbH - works at the intersection of digital fabrication and Bio-mechanics.

**Instigating the essence of hope while sharing ideas and concepts is crucial in the process of making with vulnerable communties.**

Adriana Cabrera, a scientific assistant and lecturer at FabLab Kamp-Lintfort in Germany, shared her thoughts on developing affinities in the fab-world for caring or assistive devices for people with disabilities. She stressed the significance of exchanging ideas and motivations to instill a sense of hope when working with vulnerable individuals who have been impacted by recent crises. In terms of sustaining the initial motivation of making it through the recovery process, Cabrera suggested inviting and bringing in more people to fill gaps where resources and person-power are lacking.

Cabrera discussed the need for compounding and sharing between different fields in academia and enhancing inclusivity. This can possibly help in fostering a network to reinforce cooperation between people sharing the same ambitions. She mentioned that labs often are not accessible for persons with disabilities and suggested working directly with people with disabilities to understand and reinforce adaptability.

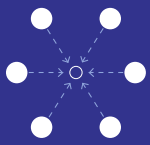
Adriana's work and approach should be considered when creating disaster relief plans and response teams. By incorporating a more collaborative and inclusive approach in which persons with disabilities participate in co-designing processes, communities can develop and provide better caring and assistive solutions.

# HIGHLIGHTS

While working on long-term solution, we need to find ways to sustain the initial motivation of making throughout the process.

Compounding knowledge in a community enables various opportunities.

We need to invite and bring in more people to fill gaps where resources and human power lacks.



Labs can be powerful equalizers in providing opportunities for those who are often marginalized to gain access to resources and technology. By working alongside individuals with physical challenges we can adapt existing designs for their specific needs, and foster a more inclusive and empowering society.

# SHARED RESOURCES

Prototype of a self-sufficient biofabrication protocol for remote territories

Publication | Materiality | Prototyping

MyOrthotics: Digital Manufacturing in the Development of a DIY Interactive Rehabilitation Orthosis

Textile labs | Digital Manufacturing

Shemakes.eu

Platform | Female Innovators

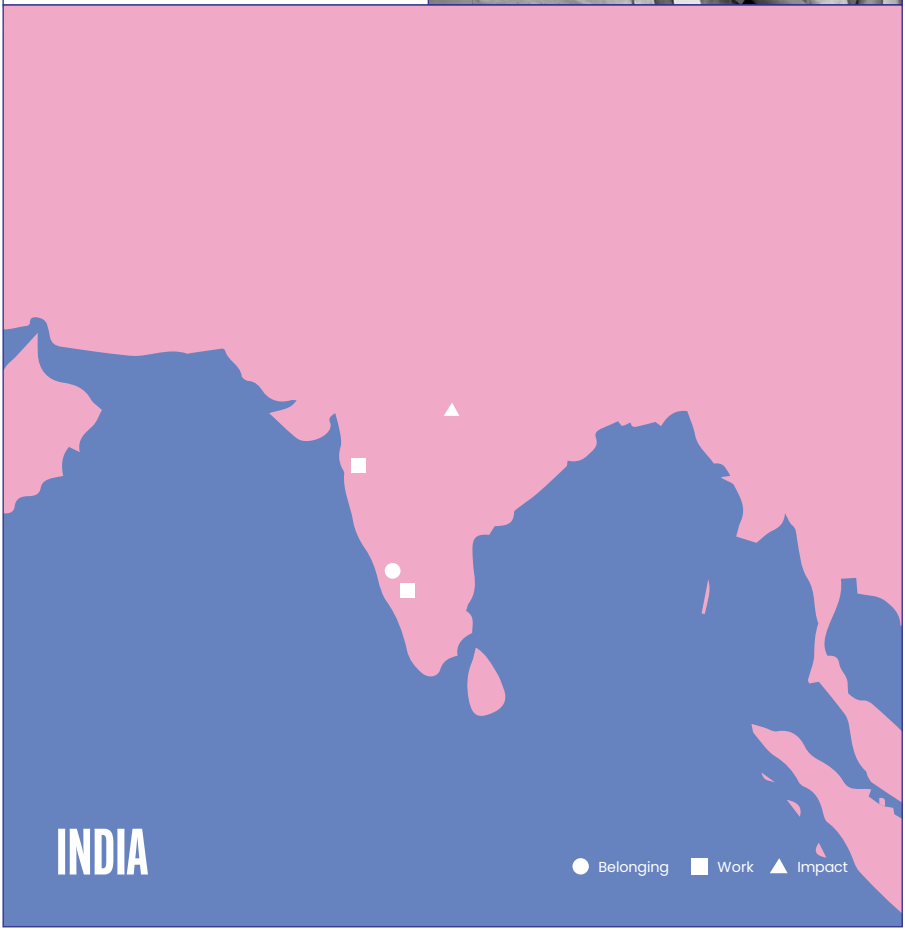
Fab4Care

Project | Fabrication | Wearables

RESILIENT MAKER 9

# RICHA & VAIBHAV

Co-founders of Maker's Asylum - Engineers - combining technical expertise with a passion for empowering makers, artists, and entrepreneurs.



**During the COVID-19 pandemic, community-based learning transformed our one way conversation into a multiway conversation, showcasing the beauty of an open-source networks in bolstering collective intelligence.**

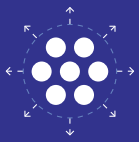
During the COVID-19 pandemic, Vaibhav and Richa played a crucial role in responding to the crisis through their M19 Initiative at Maker's Asylum - which is a community-based innovation lab found by the duo, also known as Fab Lab Goa. Their mission is to provide access to tools, technology, and a collaborative workspace for makers, artists, and entrepreneurs to empower the local community with hands-on learning and innovation.

The M-19 initiative aimed to develop low-cost, locally sourced and produced, open-source ventilators by bringing together a team of engineers, designers, and medical professionals. They also shifted their focus to designing and producing PPE for healthcare workers, including face shields, masks, and isolation gowns, and distributed them to hospitals and clinics in need. The success of the M19 initiative underscores the power of the maker community in developing solutions to pressing global challenges.

Beyond their immediate response to the pandemic, Maker's Asylum continues to work towards building a more resilient and sustainable future. They offer a range of programs and workshops, from electronics and robotics to design thinking and entrepreneurship, to inspire and educate the next generation of makers and innovators. Vaibhav and Richa's commitment to finding innovative solutions to pressing problems, highlights the critical role that makers and innovators play in building a better world. Their work demonstrates the power of community-driven initiatives and the importance of collaboration in developing accessible solutions.

# HIGHLIGHTS

There is a continuous and evolving need for long-term and collaborative capacity building between makers, stakeholders, and policymakers to foster resilience.



Collaboration between stakeholders accelerates innovation, education, and preparedness for creating more effective and sustainable solutions.

Shared access to the community's expertise was critical in driving maker's initiatives during the pandemic.

The Sustainable Development Goals are not just a list of aspirations – they are a blueprint for action. We must all work together to achieve these goals and create a more sustainable, just, and equitable world.

# SHARED RESOURCES

A digital ecosystem as an institutional field: curated peer production as a response to institutional voids revealed by COVID-19

Publication | Open-source healthcare

SDG School

Immersion Program | STEAM

Do Better With Less: Frugal Innovation for Sustainable Growth

Book | Making

The Millennials

Book | Generational narratives

## 3.2 Reflection

The stories of makers and designers showed that the Reservist manufacturing system should prioritize people and context when designing crisis interventions. This approach is human-centered and considers all stages, from prevention to mitigation and recovery. The Maker community has become an important player in the design and development of solutions to social problems, particularly in the areas of humanitarian and community-focused projects.

### 1 IT IS ESSENTIAL TO DESIGN FOR THE PROBLEM, NOT THE SOLUTION.

This means that designers should adopt a user-centered approach to understanding the needs of the community and the challenges they face before developing solutions that address those challenges. By putting the needs of the community first, designers can develop solutions that are more effective and sustainable in the long term.

### 2 DESIGNERS SHOULD EMPOWER COMMUNITIES BY MAKING THEM AN ACTIVE COMPONENT IN THE SOLUTION-DEVELOPMENT PROCESS.

By engaging with communities and seeking their feedback and ideas, designers can ensure that solutions are not only effective but also relevant. The aim should be to collaborate and seek input as the intervention evolves. This can lead to a sense of ownership and responsibility, as well as greater acceptance of the solution.

### 3 THE USE OF OPEN HARDWARE DESIGNS ENABLES CREATIVES AND MAKERS TO DEVELOP MORE IMPACTFUL SOLUTIONS.

The growing emphasis on local manufacturing and the use of open hardware design can help create and produce solutions that are tailored to a community's specific needs. This can lead to greater resilience in times of crisis and can help to build local

capacity and skills. The use of open hardware designs allows for the sharing of knowledge and best practices and many current activities of the networks such as the work of Internet of Production[4] and Fab City OS[5] look for consolidating this practice and make it a new normal. At the same time, there's a need to streamline access to the certification process so makers' open source solutions can be implemented.

## 4 DESIGNING WITH DIGNITY IS CRUCIAL, PARTICULARLY WHEN IT COMES TO VULNERABLE COMMUNITIES.

Designing with dignity allows for the creation of solutions that respect the rights, needs, and values of those who will be affected. It helps to avoid harmful or stigmatizing interventions that can further marginalize already vulnerable groups. By involving and empowering these communities in the design process, it also promotes their agency and ownership over the solutions that are implemented.

## 5 COLLABORATION AND KNOWLEDGE-SHARING ARE ESSENTIAL FOR CREATING MORE EFFECTIVE AND SUSTAINABLE SYSTEMS.

By networking and building communities of practice, designers and makers can share knowledge and best practices, enabling them to develop more impactful solutions. This approach can lead to a more community-centered approach to design that prioritizes empathy, sustainability, and social impact. By adopting these principles, the Maker community can make a significant contribution to addressing social problems and promoting positive social change.

## 6 LEARNING IS VITAL TO FOSTER PREPAREDNESS, RESPONSIBILITY, AND THE CAPACITY TO RESPOND EFFECTIVELY TO FUTURE EMERGENCIES.

There was major emphasis on identifying best practices and

lessons learned from the response to the event, including what worked well and what could be improved in the future. By applying these lessons, we can create and implement policies, plans, and strategies that will enhance our ability to be prepared for and respond to future emergencies.

**Learnings on the technology & manufacturing aspect**

The simpler and more thoroughly documented a process is, the easier it is for others to replicate and adapt it.

While it is not necessary to make significant changes to all manufacturing processes in order to produce new products, it is useful to examine existing processes for opportunities to diversify.

By making small changes and prototyping and testing new products, it is possible to expand the range of goods that can be produced.

Digital fabrication techniques such as 3D printing, laser cutting, and CNC machining can greatly increase the flexibility and customization of manufacturing and allow for the rapid and easy replication of products. However, it is important to consider factors such as production speed, material quality, and machine capabilities when using these methods.

It's important to consider if the products being produced are adequate, meeting basic needs of the population and if they are appropriate for the context in which they will be used.

**Learnings on people and communities**

Sometimes the "best" solutions don't actually work with a community - Critical thinking and co-design process with a community is crucial in finding solutions that really work.

Engaging in conversations and actively listening to the community can foster empowerment and allow for the development of effective narratives.

Distributing power and responsibilities can build trust, which is essential in implementing appropriate solutions and technologies.

Distributing power and responsibilities can build trust, which is essential in implementing appropriate solutions and technologies.

Diversification among suppliers, makers, knowledge-keepers, and service providers can help avoid disruption and enhance solutions.

Maintaining strong, trusting relationships with makers through sustainable collaboration and research can facilitate long-term sustainability.

**Learnings on land and resources**

The kitchen can serve as a crucial maker's space during a crisis.

Local manufacturing in most-times is more cost-effective and efficient.

In crisis situations, it is advisable to mobilize local labor and manufacturers, as they are likely familiar with the local supply chain.

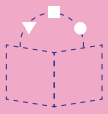
Crises cause distress but can also provide opportunities for local economic development.

Simplification and collaboration in design-process with the local community can lead to more successful production efforts.

Designing with the goal of solving the problem, rather than simply finding a solution, can lead to more effective outcomes.

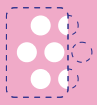
## 3.3 Questions to ask

### Past



What are the **lessons learned from past crises and interventions**, and how can we apply them to improve future efforts?

What are the **root causes of past crises**, and how can we address them to prevent similar situations in the future?



What are the **historical and cultural factors that have influenced** the communities and regions where we work, and how can we take them into account in our interventions?

## Present

What are the **immediate needs of communities affected by a crisis**, and **how can we best address them** in a timely and effective manner?

What are the **existing resources and capacities of the communities** and regions where we work, and how can we leverage them in our interventions?

What are the **ethical considerations and potential unintended consequences** of our actions in the present, and how can we mitigate them?

## Future

What are the **potential future scenarios that could affect the communities** and regions where we work, and how can we plan for them?

What are the **long-term needs of communities** affected by a crisis, and how can we work towards **regenerative solutions** that address them?

How can we **design systems and interventions that build resilience and capacity in communities for the future**, rather than just providing short-term relief?

By asking the right questions, we can learn from past experiences, address immediate needs, and plan for long-term resilience. Embracing a questioning mindset allows us to uncover underlying patterns, identify potential risks and future opportunities. As we move forward, questioning will remain a key tool for shaping a prepared and resilient future.

4

# ENVISIONING FUTURE SCENARIOS

Preparedness is fundamental for people to respond to crises. Onboarding people to anticipate, think on possible scenarios and reflect on how to collectively respond to them is a core part of the process. Then, adopting future thinking skills is key.

Traditional thinking relies on linear projections based on past trends and existing data, which may not capture the complexity and uncertainty of future events. Consequently, there has been a shift towards non-linear thinking, using tools that allow for a more comprehensive understanding of potential scenarios and effective strategy development.

Non-linear thinking recognizes the complexity and unpredictability of future events, focusing on understanding the factors, drivers, and interactions that shape potential scenarios.

## HOW CAN DECISION-MAKERS, ORGANIZATIONS, AND INDIVIDUALS BETTER ANTICIPATE AND ADAPT TO FUTURE COMPLEXITIES?

First, **backcasting** is a strategic planning activity that starts with defining a desirable future and then works backward to identify the necessary steps and actions required to achieve that future. This approach is particularly useful for dealing with long-term and complex issues, as it focuses on the desired outcomes rather than relying solely on past trends. By starting with the end goal in mind, backcasting allows for the identification of innovative and transformative strategies that can help achieve the desired future scenario[1].

**Backcasting activities entail these steps:**

1. Define the desirable future: Clearly articulate the desired long-term outcomes or vision for the future scenario.
2. Assess the current situation: Analyze the current context and identify the gaps and challenges that need to be addressed to reach the desired future.
3. Identify milestones: Determine the intermediate goals or milestones that must be achieved along the path to the desired future.

4. Develop strategies and actions: Identify the necessary strategies, actions, and interventions required to reach each milestone and ultimately the desired future.

5. Implement and monitor progress: Put the strategies and actions into practice, and regularly monitor and evaluate progress towards the desired future.

Secondly, **forecasting** involves using various methods and techniques to predict future events and trends based on available data and information. Unlike traditional linear projections, forecasting acknowledges the inherent uncertainty in future events and often employs multiple scenarios or simulations to account for potential variations in future outcomes. This approach helps identify a range of plausible future scenarios, allowing decision-makers to better understand the potential risks, opportunities, and implications associated with each scenario[2].

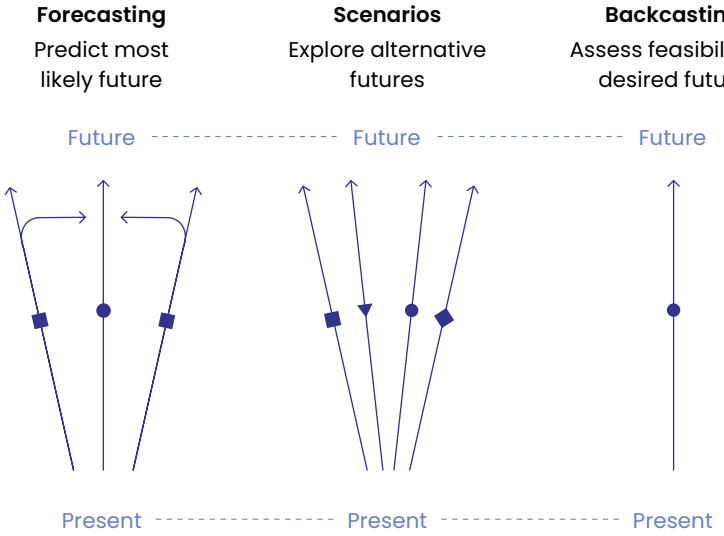
**Some forecasting techniques include:**

1. **Delphi method**: A structured communication technique that gathers expert opinions and judgments to predict future events or trends.

2. **Trend analyses**: Examines historical data and trends to project future developments or patterns.

3. **Simulation modeling**: Uses computational models and simulations to explore potential future outcomes based on various assumptions, inputs, and interactions.

Finally, scenario development and mapping is a technique used to create visual representations of potential future scenarios based on a range of assumptions and inputs. This approach allows decision-makers to explore the implications and strategies for each scenario, and to identify potential opportunities and challenges associated with each future scenario.




Visual 4.0.1: Non-linear ways of thinking

Given the significance of this transition, it is crucial to prioritize the development of strategies and tools that support new ways of thinking like a few mentioned in the visual above. By improving existing tools and creating new ones, we can better anticipate and adapt to future complexities. This will enable decision-makers, organizations, and individuals to navigate uncertainties and respond proactively to potential challenges. Moreover, investing in robust strategies and tools will contribute to building more resilient and sustainable futures. Ultimately, the development of multi-faceted tools is essential to support design research methods to effectively tackle complex and interconnected challenges.

# 4.1 The Reservist Atlas of Weak Signals - Design Tool

The Reservist Atlas Of Weak Signals tool is designed to help people experience emergency situations, identify the need for interventions, and envision how a reservist network could provide relevant products and services. By playing this design game, participants gain a better understanding of emergency management and can identify and analyze future opportunities for the network.

**What are weak signals?**
A weak signal is an indicator to identify a change in the future with little or no impact on the present, but with the potential to lead to the identification of major impact events. They set trends and indicate certain directions and by that draw up future scenarios. A weak signal can be defined as a trend before the trend itself becomes a relevant source of future research.

**Finding weak signals ahead of time**
As these signals are 'weak' by nature, the task of detecting them involves in many cases both addressing surrounding issues and exploring the boundaries between conventional society and the future of technologies. Weak signals are always more visible in retrospect, which is why it is important to detect them when they are still "weak" and before they have become a rule. When they are recognized in time they can be used as a design tool to initiate discussion and speculative thinking about the future.

**The Atlas of Weak Signals**[3, 4]
The Atlas of the Weak Signals is a toolkit designed by Mariana Quintero, transforming the research of weak signals led by Jose Luis Vincente into a practical space to navigate and understand possible emerging scenarios based on underlying trends in our current world. It is an exercise that facilitates seeking opportunities, threats, challenges and shared visions for innovation, policymaking, intervention, research and business opportunities in the future.

Acting on this approach we developed the Reservist Atlas of Weak Signals tool which can help to identify and prioritize key issues and needs, to generate and evaluate potential solutions, and plan and implement effective responses.

It helped in facilitating communication and collaboration among various stakeholders, including community members, emergency responders, and policy makers, to ensure that everyone is aware of the potential risks and has a clear understanding of their roles and responsibilities in addressing them. In this way, the tool helps to build resilience and encourage a proactive approach to crisis management, rather than simply reacting to emergencies as they occur. The cards in this tool are divided in five categories:

**Types of Emergencies:**
Based on the categories presented in chapter two, these can be classified into five major categories: natural disasters, industrial/ human-made disasters, epidemics and pandemics, war and terrorism, and blackouts and outages.

**Products and services:**
In response to these emergencies, the Reservist network has identified a collection of products and services that need to be supplied.

**Stakeholders:**
Additionally, stakeholders from various sectors, including public, private, civil, industrial, human, and environmental, play a crucial role in the Reservist ecosystem.

**Alerts:**
To anticipate alerts and risks, alert cards have been designed to help the Reservist community adapt and learn from crises.

**Areas of Opportunity:**
These cards serve as opportunities for prototyping and adaptation within the relevant Reservist cells.

You can download and read about the cards here:

Atlas of Weak Signals

EMERGENCY CRISIS CARD

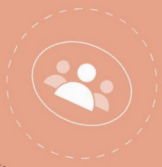
Reservist

Atlas of Weak Signals

PRODUCTS & SERVICES CARD

Reservist

Atlas of Weak Signals



STAKEHOLDERS CARD

Reservist

Atlas of Weak Signals

ALERT CARD

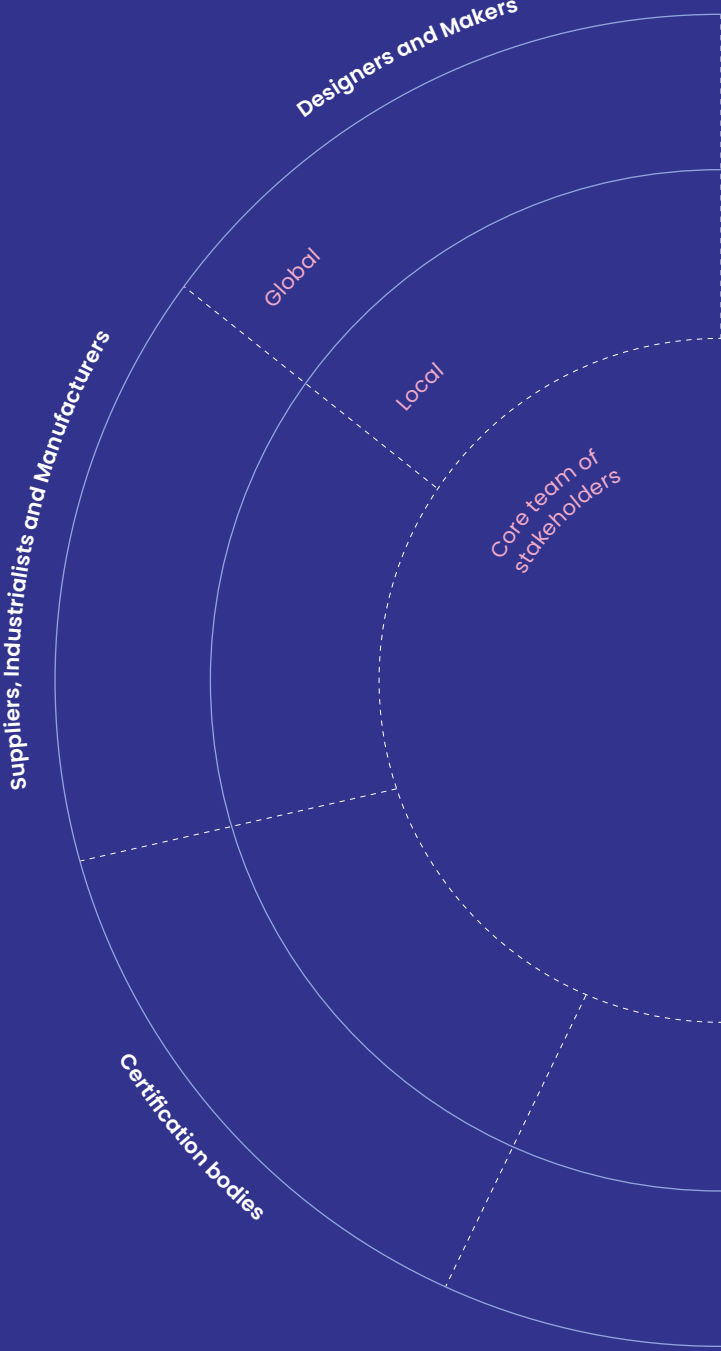
Reservist

Atlas of Weak Signals

AREAS OF OPPORTUNITY CARD

Reservist

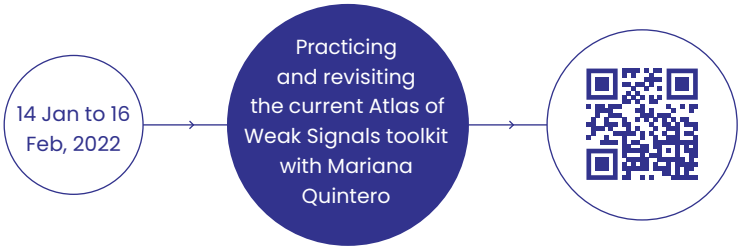
Create a Reservist cell

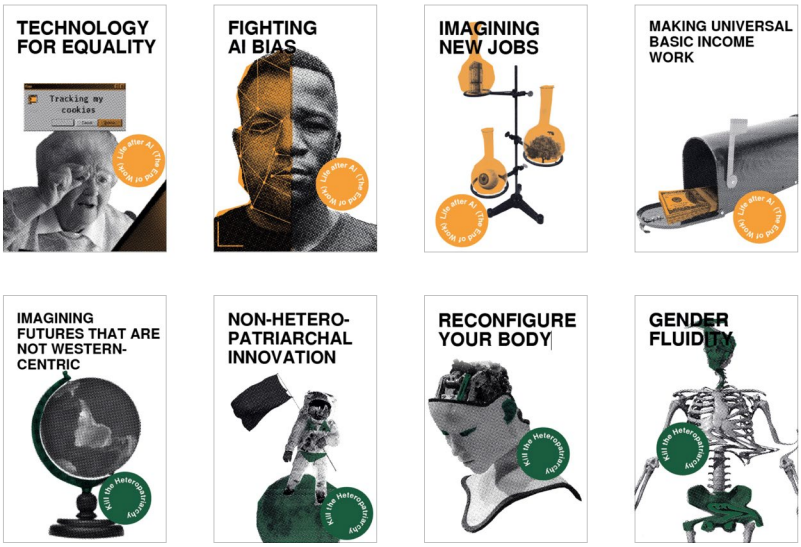


You can access and use the tool here:

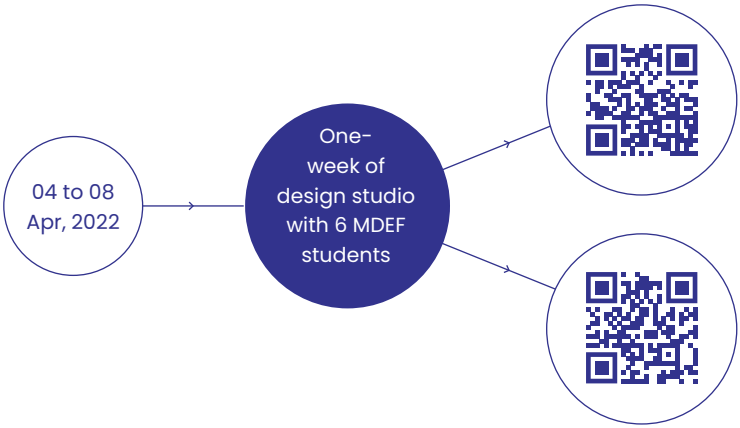
# 4.2 In practice

In this section, we will explore examples of how the 'Reservist Atlas of Weak Signals' was tested and customized. These examples will demonstrate the possible applications and trajectories in hypothesized emergency situations, providing an insight into their effectiveness and potential impact. By examining these activities and workshops, we can better understand how the network and its partners have explored the tools, and deconstructed complex and interconnected challenges, offering potential solutions and insights for future emergencies.

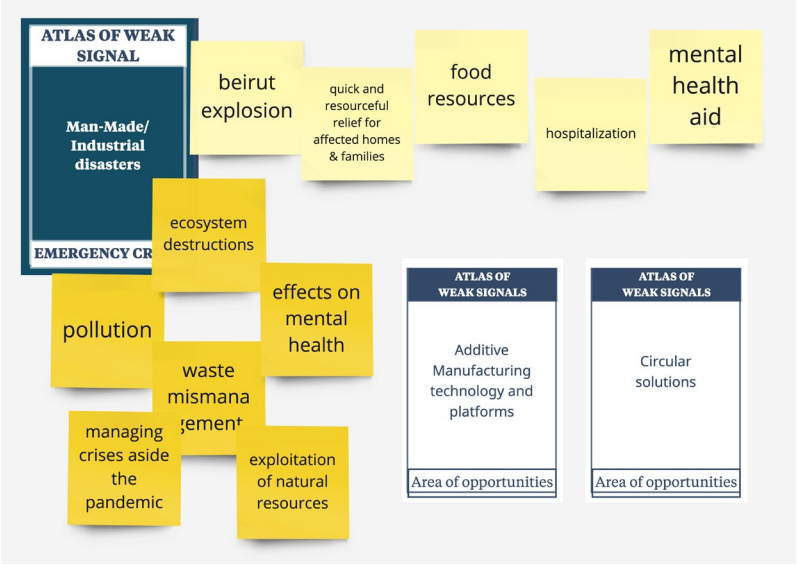


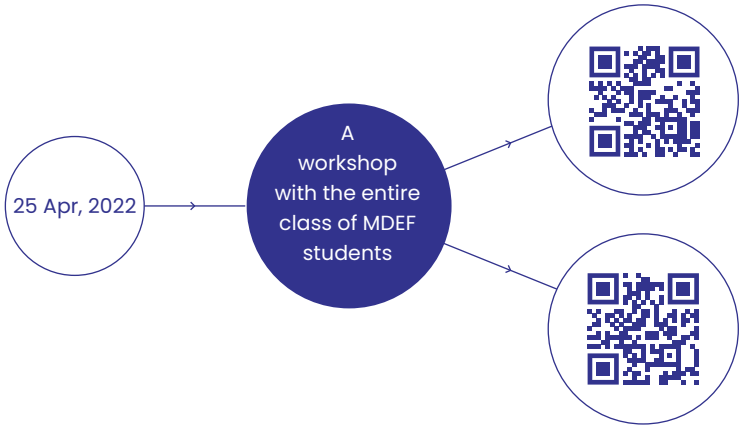

Visual 4.2.1: Cards from Atlas of Weak Signals toolkit



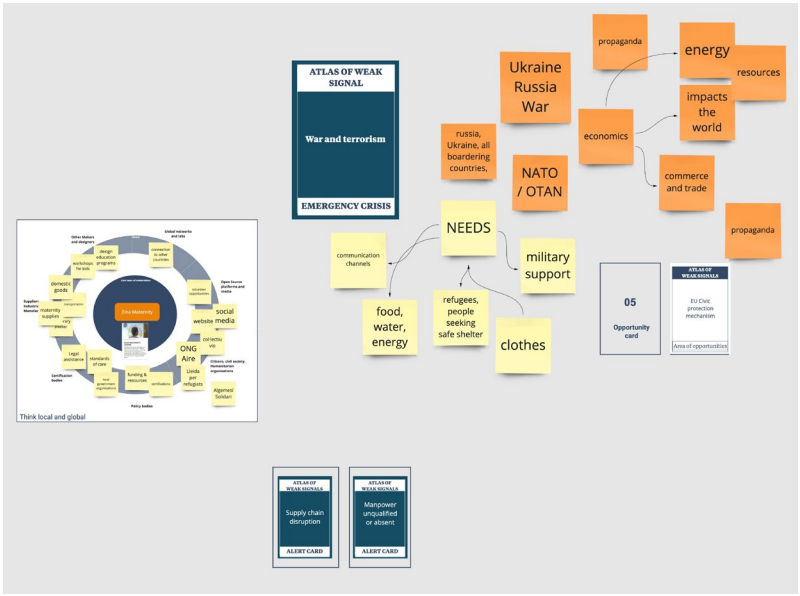

Students in the project joined by sharing live testimonies from partners and collaboratively building a skills deck to define their collective cell. They then individually explored different crisis scenarios, tested the tool, and created storyboards for future applications, culminating in presentations and reflections for further enhancements.




Visual 4.2.2: A section from the tool exploration activity I

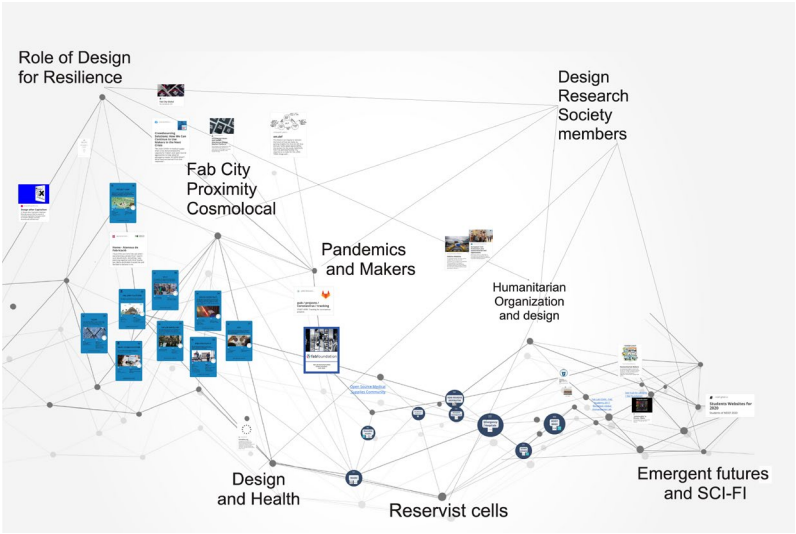



During a two hour session, students formed groups to test the tools and explore scenarios across four categories. They engaged in interactive gameplay, fostering synergy and providing valuable feedback throughout the process.




Visual 4.2.3: A section from the tool exploration activity II


As part of the Design Research Society conference in Bilbao, Reservist partners conducted a workshop to introduce design practitioners and researchers to the Reservist approach. The workshop included inspirational talks, a discovery exercise using the Atlas of Weak Signal, breakout sessions applying the approach to crisis scenarios, and a concluding wrap-up and feedback session.




Visual 4.2.4: A section from the tool exploration and systems mapping activity

## Testing RAWS with partners in Gijon

In February 2023, partners of Reservist convened in Gijon, Asturias hosted by the Idonial technological center, for a physical demonstration of the Reservist Atlas of Weak Signals. Marion Real and Vikrant Mishra from the IAAC team facilitated the session. Following a brief introduction to the tools, participants were divided into three groups to explore the cards in a four-step process.

1. Discover and explore a type of emergency.
2. Share experiences and knowledge in managing the chosen emergency.
3. Identify the needs of affected populations and stakeholders.
4. Discuss relevant Reservist products and services, and collectively select one product or service, either existing or new.

Next, the participants onboarded into the Reservist cells and identified the main stakeholders who would be involved in supplying the chosen product or service, as well as others who should be brought in. Each participant picked a card and reflected on the roles played by that type of stakeholder.

The session concluded with 10 minutes allocated for identifying alerts and opportunities. Participants picked a card each and reflected on how they could change the Reservist cell in the emergency situation based on the alert and how the opportunity could help.

The session ended with a short pitch of the explored scenario, where each partner shared their first impressions on the tool.

#### Group 1: Industrial disasters

The group chose to focus on industrial disasters, specifically on a toxic explosion at a chemical company. They discussed the importance of cooperation between local policy bodies, affected companies, and stakeholders such as certifiers and designers. The group emphasized the need for a coordinated information campaign and delivery of necessary products.


Photos by Vikrant Mishra, Fab Lab Barcelona (2022)

**Group 2: Black-out and power outage**

The group discussed the impact of blackouts and power outages, particularly in the healthcare system where electricity is critical for life-sustaining equipment. They highlighted the varying reactions depending on the duration of the outage.

**Group 3: Natural Disasters - Deepdive into the Turkey and Syria Earthquakes**

The group delved into the specific case of the Turkey and Syria earthquakes and benefited from the expertise of Hospitainer. They developed a meta-process for interventions within the Reservist network and emphasized the importance of shortening the link between end-users and manufacturers by relaxing certain procedures.

Overall, the activity demonstrated the effectiveness of using the Reservist cards to facilitate discussions and co-creation activities related to crisis management. It was noted that participation from all members and their expertise level strongly impacted the depth of conversation.

This activity illustrated how well the game is working to join in a Reservist way of thinking and discuss future reactions to crisis. We let participants play with the cards, while building new logics to inter-relate them with each other. We also learnt the importance of collective contribution and having a say for all members. The depth of each conversation is strongly relative to the expertise present inside a group and the willingness of participation in such co-creation activities.


Photos by Vikrant Mishra, Fab Lab Barcelona (2022)

## Customizing in context: One workshop by the Pole EMC2

The industrial ecosystem underwent significant changes in response to the COVID-19 pandemic, which caused disruptions to supply chains and forced businesses to adapt quickly to changing market conditions. To prepare for potential future emergencies, EMC2 utilized the Reservist Atlas of Weak Signals to develop three plausible scenarios, which were further elaborated on during another session on January 26th. The session drew in 82 participants, who collaborated to imagine how industries could reorganize and adapt in the face of crises, similar to what was seen during the COVID-19 pandemic. The goal was to anticipate potential emergencies and develop strategies to prepare for and respond to them effectively. The workshop at the Pole EMC2 highlighted the importance of customizing these activities to the specific context and needs of participants.

1. **Global warming and drought**
"France is currently facing a period of intense drought, which is affecting the entire territory. While the weather forecast for the next weeks is not at all encouraging, the French Government has taken the decision to subject the whole territory to a drastic restriction of its water consumption. The Government has even gone further by forcing French industries to divide by half their water consumption."

2. **Volcanic eruption**
"It is now a week since Stromboli erupted, causing considerable collateral damage to the entire Italian territory and bordering countries, bringing Europe's activities to a halt. The ash from the eruption was propelled into the upper atmosphere, at an altitude of more than 6000 meters and gave rise to a volcanic ash cloud, paralyzing the whole of Europe. By now, the ash cloud caused by the eruption of Stromboli has invaded a large part of the European territory, putting a stop to all infrastructures."

3. **Underwater cable-cut**
"The cut of one or several submarine internet cable(s) has caused a total blackout of the internet in Europe. Unintentional incident or sabotage, the search teams, accompanied by police forces, are currently scouring the French and Irish coasts in search of the causes of this unprecedented gigantic and catastrophic for the economy."

The purpose of this game was to engage the manufacturing industries in emergency crisis planning. All participants were divided in several teams, each working on one of the three scenarios. The main objectives were to:



Photos provided by EMC2 (2022)

- Identify potential impacts on both individual and collective levels, including consequences and mitigation measures
- Encourage collective reorganization and consider how a network could provide new products or services
- Seek opportunities for innovations
- Implement an effective collective response.

The immersion game lasted 3 hours and was divided into two main sessions:

**Session A: Scenarios and consequences for the stakeholders**

This ideation session was facilitated by several brainstorming sessions, using several materials such as post-it or interactive board. All team answered the following questions:

? What consequences could this crisis have on industries?

? What solutions could be explored to meet these challenges and what opportunities do you identify for your company or for the manufacturing sector?

**Session B: Stakeholders mobilization to meet the challenges**

In a second time, each team represented a fictitious company, and was required to brainstorm ideas on how to meet the new needs arising from the crisis. For instance, the teams working on the scenario "volcanic eruption" had to come up with ways to continue communication during the crisis.

The main objective was to develop a new product that could provide a solution to the challenges posed by the crisis.

**Main outcomes from Session A:**

All participants explored the different consequences, solutions and opportunities that the industrial ecosystem could face in a crisis situation. The different ideas that emerged during the session are summarized in the following sections.


Photos provided by EMC2 (2022)

**Scenario 1: Global warming and Drought**

Consequences

**Disruption of production:** Manufacturing plants depend on water as a crucial component in their production process.

**Problems with cooling:** Water is often used as a cooling agent in manufacturing processes, particularly in industries that involve heavy machinery or equipment.

**Lower productivity:** High temperatures associated with global warming can affect the productivity of manufacturing workers, reducing efficiency.

**Health and safety risks:** water shortages can also pose health and safety risks to employees, especially in industries where workers are exposed to high temperatures or hazardous materials.

**Supply chain disruptions:** shortages can lead to interruptions or delays in production.

Other indirect consequences:
**Energetic crisis, Decrease in production of raw materials, Economic crisis etc.**

Solutions

**Prioritization of activities** according to water needs or relocation of certain activities according to water resources on French territory

**Water recycling:** Implementing a closed-loop system in which water is used, treated, and recycled within the facility can significantly reduce water usage. The treated water can be used for non-potable purposes, such as cooling or cleaning

**Collecting rainwater** from rooftops and other surfaces can help supplement the industry's water supply. The collected water can be stored and treated for later use.

**Sustainable Water Management:** Developing a comprehensive water management plan that includes water monitoring, leak detection, and water-saving targets can help identify opportunities for improvement and reduce water usage.

**Other sources of water** by dealloying water or treating wastewater

# The Reservist

**MARDI** 21 SEPTEMBRE 2027 | Numéro 13.291 | ÉDITION NANTES | **Prix: 3,50 €**

**A quelques minutes de Nantes, le long de la Divatte, la Loire a laissé place à des sols arides.** / PHOTO MÉLANIE LE NICOL (Déléguée Départementale de la Météorologie)

# Déficit pluviométrique, températures en hausse, la sécheresse perdure en France

*La totalité des départements français sont passés en état de crise*

Virginie, Le Houllier, Bouguenais

**La France connaît actuellement une période de sécheresse intense sans précédent, qui touche l'ensemble du territoire. Décryptage des causes de cette situation, des actions menées pour y faire face et des mesures pour économiser l'eau.**

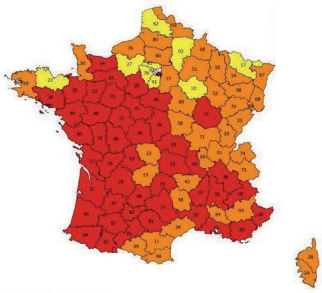
Voilà maintenant près de 4 mois que le sol français n'a pas reçu une seule goutte de pluie et que les épisodes de fortes chaleur se font de plus en plus présents. Alors que les prévisions météorologiques des prochaines semaines ne sont pas du tout encourageantes, l'Etat a pris la décision de soumettre l'ensemble du territoire à une restriction drastique de sa consommation en eau.

Le mois de septembre 2027 s'annonce pour pour être le plus chaud jamais enregistré en France, les niveaux des cours d'eau et des nappes phréatiques sont au plus bas, des seuils records qui n'avaient jamais été atteints. Selon Propluvia, le site du ministère de la Transition écologique qui recense les arrêtés préfectoraux de restrictions d'eau, cette situation est sans précédent : tous les départements sans exception sont passés d'état d'alerte renforcée à état de crise.

Pour faire face à cette période inédite d'insuffisance de la ressource en eau, les préfets ont en effet pris des mesures exceptionnelles de limitation et de suspension des usages de l'eau non prioritaires pour les particuliers et les professionnels. L'agriculture n'est donc plus le seul secteur concerné par l'interdiction de prélèvement en eau. Depuis le 18 septembre, l'ensemble des secteurs est soumis aux mêmes restrictions. L'état est même allé plus loin en contraignant les industriels français à diviser par 2 leur consommation d'eau, sous peine de quoi ils se verront attribuer de sévères sanctions pénales et financières.

Une situation sans précédent sur le sol français qui voit de nombreuses entreprises rivaliser d'innovations pour trouver des moyens de réutiliser au maximum le peu de ressource en eau à leur disposition.

*L'intégralité du sol français métropolitain connaît des niveaux d'alerte records en termes de pénurie.*



**Carte représentant le niveau de gravité maximal limitant les usages de l'eau par département**

**Scenario 2: Volcanic Eruption**

Consequences

**Disruption of supply chains:** Volcanic eruptions and transportation paralysis can disrupt supply chains by preventing the timely delivery of raw materials, components, and finished goods.

**Health and safety risks:** The volcanic ash and gas emitted during an eruption can pose health and safety risks to workers, which may result in a shutdown of operations.

**Increased costs:** The disruption of supply chains can increase the costs of production due to the need to find alternative sources of raw materials and transport goods, which can be more expensive.

**Reduced production capacity:** The disruption of supply chains can result in a shortage of raw materials and components needed for production, leading to production delay.

Solutions

**Stockpiling inventory:** Another solution is to stockpile inventory of critical raw materials, components, and finished goods to ensure that production can continue in the event of a disruption.

**Collaborating with other companies:** Collaboration with other companies in the industry or related industries can help to share resources and expertise, and coordinate response efforts during times of disruption.

**Scenario 3: Underwater cable cut**

Consequences

**Disruption of production:**
**Internal communication issues:** If the internet is down, it can be challenging to communicate efficiently between the different departments, leading to delays, miscommunication, and errors.

**External communication breakdown:** same issues but with the suppliers and customers (for sending or recording).

**Decline in sales** due to inability to record orders.

# The Reservist

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**Le nuage de cendres volcaniques s'est étendu à l'ensemble de l'Italie et des pays frontaliers** ./ PHOTO SIPA PRESSE

# Le volcan italien Stromboli met l'Europe à l'arrêt

*Un immense nuage de cendres perturbe les infrastructures de transport*

Margaux Boisnicol, Bouguenais

**Voilà maintenant une semaine que Stromboli s'est réveillé, provoquant des dommages collatéraux considérables sur l'ensemble du territoire italien et des pays frontaliers, mettant ainsi un coup d'arrêt aux activités de l'Europe.**

Le volcan le plus actif d'Europe avait annoncé les prémices d'une catastrophe sans précédent le 9 août dernier avec un pic d'éruption entraînant d'importantes projections et coulées de lave. Près de deux mois plus tard, c'est une éruption d'une intensité 10 fois supérieure à la première qui a éclaté sur l'île italienne. Les cendres issues de l'éruption ont été propulsées dans la haute atmosphère, soit à une altitude de plus de 6000 mètres et ont donné naissance à un nuage de toire européen.

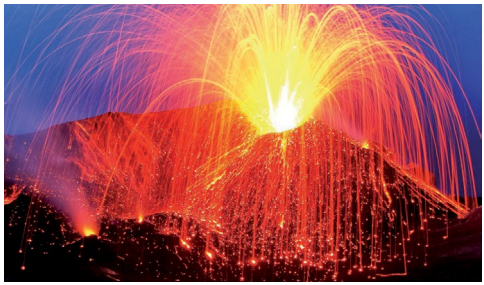
Une catastrophe qui avait presque été prédite. Il y a quelques mois, nous diffusions un article dans lequel des chercheurs britanniques alertaient sur le fait que nous avions une «chance» sur six qu'un évènement volcanique majeur survienne au cours des prochaines années. Ces derniers déploraient notamment que cette hypothèse ne soit pas suffisamment prise au sérieux par les grands dirigeants.

Alors que l'Europe se remettait tout doucement du désastre économique provoqué par l'épidémie du nouveau variant de COVID-N7, elle est de nouveau mise à mal par cette catastrophe naturelle.

A l'heure actuelle, le nuage de cendres provoqué par l'éruption du Stromboli a envahi l'Italie et tous les pays frontaliers, tures de transport. Ce sont notamment plus de 300 aéroports qui ont dû fermer leurs portes, des centaines de ports et de hubs de transports routiers, complètement paralysés par une visibilité réduite à néant.

*L'éruption pourrait encore se prolonger plusieurs semaines selon un expert italien.*

Dans ses dernières allocutions, le chef de l'Etat a vivement encouragé l'ensemble des industriels français à se mobiliser pour trouver des solutions pour pallier cette inertie des transports.



**Reduced productivity:** Many manufacturing processes rely on automated systems that require a constant internet connection.

**Impossibility of using all the software**, and thus the machines .

**Data storage issues.**

Solutions

**Return of paper** and face-to-face meetings.

**Reinforcement of human and local interactions.**

**Offline data storage:** In case of an internet breakdown, having offline data storage can help the manufacturing industry to continue its operations.

**Main outcomes from Session B:**

Responding to emergencies quickly and efficiently is a challenge and innovation can be one answer. Indeed, many companies are usually developing new solutions or products since many businesses simply cannot operate as they have in the past.

In our play game, each team represented a fictitious company and had to work on the design of a new imaginary product:

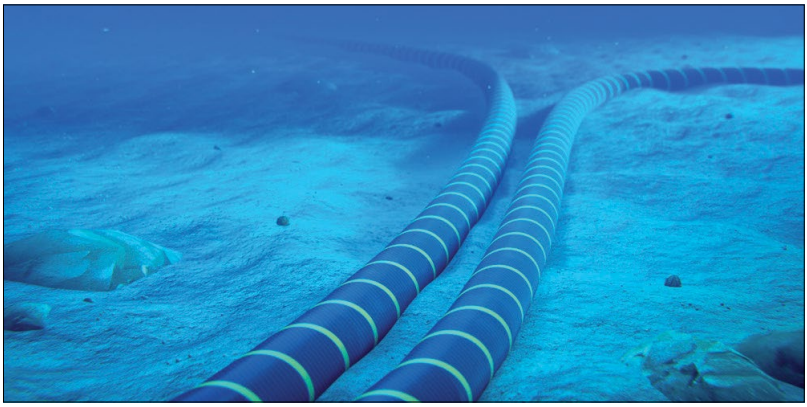
- A suit that recovers body fluids and transforms them into drinking water to face with water shortage (Inspired by the movie 'Dune', 2021).
- An object teleportation capsule to overcome transportation paralysis caused by the volcanic eruption.
- A factory breeding and producing augmented pigeons to substitute the existing communication channels.

Not having all the skills in-house, the objective was to collaborate with other companies. The objective was to get the participants to think about the following key points:

? How can a company adapt its processes and structure to address new challenges, such as the need to redefine production lines or to change its sales model?

# The Reservist

**MARDI 21 SEPTEMBRE** 2027 | Numéro 13.291 | ÉDITION NANTES | **Prix: 3,50 €**



**Le câble sous-marin "Peace", à Marseille, connecte l'Europe à l'Asie .**/ PHOTO ORANGE MARINE

## Coupure générale des communications : acte manqué ou sabotage ?

*Panne générale des communications et de l'Internet depuis maintenant 3 jours*

Margaux Boisnicol, Bouguenais

**Le scénario tant redouté par les forces armées occidentales a vu le jour avant-hier. La coupure d'un ou plusieurs câble(s) internet sous-marin(s) a provoqué un black-out total d'Internet en Europe. Incident involontaire ou sabotage, les équipes de recherche, accompagnées des forces de police, sillonnent actuellement les côtes françaises et irlandaises à la recherche des causes de cette coupure gigantesque inédite et catastrophique pour l'économie.**

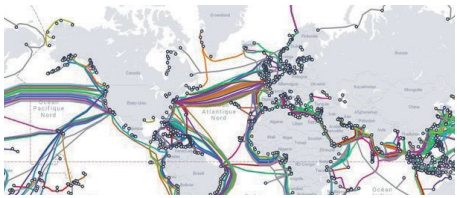
Nous pensons à tort que nos smartphones, ordinateurs et autres machines informatiques sont reliés les uns aux autres en passant par des connexions satellitaires, par des ondes hertziennes, ou encore par du Wi-Fi. Mais qu'elles

*La France est le point d'entrée de la plupart des câbles reliant l'Europe au reste du monde.*

monde, la quasi-totalité de nos communications électroniques, y compris nos échanges vocaux par mobiles, dépendent à 99% des câbles sous-marins. Ces autoroutes de fibre optique reposant au fond des mers et qui assurent les communications intercontinentales sont des infrastructures essentielles pour l'Internet européen et le bon fonctionnement de son économie.

Alors que l'Europe se concentre de plus en plus sur les menaces de cybersécurité, l'investissement dans la sécurité et la résilience des infrastructures physiques qui sous-tendent ses communications avec le monde entier ne semble pas aujourd'hui une priorité. On recense d'ailleurs chaque année plus d'une centaine de ruptures de câbles sous-marins, généralement causées par des bateaux de pêche traînant les ancres.

Il est difficile de mesurer les attaques intentionnelles, mais les mouvements de certains navires ont commencé à attirer l'attention. Depuis le début de l'invasion de la Pologne, l'hypothèse de s'attaquer aux câbles sous-marins est revenue sur le tapis à plusieurs reprises, notamment au sein de certains États-majors. Nos confrères britanniques du Guardian relayaient par exemple, en décembre 2026, les propos du chef des forces armées britanniques, Tony Radakin, qui évoquait la possibilité que Moscou puisse « mettre en danger le système de circulation de l'information qui dépend des nombreux câbles sous-marins ». Le think tank américain Atlantic Council pense la même chose.



A l'heure actuelle, nous n'avons aucune certitude sur les causes de cette coupure inédite majeure qui affecte la quasi-totalité du continent européen et les investigations suivent leur cours. En attendant, les entreprises rivalisent d'ingéniosité pour trouver

? How collaboration with other industries can be seen as a means of building greater strength and resilience in the face of changing market conditions?

The workshop at the Pole EMC2 highlighted the importance of customizing the design activities to the specific context and needs of participants with the sharing of more immersive artifacts during the sessions.

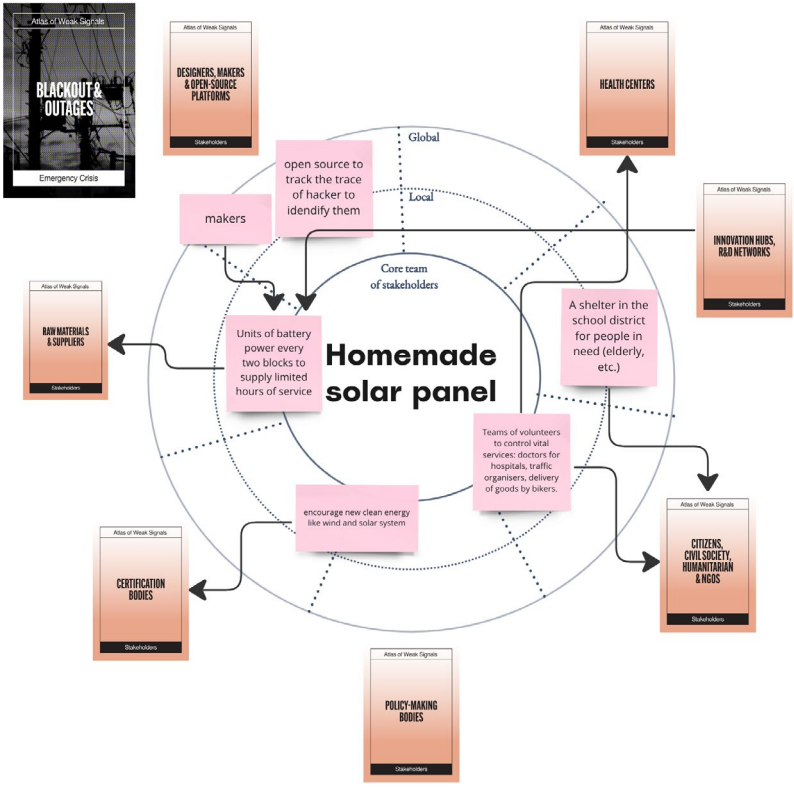
## Illustrating the use of RAWS as a pedagogical tool for future innovators

On May 12th, a discovery session was conducted amongst the participants of a distributed learning program under a 5-day module titled 'Bioregions matter', offered by Fab Lab Barcelona.

One day was dedicated to introducing the Reservist approach and encouraging participants to reflect on enhancing preparedness in their own bioregions. They had the opportunity to experience the digital version of the RAWS tool, through an online game activity, after a brief presentation by the facilitators. Two groups of 3 participants worked on the following two categories of emergency situations:

1. **Industrial-Man Made disasters**
   Following an exploration of different crisis scenarios, the group honed in on the issue of water contamination in the Chicago area. They identified green infrastructure as a potential solution and engaged with various stakeholders to discuss their roles within the project. Recognizing the complexities involved, they proposed the use of sensors to monitor pollutants and suggested utilizing locally manufactured solutions, such as weaved habitats made from resources sourced from local invasive plants.

2. **Black-out and outages**
   The second group focused on a scenario of a hacker-induced black-out in Los Angeles, resulting in widespread power outages and various disruptions. This widespread power outage affected all citizens, resulting in blocked traffic, limited hospital services, emergency transportation measures, and people being stranded at night venues. They identified the need for homemade solar panels as a solution and expanded their ideas through stakeholder engagement. Due to time constraints, they prioritized scenario immersion and ideation over testing alert and opportunity cards.




Visual 4.2.5: A section from the tool exploration activity

Participants emphasized the value of the activity's playfulness and encouraged the team to expand its use in enhancing population preparedness.

5

# EMERGING RESERVIST CULTURES

The world is facing an array of unprecedented challenges, including climate change, political instability, and global pandemics. One key question for the future is how best to prepare for overcoming the difficulties triggered by crises – and how to optimize our collective capacity to react when they arrive. The work initiated by the Reservist project showed that the development of Reservist networks in the area of design and manufacturing, can have a pragmatic role to play in disaster-response and humanitarian efforts. To maintain the effectiveness and adaptability of this, it is essential for these networks to recognize, address the future challenges they may face and collaborate. Six core challenges were identified by the authors, as a future strategic roadmap to develop and sustain reservist cultures.

# 5.1 A map of future challenges


## ACCESS TO FABRICATION TECHNIQUES AND PRODUCTION FACILITIES

Gaining expertise in engineering and efficient manufacturing techniques is crucial today, and reservist networks must keep pace with evolving technologies and production methods. They will benefit by caring about preserving technical heritage and learning craftsmanship alongside manual techniques. This knowledge could enhance their capabilities to use appropriate technologies during emergencies.

## CONSOLIDATION OF COLLABORATIVE PLATFORMS

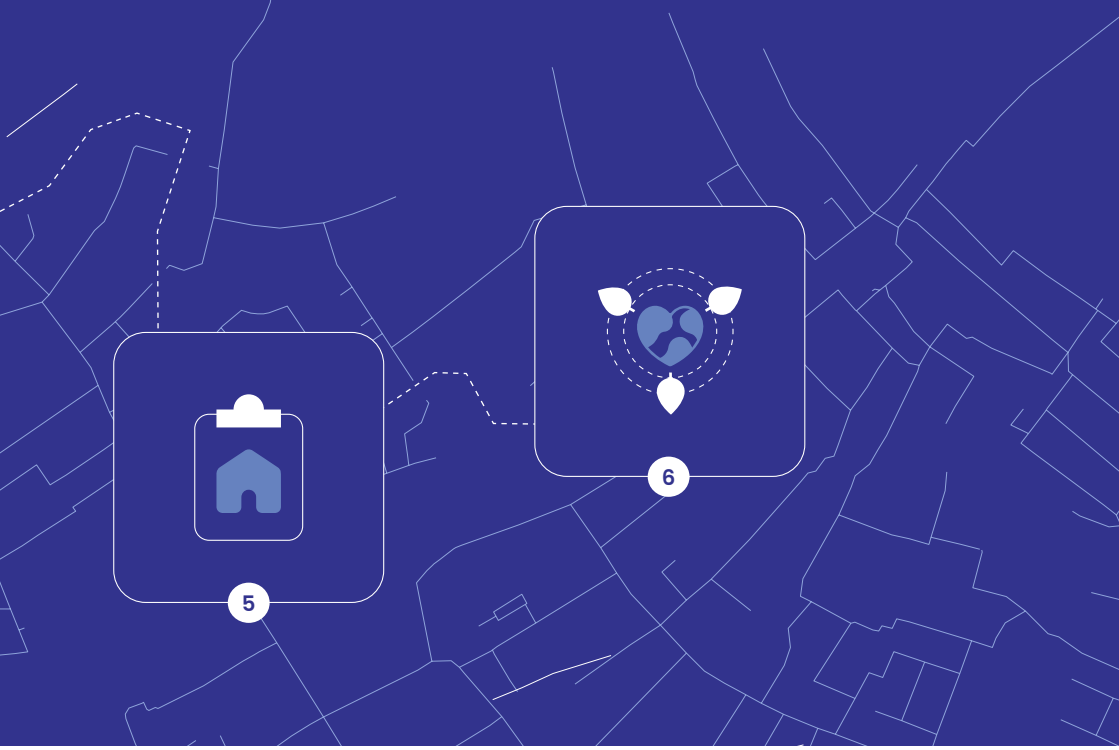
Effective collaboration requires coordinated operational platforms and engagement procedures. As crises become more complex, networks must be able to work seamlessly with various entities, including governmental organizations, NGOs, emergent groups of volunteers[1] and private sector partners. Streamlining communication and developing efficient collaboration systems will be essential for success[2]. Reservist networks should focus on creating interoperable platforms that can facilitate real-time information sharing and decision-making.


## DEVELOPMENT OF CLEAR COOPERATION POLICIES ACROSS SCALES

Transparent and open communication regarding such cooperation activities can drive innovation and enhance disaster response capabilities. Addressing these challenges requires a call for preparedness through a dialogue between companies and public institutions. Reservist networks could support policy makers in consolidating a 'pay-for-preparedness' strategy to provide financial models and funding at the local, national, and European levels.

## DESIGNING SPACES FOR COLLECTIVE ENVISIONING OF FUTURES

Embracing a futurist, systemic, and problem-solving thinking approach is vital for reservist networks to anticipate and navigate future challenges. By adopting a futurist's framework for strategic planning, these networks can better understand and prepare for uncertainties and create long-term plans that remain flexible in the face of change. This mindset encourages thinking beyond immediate concerns and considering the broader implications of potential future developments[3]. Interesting




research also opens new spaces for rethinking humanitarian actions and meaning for interventions[4].

## SITUATING ACTIONS IN THE LOCAL CONTEXT

Developing local supply chains poses a significant challenge that requires careful planning and implementation[5, 6]. These actors are vital in streamlining logistics, reducing operational costs, and accelerating manufacturing. Fostering small territorial nodes within the Reservist network could boost local integration, enhance sense of community, and create opportunities for customized, innovative solutions.

## CONSIDERING ENVIRONMENTAL IMPACTS WHEN RESPONDING TO CRISES

Sustainability and eco-innovation are increasingly important in the humanitarian and disaster management sectors[7, 8, 9]. Reservist networks must prioritize environment-friendly solutions that minimize negative impacts on the environment while still providing effective disaster relief. Integrating such practices into their operations can help these networks achieve their goals while also promoting a more sustainable future.

## 5.2 Imbibing an Emergent Reservist Culture

# HOW CAN ONE BETTER UNDERSTAND AND UTILIZE THE RESERVIST APPROACH TO ADDRESS EMERGING CULTURAL CHALLENGES AND CAPTURE IT'S FUNDAMENTALS?

**Our Manifesto**

*We, as Reservists, recognize the importance of taking responsibility for our individual actions while engaging in acts of solidarity within our groups and communities - from NGOs to workspaces, to local communities and within our own spaces. We understand that preparedness and will to serve in times of need, is crucial for the survival of our communities. We pledge to think and act collectively, recognizing that we are part of a larger alliance and that our actions contribute to the collective effort. We are committed to promoting care, cooperation, agility, adaptability, diversity, quality, efficiency, and openness in all our endeavors, especially when supplying critical products and services to affected populations. We welcome a diversity of roles, perspectives, and engagements from companies, clusters, designers, makers, and all those who share our values. We strive to be adaptable, open-minded, and always ready to challenge our current activities, working towards rising diversity in the way we do things. As Reservists, we pledge to use our knowledge and skills to serve our communities and help create a more resilient and sustainable future for all.*

We deem importance to these multitude of values:

- Care and cooperation within people
- Agility and Adaptability in process
- Quality and efficiency of products and services
- Openness and Diversity within a network or system

**Acting inside organizations**

All organizations such as companies, associations, fablabs, public institutions are guided by a "raison d'être", a purpose, a clearly defined value proposition, gathering an ecosystem of stakeholders with specific expertises and roles, diffusing a certain culture of innovation and defining governance systems in order to deliver specific offers from products to services.

While we were observing the experiences inside the Reservist ecosystem, we have identified core assets that would endeavor the appropriation of reservist cultures inside organizations and make them more prepared for the next crises that are coming. Organizations can prepare themselves to be more resilient if they find pathways to:

## BE SUSTAINABLE IN THE LONG RUN

Guaranteeing that value proposals are aligned with sustainability/ societal goals.

When fixing sustainable goals and having a better understanding of their societal impacts, through hours of training and strategic design thinking sessions, organizations become more aware, have a more eco-centric view on what needs to be reached. They can feel more responsible and engaged to contribute to a collective effort.

## PRACTICE DAILY GROUNDING

Constantly observing real needs from your communities and territory

It is day by day, in the operations that people make social connections, bond one with each other, build authentic and trusty relationships. If people get used to working with each other, they tend to be more comfortable engaging together when a crisis arises. If you do not take time to care about people and to look at how things are made, in daily situations, you might lose your connections with some realities, creating some distances that might prevent some strategies or tactics from being operational onsite. It is when organizations establish real connections with users, put efforts in developing products that are made with high quality standards, without damaging the environment, guarantee good uses of products from the consumers and open spaces for voicing their experiences, needs, ideas and expectations, that they can be more reactive to new alerts and envision better how to work with people to effectively solve upcoming problems.

## BE ECOSYSTEMIC

Fostering interactions and knowledge inside your networks

Consolidating the network of stakeholders appears to be one of the key elements for succeeding to adapt production capabilities when crises arise. From this research, 3 types of networks were observed as important to develop, care and maintain in the long run, playing different roles in critical situations.

## CARE ABOUT THE SUPPLY-CHAINS

It is inside the core network of the organization that is engaged in supplying the products and services that live the knowledge about existing capabilities of production and their potential for innovation.

Manufacturers know their resources really well (equipment, staff and procedures), their suppliers, distributors and clients. A good management of the supply-chain requires effort for mapping and monitoring stakeholders in a constant way, guaranteeing engagement, satisfaction and quality from them. Opening up the supply-chain, making it visible and transparent can help to have more visibility on how things are made and could be changed. Moreover, engaging the staff and suppliers in adapted training and collective processes for envisioning and operationalizing other scenarios of production will prepare them to adopt more adapted relevant behaviors when crisis emerges.

## NETWORK WITH LOCAL MANUFACTURERS

The more you know about your local territory, the more you will be able to find solutions for re-organizing, repurposing part of the production in existing spaces and with local expertise.

Mapping production capacities and dynamizing local networks around fabrication will endeavor the collective capacity for local production and open opportunities of cooperation and mutualisation. Stakeholders will benefit from knowing the complementary nature of their work and can work together in bridging the existing gaps - holes and improving the generated impact.

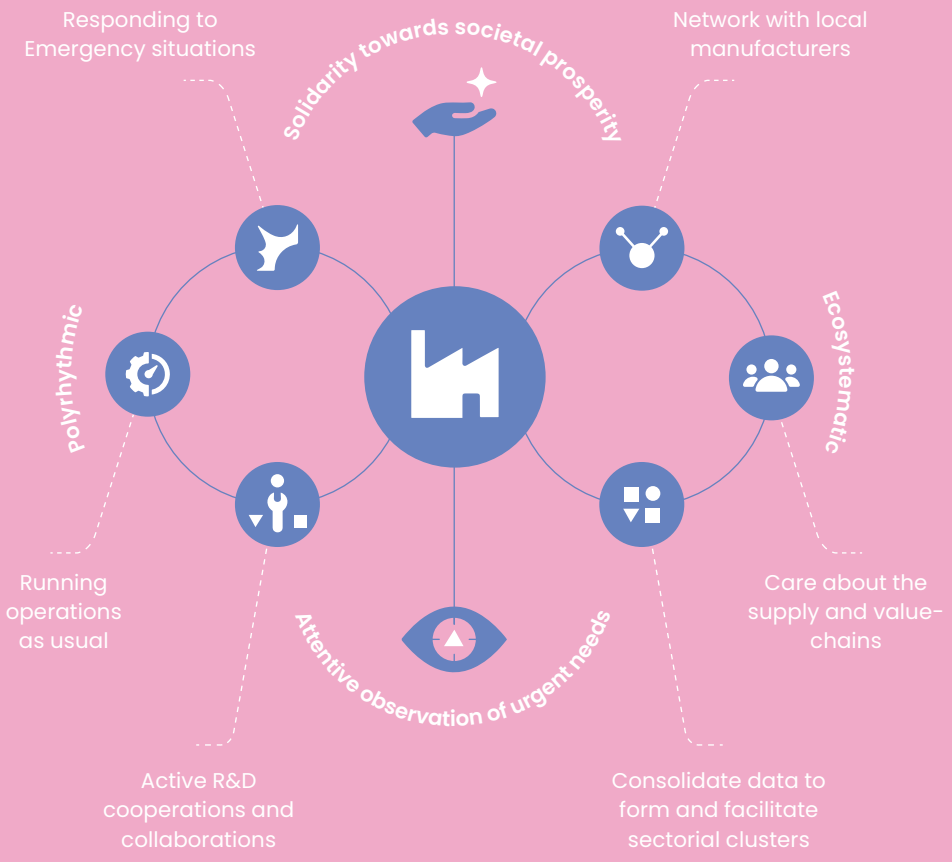
## FORM AND FACILITATE SECTORAL CLUSTERS

Clusters are generally gathering a diversity of organizations coming from the same sector and build around a collective knowledge. Clusters could have the role to collect an advanced knowledge about the sector, sharing an exhaustive view of all the actors active in the sector, and to facilitate the interaction between them for R&D purpose, market development. During the crisis, they appeared to play an important role for finding and transferring existing knowledge, fostering synergies, creating alliances and programmes for better planning collaborative production requested at national or international level.

In each network, opportunities for training members on emergency preparedness would definitely help for crisis management.

## BE POLYRHYTHMIC

One original finding is that taking part in a Reservist network is influenced by the ability for organizations to play with various rhythms at the same time, putting in place strategies and actions to be prepared to operate in different temporalities. The pace of what we can call the "usual operation mode", will be challenged by emergency situations that interrupt classic activities that will ask for quick adaptation, but also with R&D collaborations that engage quite long-term thinking and results. There are interesting perspectives to develop individual and organizational skills to be able to work at different rhythms and be easily able to switch from one mode to another. At the moment, Reservist cultures in an organization would benefit from carrying out R&D projects (being used to collaborate with an open innovation mindset) and from preparing their staff to anticipate possible scenarios of crisis.


Responding to Emergency situations
Solidarity towards societal prosperity
Network with local manufacturers
polyrhythmic
Ecosystematic
Running operations as usual
Care about the supply and value-chains
Attentive observation of urgent needs
Active R&D cooperations and collaborations
Consolidate data to form and facilitate sectorial clusters

# 5.3 Acting now for strengthening resilience

**Engage formally with the Reservist network**

1 You can join the existing network as a company that will be contacted in case of an emergency.

To gain entry into the RESERVIST network, companies must meet minimum reliability and capacity requirements verified by a group of partners known as "INTERFACE." This ensures that all parties within RESERVIST have the necessary economic stability and production capacity to effectively respond to emergencies and repurpose their production lines.

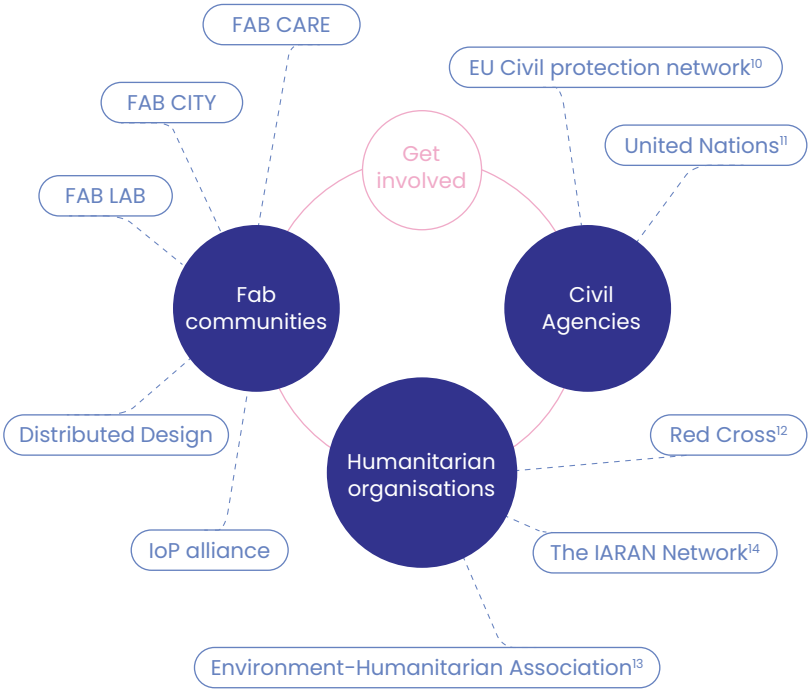
I The procedure for requesting admission to RESERVIST involves submitting an entry request through the platform, completing online questionnaires to provide general information and product data.

II Once validated, the application will undergo an assessment by INTERFACE, which will analyze and evaluate the content, indicated threshold and criticality of the data.

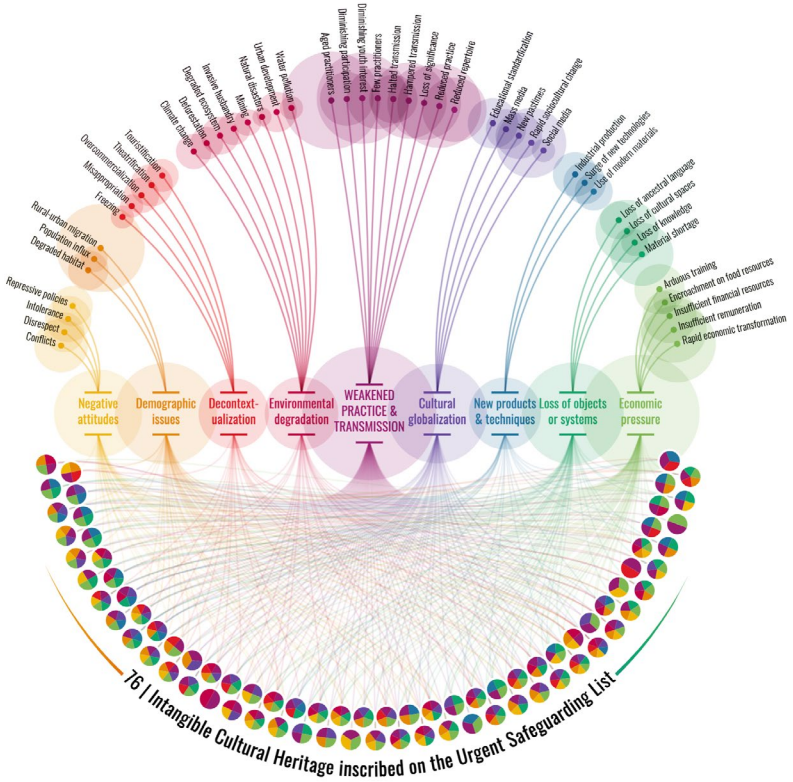
III The process concludes with a formal interview, and ultimately signing a contractual agreement to become a new partner in the RESERVIST network.

For more, please visit:
https://reservist.collab-cloud.eu/
or scan:

2 Engage beyond, to foster emerging reservist cultures, by sharing ideas, engagements and experimentations.



Organizations like UNESCO have also recognized the importance of resilience in emergency situations[15]. In their report on emergency situations, UNESCO emphasizes the need for a holistic approach to resilience, which involves promoting the resilience of individuals, communities, and societies. This approach involves creating a supportive environment that fosters resilience at all levels, including education, culture, and social support - requesting an urgent care and discussion about culture and heritage[16].

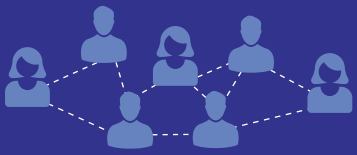



Visual 5.2.1: The phenomena that threaten the elements of intangible cultural heritage

# A Resilient community

**... is knowledgeable, healthy and can meet its basic needs**

**... is socially cohesive**



**... has economic opportunities**

**... has well-maintened and accessible infrastructures and services**

**... can manage its natural assets**

**... is connected**

Features of a resilient community, Roadmap to community resilience. Source: IFRC (2016)

**Stage whisper from the authors**

Alain Damasio is an influential author and thinker who sees Science Fiction as a means of breaking free from the limitations of the present and exploring new possibilities for the future. His work provides a space for experimentation, imagination, and reflection on our current social and political realities that can serve as a catalyst for future actions. By exploring collective dynamics and nurturing strategies of emancipation and social transformation, his works can contribute to building more resilient futures[17, 18].

In a similar vein, Ted Chiang's writing in the book "Stories of Your Life and Others[19]," delves into the realms of speculative futures. Chiang's stories are not merely flights of fancy, but profound reflections on the impact of technology, consciousness, and society. They challenge the perceptions and provoke deep introspection, inspiring us to envision alternative pathways to the future.

Both Damasio and Chiang remind us that fiction is not just a form of entertainment, but a powerful tool for introspection, empathy, and envisioning new possibilities. By immersing ourselves in their narratives, we gain the capacity to explore the complexities of our present reality and shape resilient futures. Through their works, we are inspired to engage in speculative futures thinking, where imagination meets critical thinking, and transformative ideas are born.

As we conclude this book, we extend our heartfelt gratitude to all the authors who have enriched our understanding of resilience and the power of speculative thinking. May their words continue to fuel our curiosity, spark conversations, and propel us towards a future where resilience and imagination coexist harmoniously. We hope this book is an inspirational guide towards more emancipation on our way towards resilience.

**Midjourney prompt**

/imagine; A soft pastel illustration of a hopeful and resilient society with collective intelligence and shared knowledge systems - Inspired from science fiction by Alain Damasio - visual should encourage commitment and action by proposing modes of collective resistance - use dystopian themes with a ray of hope to symbolise 'power to the people' - shades of norwegnian purple --ar 3:4 --q 2 --v 5 .2 --s 250

Illustration generated using Midjourney

6

# RESOURCES

In closing, we present a compilation of inspiring resources that can serve as valuable guides on your path towards building resilience.

# 6.1 Reservist productions

RESERVIST report on the best practices and lessons learned from the pandemic in the textile sector [Internet]. Reservist. [cited 2023 May 16]. Available from: https://cov-reservist.eu/reservist-report-on-the-best-practices-and-lessons-learned-from-the-pandemic-in-the-textile-sector/

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**Resilient Maker Stories**

Videos:
https://www.youtube.com/watch?v=C1rOlm_YPq0&list=PL33KKs9g8Y1Isg_Qzxyulj2RUtMArMMvT

Miro board:
https://miro.com/app/board/uXjVPdmJ9dg=/

**The Reservist Atlas of Weak Signals**

Cards:
https://fablabbcn.org/blog/emergent-ideas/emerging-reservist-cultures

Miro board:
https://miro.com/app/board/uXjVOwQSV7I=/

**Battery Pack documentation from IAAC**

https://hackmd.io/VkI3YTtzSaeVrgSXvAtZIw

**Reservist website**

https://cov-reservist.eu/

**Reservist platform**

https://reservist.collab-cloud.eu/

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# 6.3 Use Me

**Get informed and trained**

Check out the Reservist Open Resource Series:
https://www.youtube.com/@Reservist_EU

Discover Fab Academy and Fabricademy programs
https://fabacademy.org/
https://textile-academy.org/

Engage with the MASTER IN DESIGN FOR EMERGENT FUTURES:
https://fablabbcn.org/education/master/master-in-design-for-emergent-futures

Master classes of European Textile Platform:
https://textile-platform.eu/masterclasses

Open Schooling resources
https://openschoolingnavigator.eu/

Supply-Chain Preparedness Manual:
https://www.ahrmm.org/system/files/media/file/2020/03/Supply-Chain-Disaster-Preparedness-Manual_1.pdf

The Nexus Environmental Assessment Tool:
https://resources.eecentre.org/resources/neat/

**Design and share fabrication files openly with others**

OPEN KNOW-HOW:
https://search.openknowhow.org/

APPROPEDIA:
https://www.appropedia.org/Welcome_to_Appropedia

WIKIFACTORY:
https://wikifactory.com/

FIELDREADY CATALOG:
https://www.fieldready.org/

Fab City OS:
https://interfacer-gui-staging.dyne.org/

Open Source Medical Supplies:
https://opensourcemedicalsupplies.org/

MAKE.WORKS:
Make.works

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Crises can be unforeseeable and can manifest in various forms. It is nearly impossible to be fully ready for every potential circumstance. Nevertheless, by drawing lessons from previous crises and consistently enhancing our response strategies, we can strive to become more adaptable and better equipped to tackle future challenges as they emerge.

This publication urges stakeholders, policymakers, industry leaders, researchers, creators, and the general public to enhance their readiness for urgent situations by enabling collaborative production networks prepared to design, manufacture, certify, and distribute needed products and services when emergencies are declared.

Reflections stem from a series of co-creation activities conducted during the European project titled Reservist where partners shared their experience in building reservist networks and envisioned how these could be deployed in prospective emergency scenarios.

Embark on this visual guide to gain a deeper comprehension of potential Reservist cultures. Immerse yourself in contextual exploration and navigate through diverse crises. Delve into Resilient Maker Stories and explore the Reservist Atlas of Weak Signals, offering inspiration and design approaches for assimilating the Reservist concept. Conclude with spaces for reflection, embracing the Reservist Manifesto and contributing to the strategic foresight towards resilient cultures.

This book is an inspirational guide towards more emancipation on the constantly evolving and emerging ways of fostering resilience.

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FAB LAB BCN

Reservist

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