



CITIES  
NETWORK



Comune di  
Milano

# Milano resilient city

## SAFETY4RAILS (H2020)

November 2021

**City Resilience Department | Environmental Transition department**

Comune di Milano

## — The context

### Milan in transition

Nowadays, public administrations face more than ever the so-called '*wicked problems*', complex and articulated challenges among which climate change stands out.

**Milan is therefore learning to act in a practical and tangible way**, through innovative tools and actions to develop a **new framework for growth and development**.

Milan is experiencing a period of profound renewal that has demonstrated the **great level of adaptation of the city**.





## Urban Resilience

It is the **ability** of individuals, communities, institutions, businesses to **survive, adapt and grow** regardless of what chronic stress and acute shocks they suffer



# — The Environmental Transition Department

## UNITS INVOLVED



City Resilience Department



Climate and Energy Area



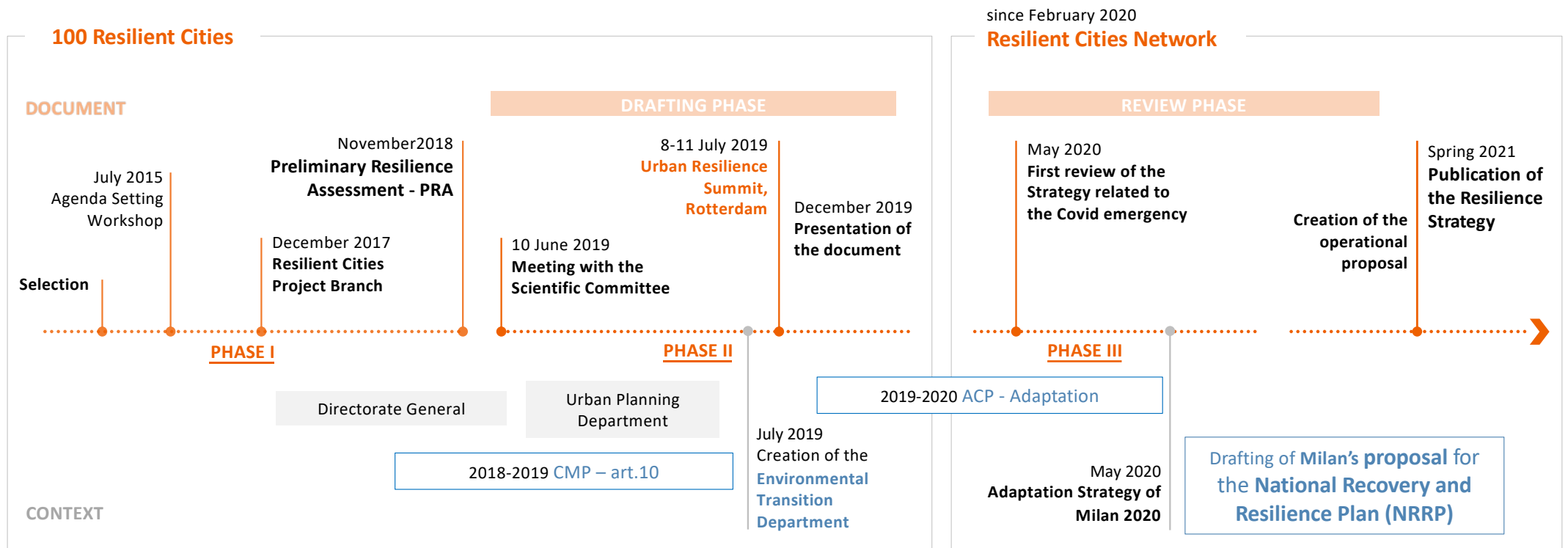
Water Resources and Environmental Hygiene Area

## RESPONSIBLE FOR:

- The implementation of environmental and energy policies;
- Resilience issues;
- Functions in the field of environmental protection and the fight against pollution



# — City Resilience Department timeline



# Milan's Resilience Strategy

Preliminary Resilience Assessment - PRA

RESILIENCE STRATEGY

## SHOCK e STRESS

- Flooding
- Collapse of the infrastructure system
- Deprivation and poverty
- Phishing attacks
- Hazardous material incidents
- Air and water pollution
- Heat waves and extreme heat
- Degradation of urban spaces
- Shipbuilding management and temporary uses
- Social exclusion and inequalities
- Shortage of decent affordable housing
- Ageing population
- Lack of security and possible terrorist attacks
- Migration waves
- Riots or civil unrest

## 6 DISCOVERY AREAS

- Milan and Water
- Living Milan
- Cool Milano
- Circular Milan
- Safer Milano
- Next-US Milano

## PILLARS

Services and procedures

1 | Efficient and participated procedures for a resilient and sustainable urban development

Infrastructure and spaces

2 | A public and private space, liveable, comfortable and adaptive at the service of inhabitants

Inhabitants and communities

3 | Inclusive, aware and proactive communities

## GOAL

## ACTIONS

ANALYSIS AND RESEARCH

COORDINATION AND SOLUTIONS DEVELOPMENT

IMPLEMENTATION AND MONITORING





# — Towards a positive evolution



**Equity**

To update the positive moment of Milan and extend it to all the **social and registry groups**

**Accessibility**

Take the opportunity to **expand growth to all neighborhoods**

**Re-Naturalization**

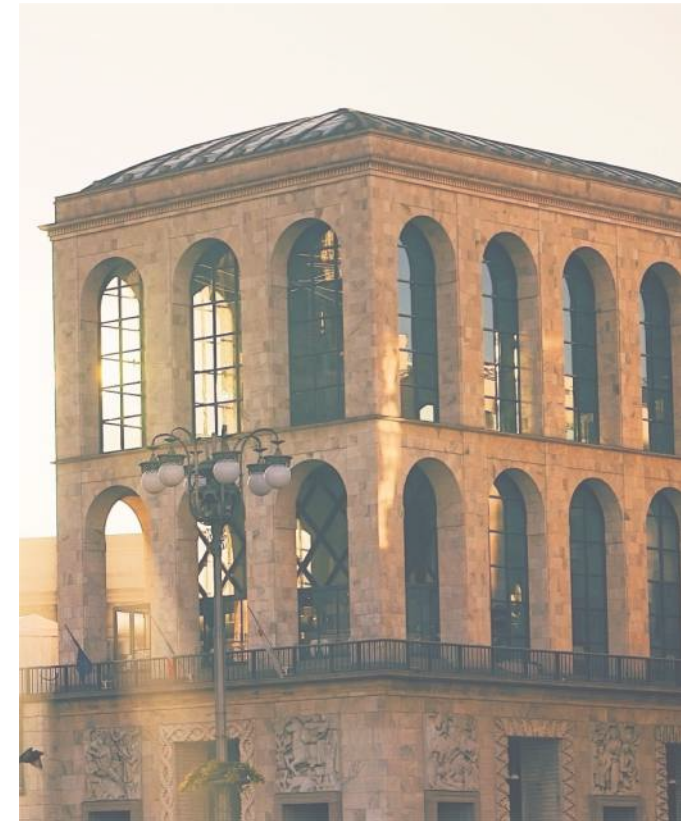
**Improve environmental conditions**, urban climate and quality of life

**Decarbonization**

Implement new development models based on **sustainable energy** to help recovery

**Active Participation**

Listening to the **citizens** and their needs that emerged during the epidemic, and their proposals for tomorrow's Milan





A photograph of a modern urban garden. In the foreground, there is a large, light-colored wooden bench with a curved metal trellis structure arching over it, covered in yellow flowers. The garden is filled with green grass, various plants, and trees. In the background, a long brick building with a corrugated metal roof is visible, along with some trees and a distant church spire under a clear blue sky.

## Plans, projects and actions of Milan Municipality

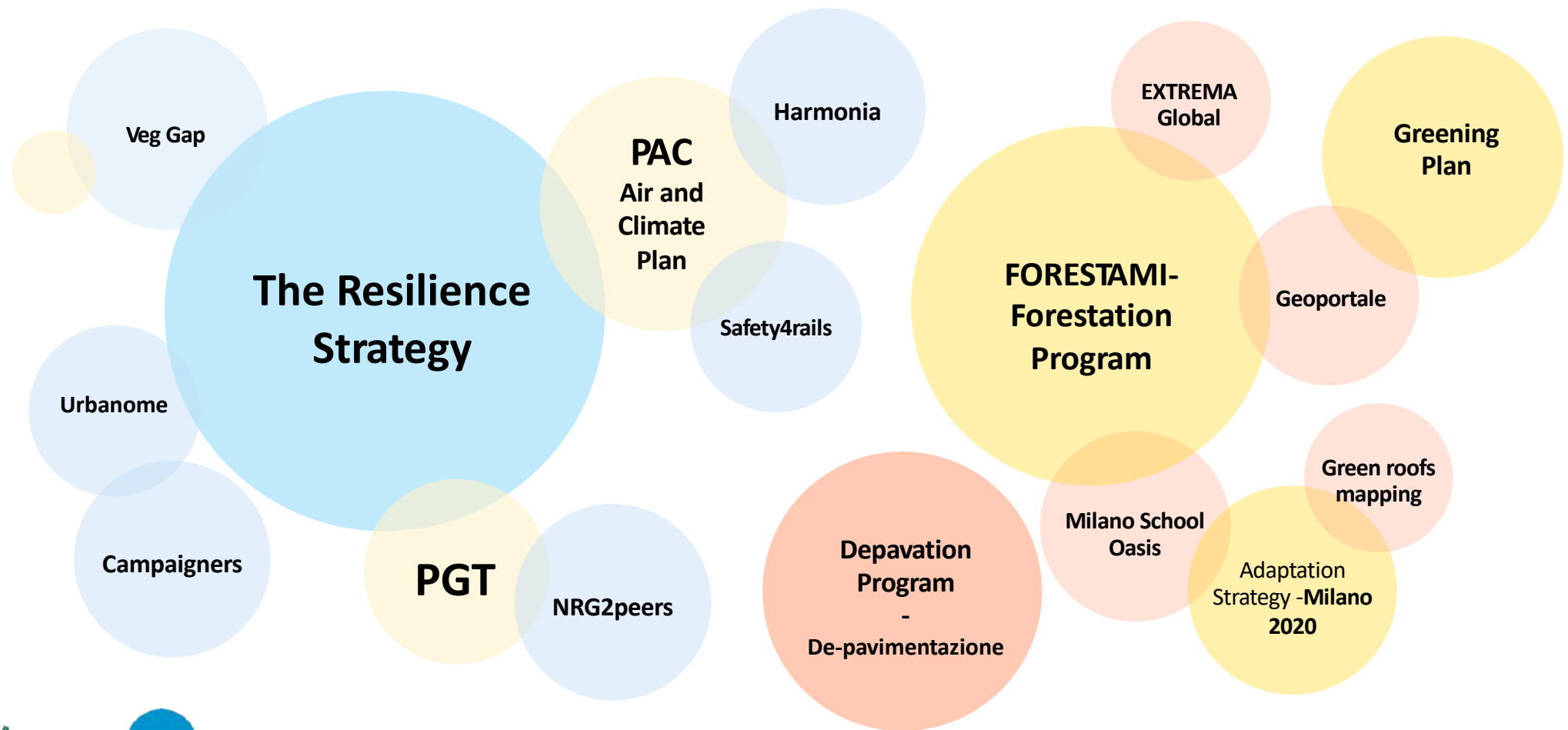


# — Objectives of the City of Milan

Related to planning and strategic tools



# — The ecosystem of Plans, actions and projects





# — European Projects

Planting, urban greenery

Energy communities

Resilience of transport networks

Equity and urban resilience

Adaption and participation

**VEG-GAP** – LIFE

**Sharing Cities** - Horizon 2020

**NGR2peers** - Horizon 2020


**Safety4Rails** - Horizon 2020

**Urbanome** – Horizon 2020

**Harmonia** – Horizon 2020

**Campaigners** – Horizon 2020



A photograph of a red high-speed train stopped at a station platform. Several passengers are visible, some standing on the platform and others boarding the train. The platform has a yellow tactile paving strip along the edge. The train has large glass windows and doors. The text "SAFETY4RAILS – Horizon 2020" is overlaid on the image.

# SAFETY4RAILS – Horizon 2020

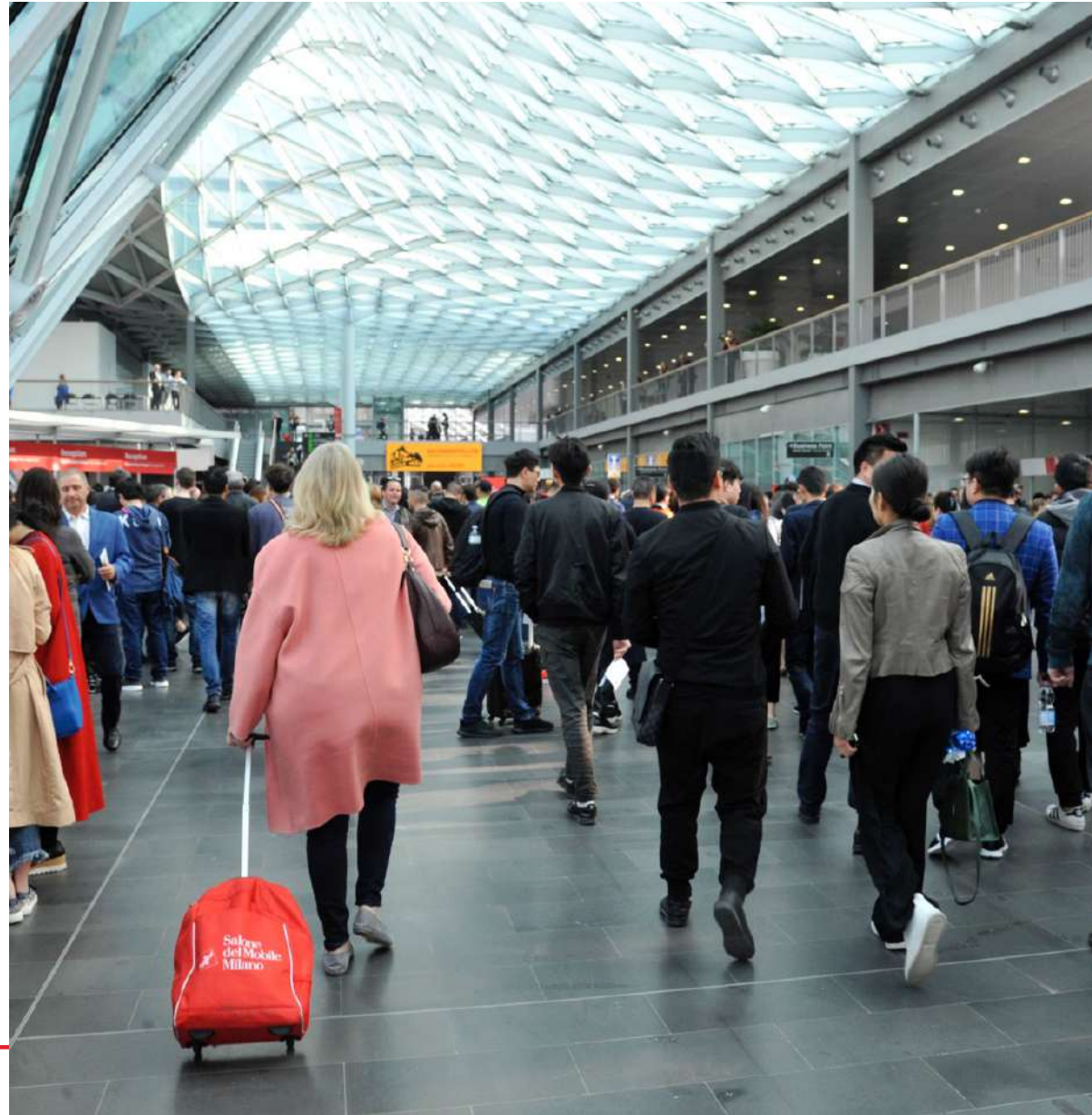


# — SAFETY4RAILS

## Milanese context

A wide context, in which large masses of people are expected to move (and therefore large events) and in which climate change has a great impact with evident effects and major repercussions on the system

- Risk assessment in view of the **S4RIS** platform: what are the main threats to the rail system? What needs to be identified for Milan?





# — SAFETY4RAILS

## Objectives

Given the urban context of reference, the project highlights the need to anticipate incidents and risks, with particular interest in rail, inter and intra-city infrastructures.

We will analyse in particular the connection network and the different interchanges.





## — S4RIS –17 tools



**SAFETY4RAILS**  
«puzzle»

The 17 different tools presented by the technological partners of the consortium will be further developed and implemented within the SAFETY4RAILS Information System: **S4RIS**

The added value of this pathway will be the production of risk analysis and prediction models applicable to the context of Milan in transition: the method produced can then be standardised so as to be replicable.

The focus in Milan will be on the consideration of environmental risks in view of the organisation of the 2026 Winter Olympics (and in general of events with great appeal and large movements of people from outside and within the city).





# — Safety4Rails

## Our Role

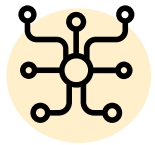
The Municipality of Milan is involved in the project as end-user.

The Resilient Cities DP will specifically consider all climatic and environmental risks that could undermine the safety of urban and interurban transport lines, together with the analysis and assessment of risks for major events in view of the 2026 Olympics.



# — Safety4Rails

An innovative approach



## ANALYSIS

**Research and listening phase**  
Internal/external analysis work

- Mapping of system actors
- Analysis of the context, risks and threats
- Interviews and listening phase
- Mapping of needs and requirements



## SUMMARY

**Translation of research results into tools and maps**

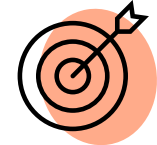
- Reporting of methods and processes, aggregation of different projects and actions
- System mapping, contact points and existing projects
- Analysis of current scenario and main problems



## REPORTING

**Return and validation**

- Return mapping and tools with system actors
- Collection of feedback and validation of analysis
- Definition of future scenario and possible integrations



## DEVELOPMENT

**Proposal presentation, testing and pilot development**

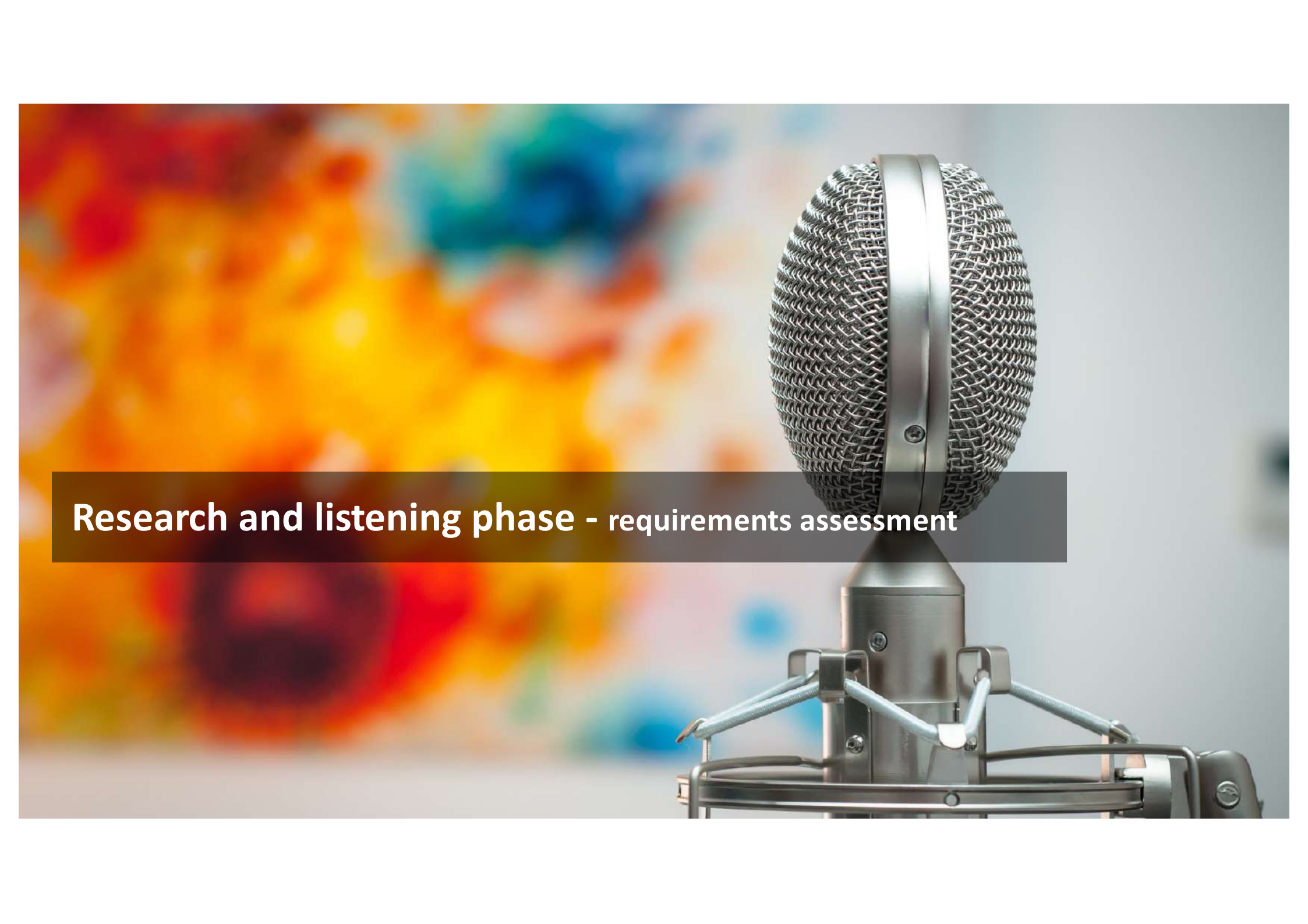
- Return of results
- Operational process of integrating tools into existing systems
- Pilot development in Milan

[Threats analysis](#)

[Crisis communication](#)

[Emergency response](#)



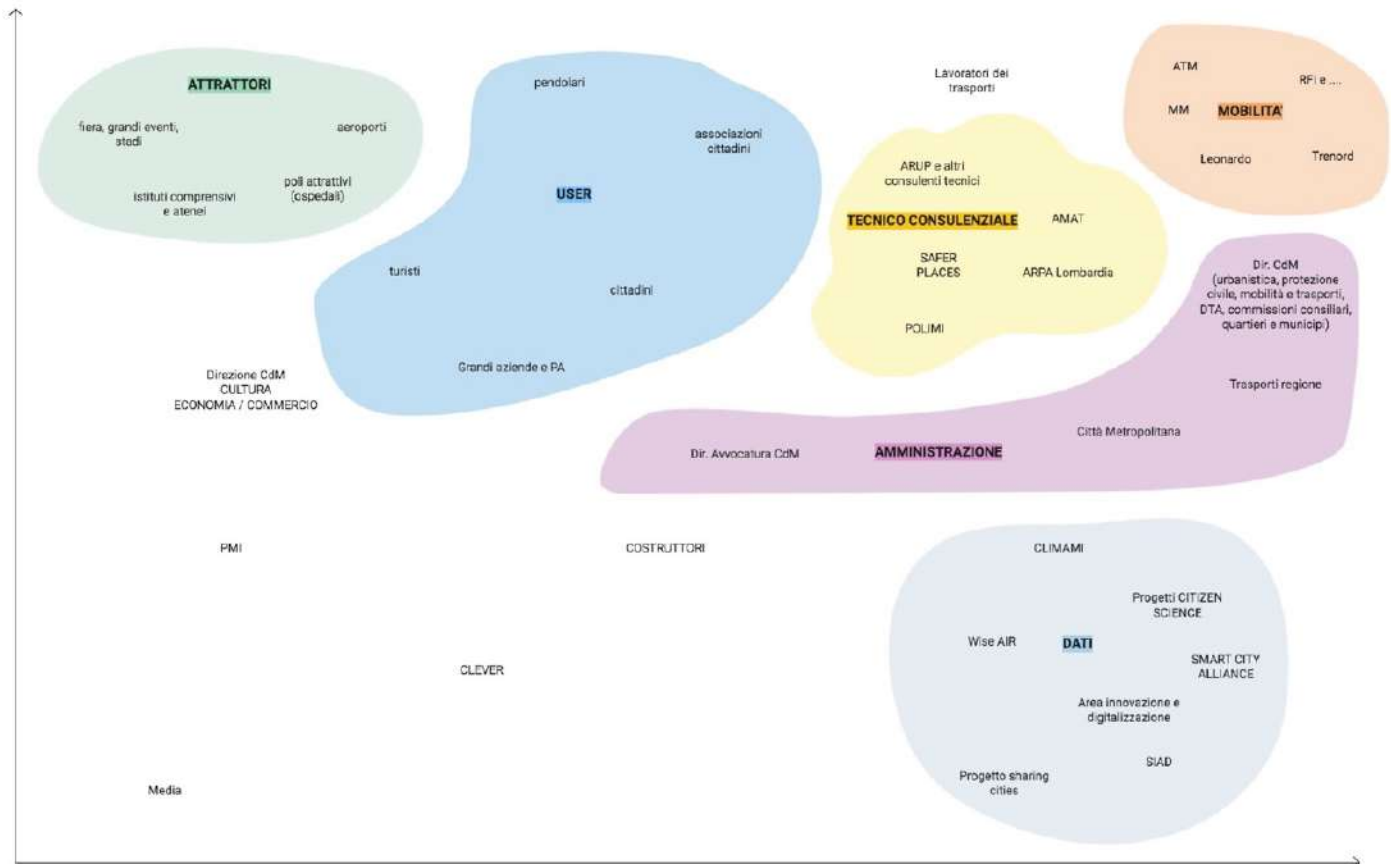
A professional silver condenser microphone with a mesh grille is mounted on a stand. The background is a vibrant, out-of-focus bokeh of orange, yellow, and blue colors. A semi-transparent dark grey banner is overlaid across the middle of the image, containing white text.

**Research and listening phase - requirements assessment**

# — Preliminary mapping of actors

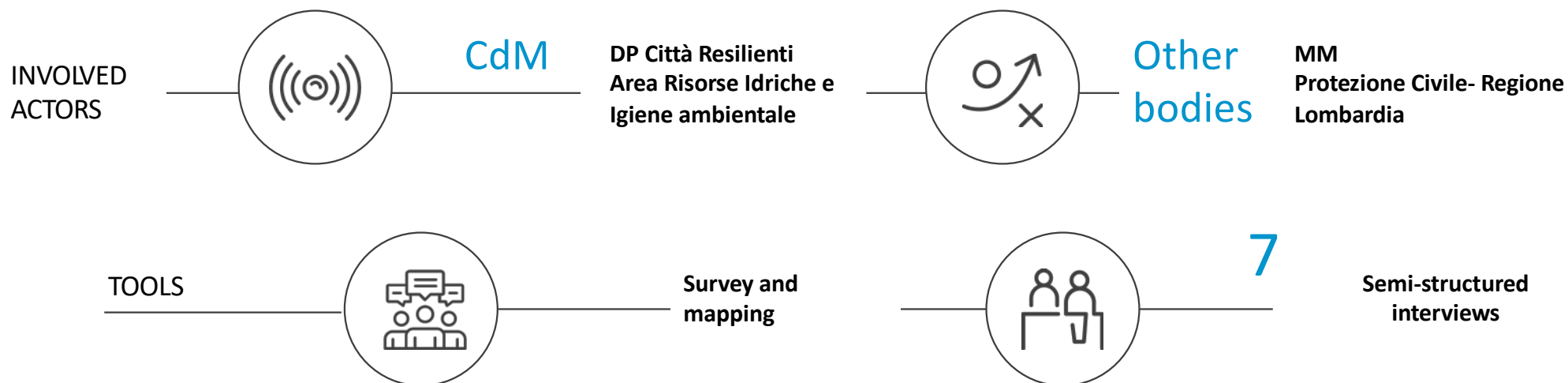
The first step in the fieldwork was to map all possible actors in the system, according to their potential or current interest in the project (y-axis) and their more or less technical skills related to the topic (x-axis). This helped the team to define and delineate 6 main clusters of actors:

- Attractors
- Users
- Technicians
- Part Mobility
- Administration
- Data part





# — Listening phase




## RESULTS:

### ■ Main threats related to railway infrastructure:

- 
- FLOOD RISK
  - CLIMATIC RISKS
  - CYBER ATTACKS

### ■ CRITICAL points in the city of Milan:

- 
- Milano Garibaldi (trains, suburban lines, metro)
  - Train-metro interchange nodes

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## Stakeholders map

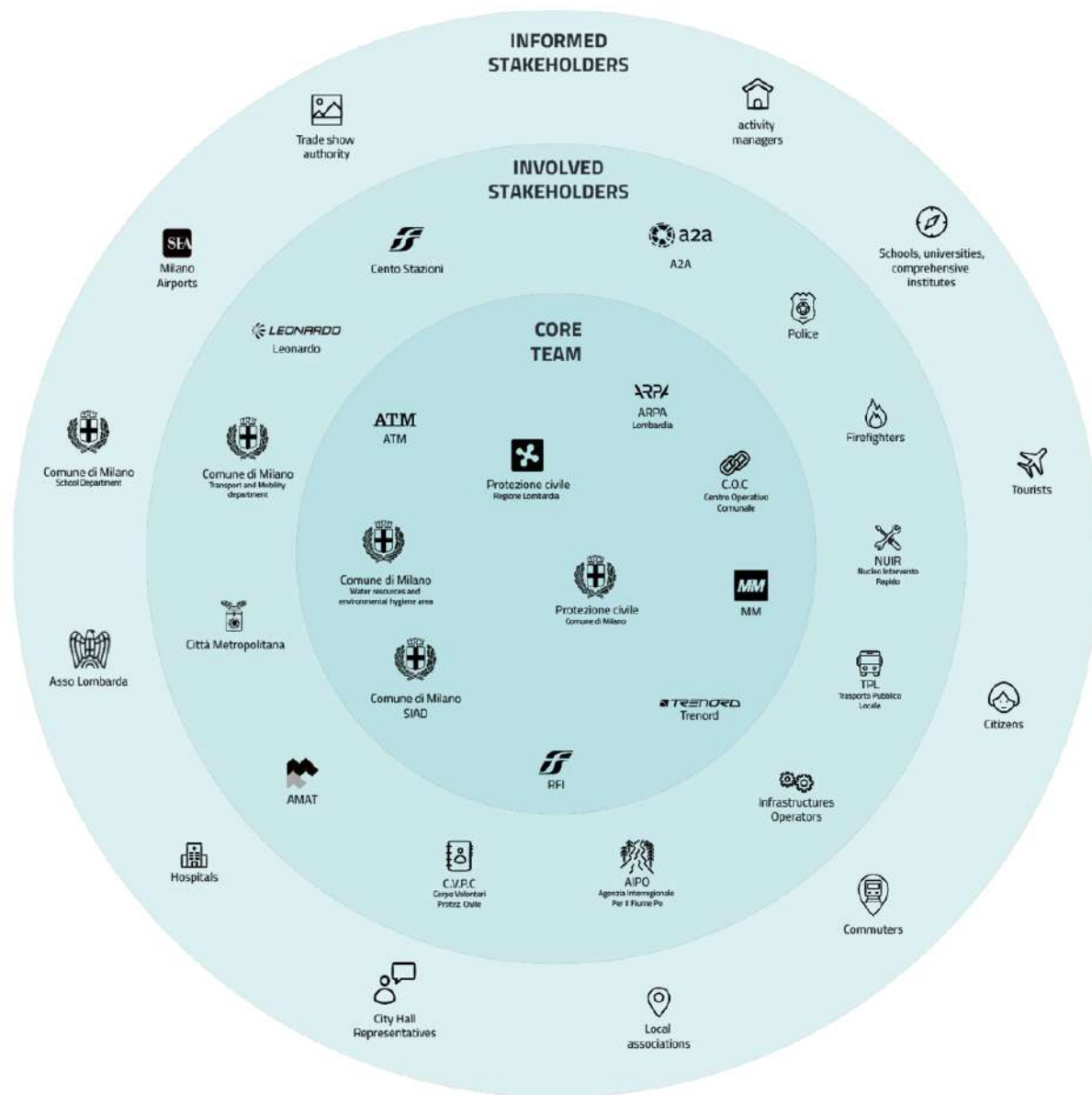
The interviews allowed a detailed mapping of the actors involved in the management of risks and crises related to the railway infrastructure in the city of Milan.

It was possible to outline three levels:

**CORE TEAM:** actors directly involved in the frontal management of emergencies

**INVOLVED ACTORS:** those who are an active part of the emergency, but do not directly manage it

**INFORMED ACTORS:** those who are informed in a more or less priority way of the emergency in progress.



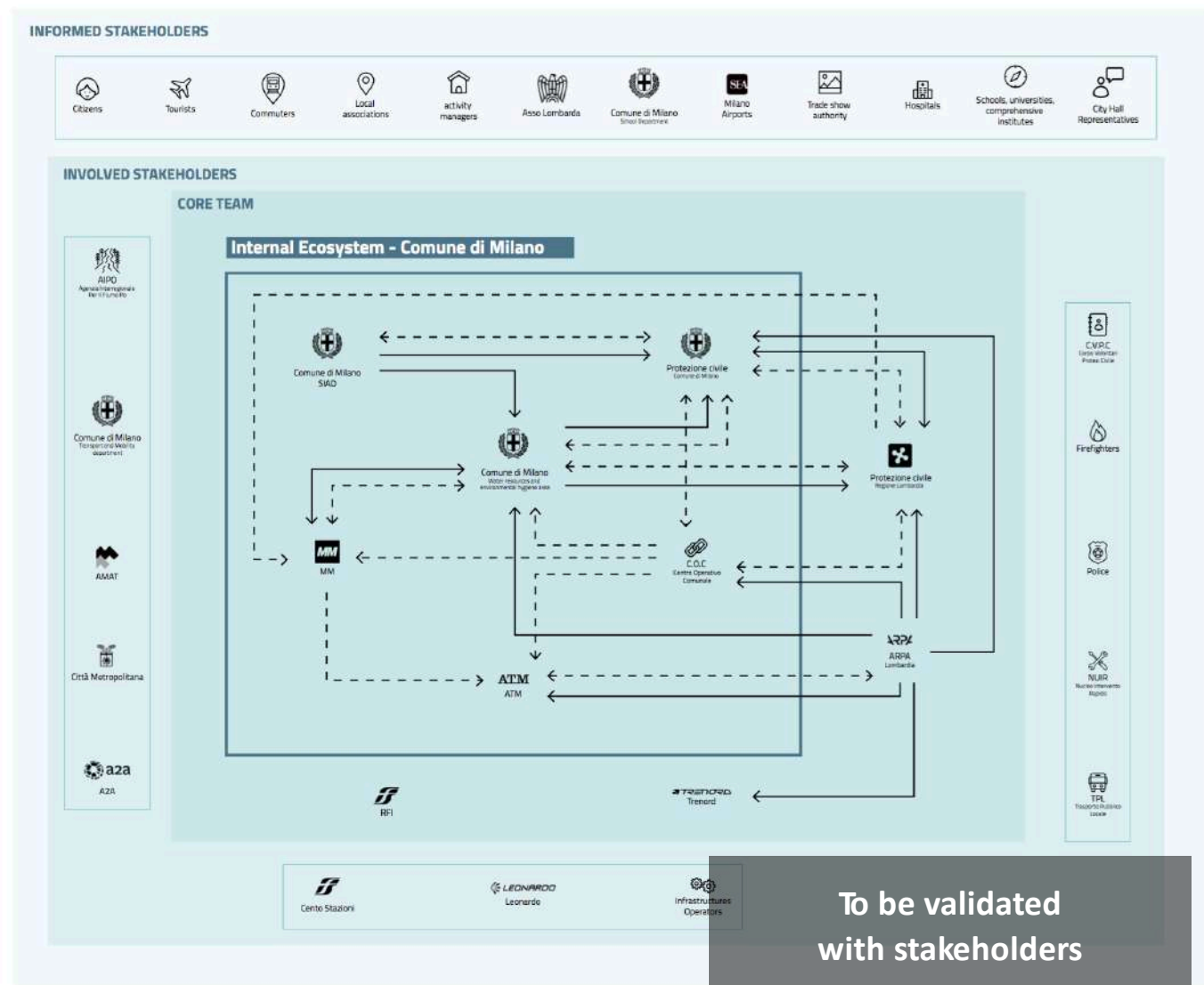


# Results mapping

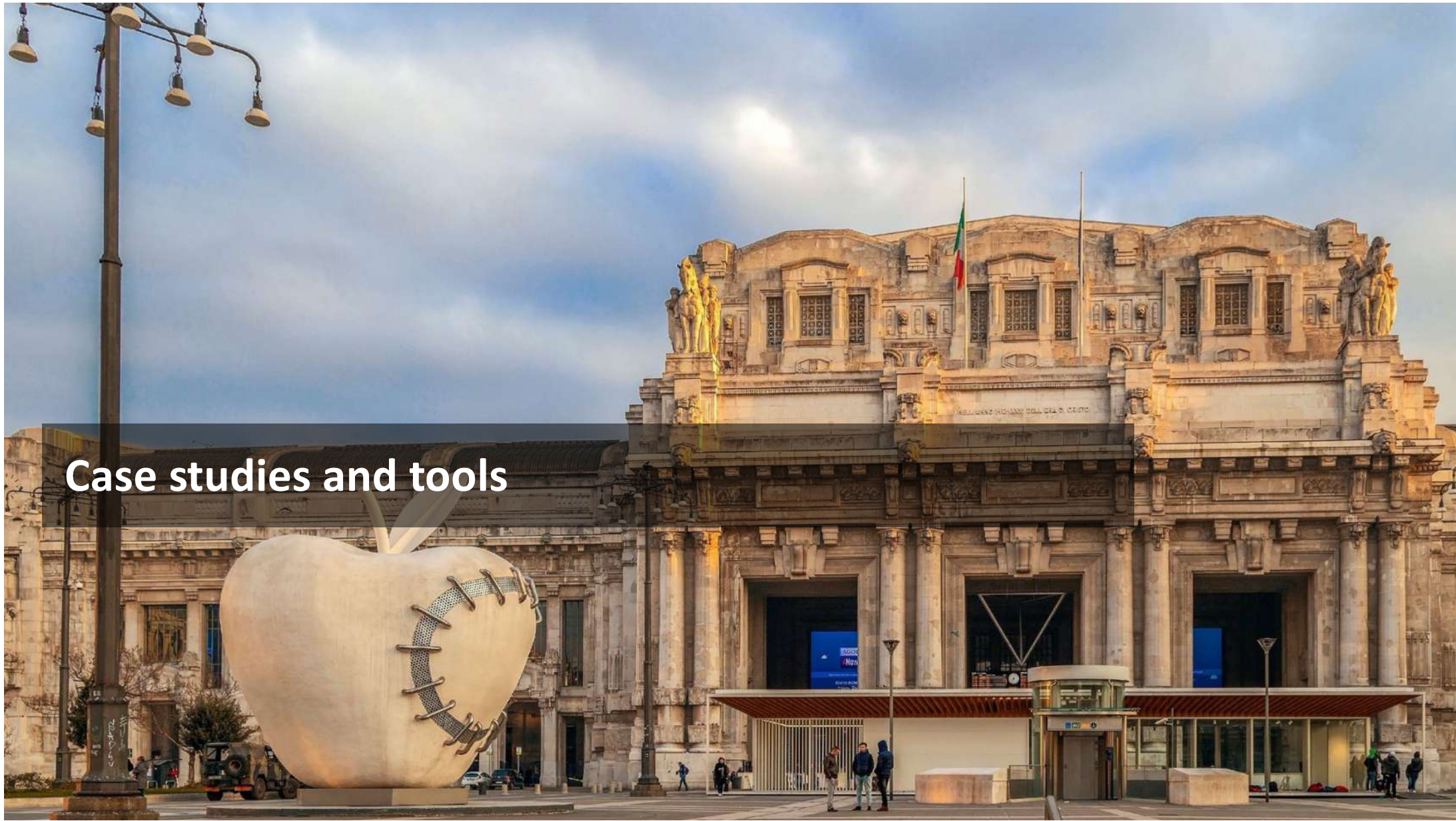
## System Map

The analysis allowed the team to explore the different flows that link stakeholders in case of a crisis.

As the map highlights, the **Civil Protection (Protezione Civile)** is the **central core of communication** and both the municipality and the regional one are in charge of update citizens and other secondary and tertiary actors.



## Case studies and tools

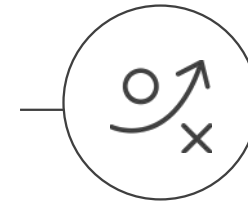




## — City of Milan – case studies

The case study of the Municipality of Milan will focus on the assessment, management and possible mitigation of cyber and physical risks with respect to the different intra- and inter-urban rail networks (rail, metro, tram) serving the city. Attention will also be paid to the cascading effects on the different transport modes and networks serving the city, taking into account the lessons learned from the Covid-19 pandemic adaptation experience. Furthermore, as a municipality we want to focus on the risks caused by Climate Change (especially hydraulic risk and heat waves), also in association with other threats, such as cyber-attacks.

The application cases of interest for the Municipality of Milan are mainly those events that attract a high number of visitors to the city (a type of event that in Milan has become a practice and a successful formula in the pre-covid period) and that cause large movements of goods and people. In particular, we look at the 2026 Winter Olympics in Milan-Cortina.



Case  
studies

**CASE STUDY 1:**  
**flood risk > big event >**  
**cascade effect**

**CASE STUDY 2:**  
**heat waves (or any climate-**  
**change related risk) > black out >**  
**big event > cascade effect**

# — City of Milan – case studies

## Main threats – FLOOD RISK

**Threat:** major flooding

**Action:** caused by torrential rain resulting in flooding of rivers close to the urban area

**Asset targeted:** citizens, tourists, infrastructures' operators

**Effects:** flooding of metro and train stations, particularly at key interchange points in the city

**Consequences:** stop of major transport lines of the city with consequent activation of replacement transport lines; inconveniences and repercussions on the organization of the event

**Likelihood:** Likely / possible

**Impact:** Major / critical



# City of Milan – case studies

## Major threats – heat waves\*

**Threat:** climate-change related risk

**Action:** heat waves

**Asset targeted:** citizens, tourists, infrastructures' operators

**Effects:** a period of atmospheric weather during which the temperature is unusually high compared to the average temperatures usually experienced in a given region, at that time and with persistent characteristics.

**Consequences:** inconveniences and repercussions on the organization of the event temporary total blackout on transport lines with a lot of inconveniences particularly at key interchanges in the city

**Likelihood:** unlikely / possible

**Impact:** Major / critical





## — Potential nodes of interest

The nodes identified are those most affected by urban risks related to climate change and those that will be the protagonists of visitor flows during the 2026 Olympics:

- Milano Garibaldi station (railway + metro line 2 and 5 + buses and tram + means of transport to the three main Milanese airports);
- Porta Romana station and Lodi TBB
- Milano Central station (railway + metro line 2 and 3 + buses and tram + taxi + means of transport to the three main Milanese airports);
- interchange nodes (ex. Milano Cadorna, Zara metro stop,..)







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