PMG
PROJECT MANAGEMENT GROUP

FONDAZIONE
BRUNO KESSLER

18 September 2024

The potentials of dataspaces and Artificial Intelligence in the Alpine Area.

Matteo Gerosa
Head of PMG - FBK

FONDAZIONE
BRUNO KESSLER

Fondazione Bruno Kessler – Center for Information and Communication Technology (FBK ICT Center)
Project Management Group (PMG)
via Sommarive 18 – 38123 Trento (Italy)

Introduction

- The Alpine region faces unique challenges: it is **highly sensitive to climate change** (the most visible signs of this being the rapid melting of glaciers and the extinction of plant species), is is often heavily reliant on **tourism and agriculture**, two sectors that are facing uncertainty in the future, and its most remote areas **lack access to Services of General Interest** (SGIs). thus causing increasing **depopulation**.

- **Dataspaces** and **AI** provide an opportunity to address these issues by fostering data-driven decision-making and cross-border collaboration but can also hinder integration and increase the divide between territories and people.

- How can we use these technologies so they do not become an obstacle but enhance **rural development** and **environmental protection**?

What are Dataspaces?

- Dataspaces are **collaborative environments** where **data** from multiple stakeholders can be securely shared while maintaining control over privacy and sovereignty. This enables cross-sector collaboration without losing ownership over sensitive information.

- In Europe, initiatives like **GAIA-X** are developing frameworks for trusted Dataspaces.

- While there is no specific data space initiatives for the Alpine area, there are relevant initiatives undergoing such as **Data Space for Tourism** and **Common European data spaces for agriculture and mobility**

What is AI?

- '**Artificial Intelligence (AI) system**' means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments; *(from the EU AI Act)*

- AI and Dataspaces are closely related: AI needs data to train and fine tune its models so to turn vast amounts of shared data into actionable insights.

Challenges to the use of Dataspaces & AI in the Alpine Region

- **Data Governance**: Creating a framework for sharing data without compromising privacy, security, or local data sovereignty.
- **Technological Barriers**: The lack of connectivity in remote mountain areas limits the use of cloud-based AI tools and shared data platforms.
- **Cultural Adaptation**: Convincing traditional rural/remote communities to adopt new technologies may require training and building trust.

Data and AI for the Alpine area: the AIxPA project

Funding

Piano Nazionale Complementare

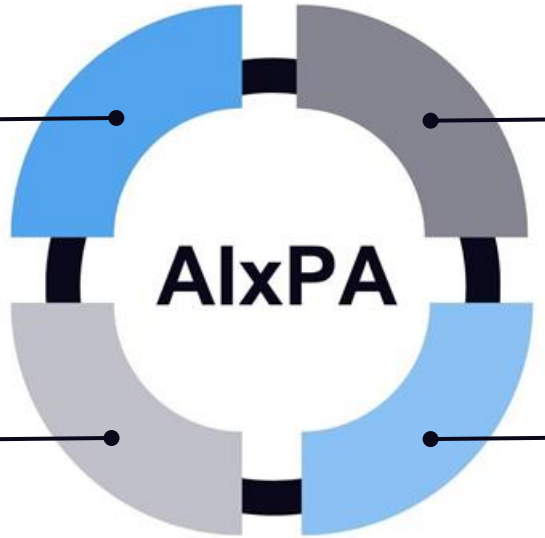
“Servizi digitali e cittadinanza digitale”

Budget

5 M Euro

Autonomous Province of Trento
Department for Digital Transformation

General coordination



Fondazione Bruno Kessler

Scientific and technical coordinator

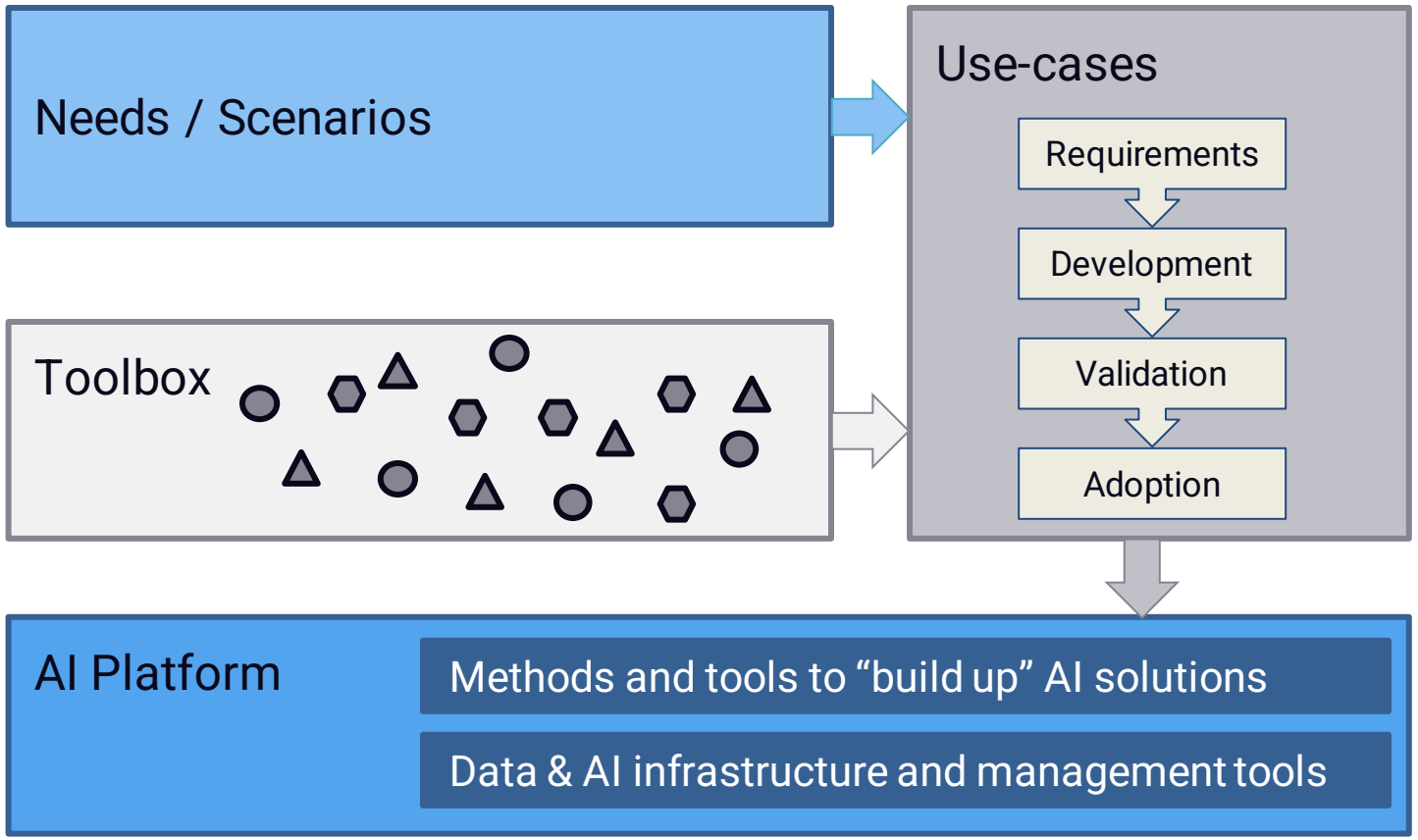
Autonomous Province of Trento
UC Departments

Use-case design and experimentation

Companies

Deployment and evolution of the solution

AIxPA project ecosystem



Domain experts

- Integration of the AI platform with verticals

AI Engineers

- Development of AI solutions using the AI Platform

IT Engineers

- Development and maintenance of the AI Platform

AIxPA UC1: impact of extreme weather events

- Analysis of **multi-temporal satellite images with AI techniques** aimed at defining the areas (surface, perimeter) impacted by the consequences of extreme events (e.g., flooding, crashes).

- Satellite remote sensing technology is an effective source of information (Yamazaki & Matsuoka, 2007). It provides spatially distributed spatial information without being invasive and without the need for surveys with the consequent burdens in terms of human, time and economic resources; in addition, this technology is **not impacted by the degree of accessibility of the territory** (Rogan & Chen, 2004).

- Developing an approach that information available on the Trentino region (e.g., real estate reg**combines satellite images with other geospatial data sources** istry maps, hydrographic grids, etc.) to manage the territorial complexity of Trentino and detect the effects of different extreme events, such as, for example, heavy rain and consequent flooding, wind storms and consequent crashes (Meshkini et al., 2024; Bergamasco et al., 2022; Zanetti et al., 2021).

- **Available Data**:
  - ESA Copernicus Sentinel-2 data, i.e. satellite images acquired by passive optical sensors;
  - ancillary data (e.g. real estate registry maps, meteorological event databases, geological data, land use, forest and fire data and topographical data).

AIxPA UC: overtourism

- The goal is to **define and measure the phenomenon of overtourism**, to understand its effects and to offer local decision makers a decision support system to define a set of actions to mitigate its impacts.

- Official data **fail to take into account the share of 'illegal' tourism**, e.g. linked to private tourist accommodation that correspond to non-entrepreneurial activities and are therefore more difficult to trace.

- The approach is based on decision support systems that combine a digital model of the system (a "**Tourism Digital Twin**") with AI techniques aimed at extracting relevant parameters from available data (e.g. the parameters related to illegal accomodations, carrying capacity and overtourism).

- **Available Data**: cartographic data; number of facilities and availability of accommodation and tourist; tourist presences (official ISPAT data) in the various locations in Trentino; data relating to transits (of vehicles and/or people) at specific points in the territory (roads, crossings, facilities); data relating to the presence of people in selected areas of the territory (tourist districts, municipalities, other selected localities); data relating to demonstrations and events; weather data;

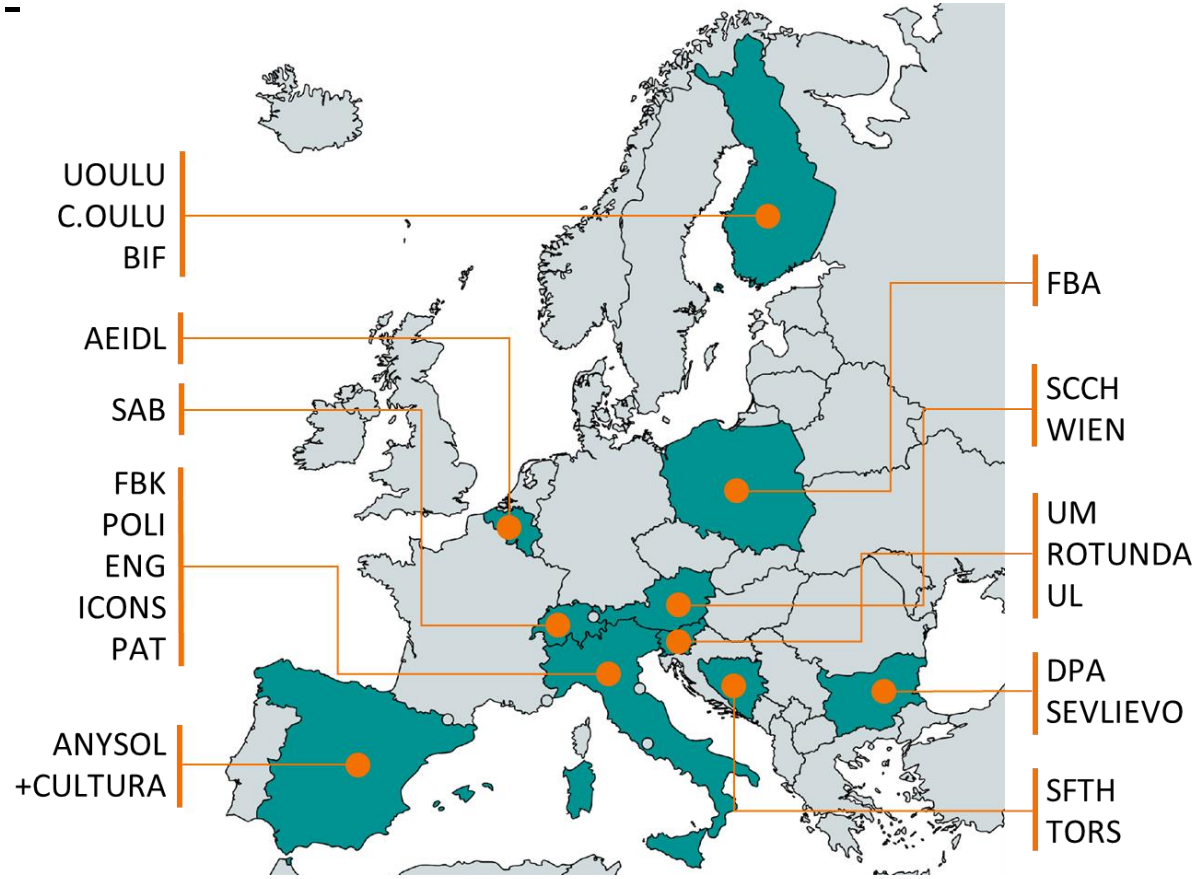
Data and AI for the Alpine area: the SMART ERA project

TOPIC: HORIZON-CL6-2022-COMMUNITIES-02-01-twostage "Smart solutions for smart rural communities: empowering rural communities and smart villages to innovate for societal change"

25 partners/associated partners/affiliated entities
from **10** European Countries

Budget: **€ 6 861 437.50**

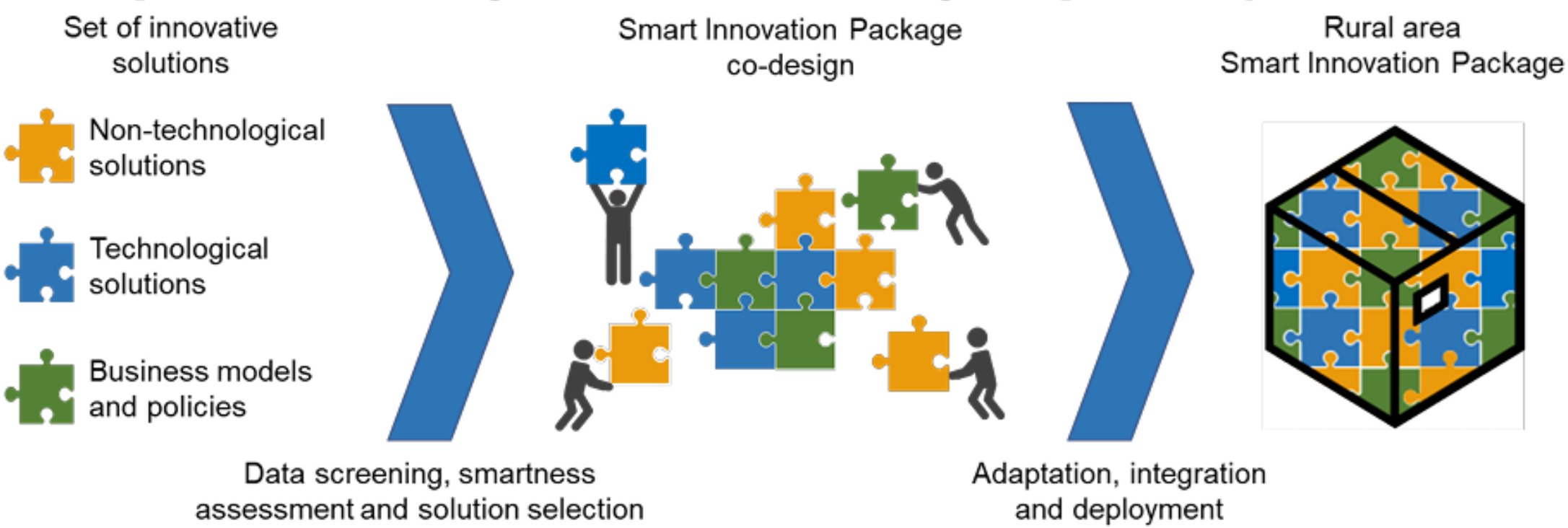
Length: **4 years**
(January 2024 → Dec. 2027)



https://smartera-project.eu/

SMART ERA project concept

"Sets of integrated, digital and non-digital, solutions for rural innovation"

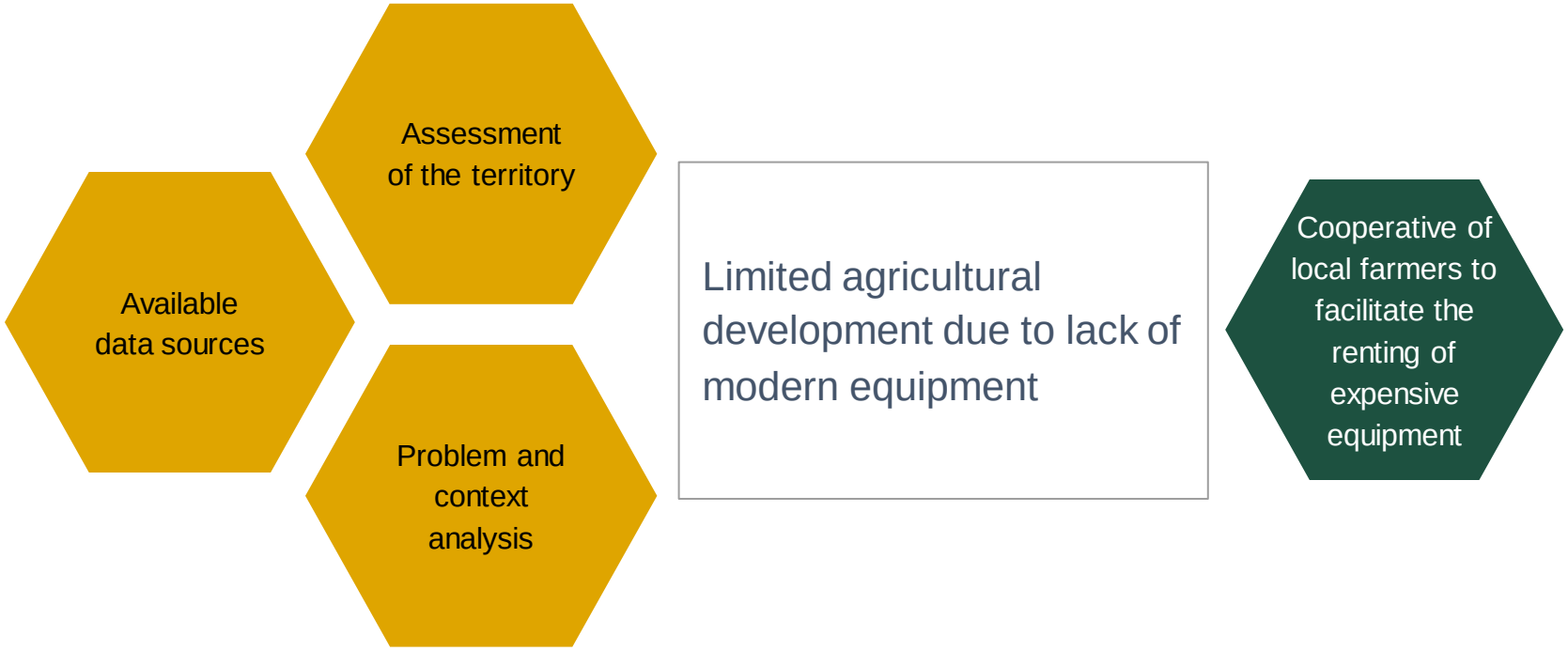


Intuitive definition of SIPs

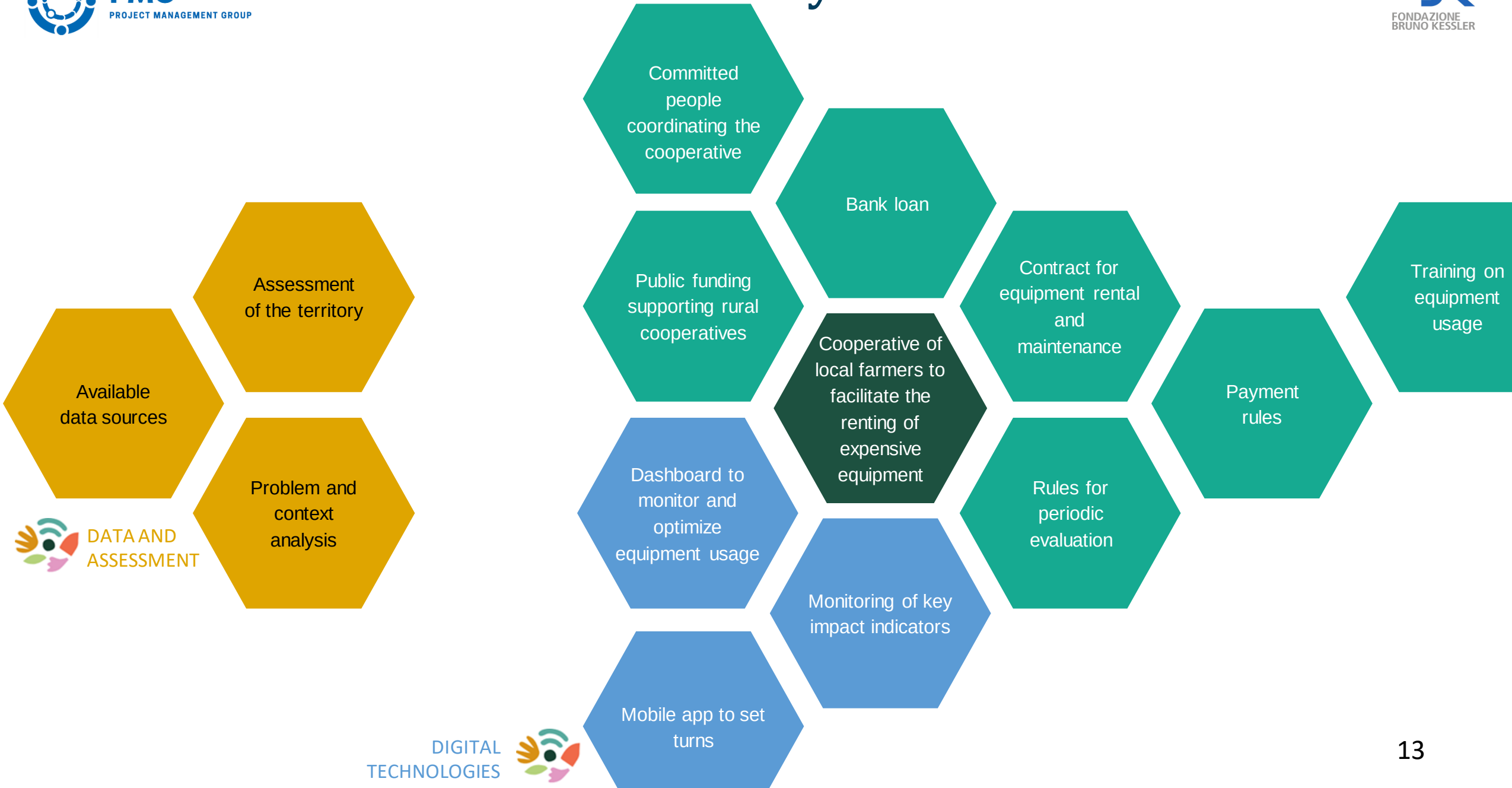
1. PRELIMINARY ANALYSIS

2. IDENTIFICATION OF RURAL CHALLENGE

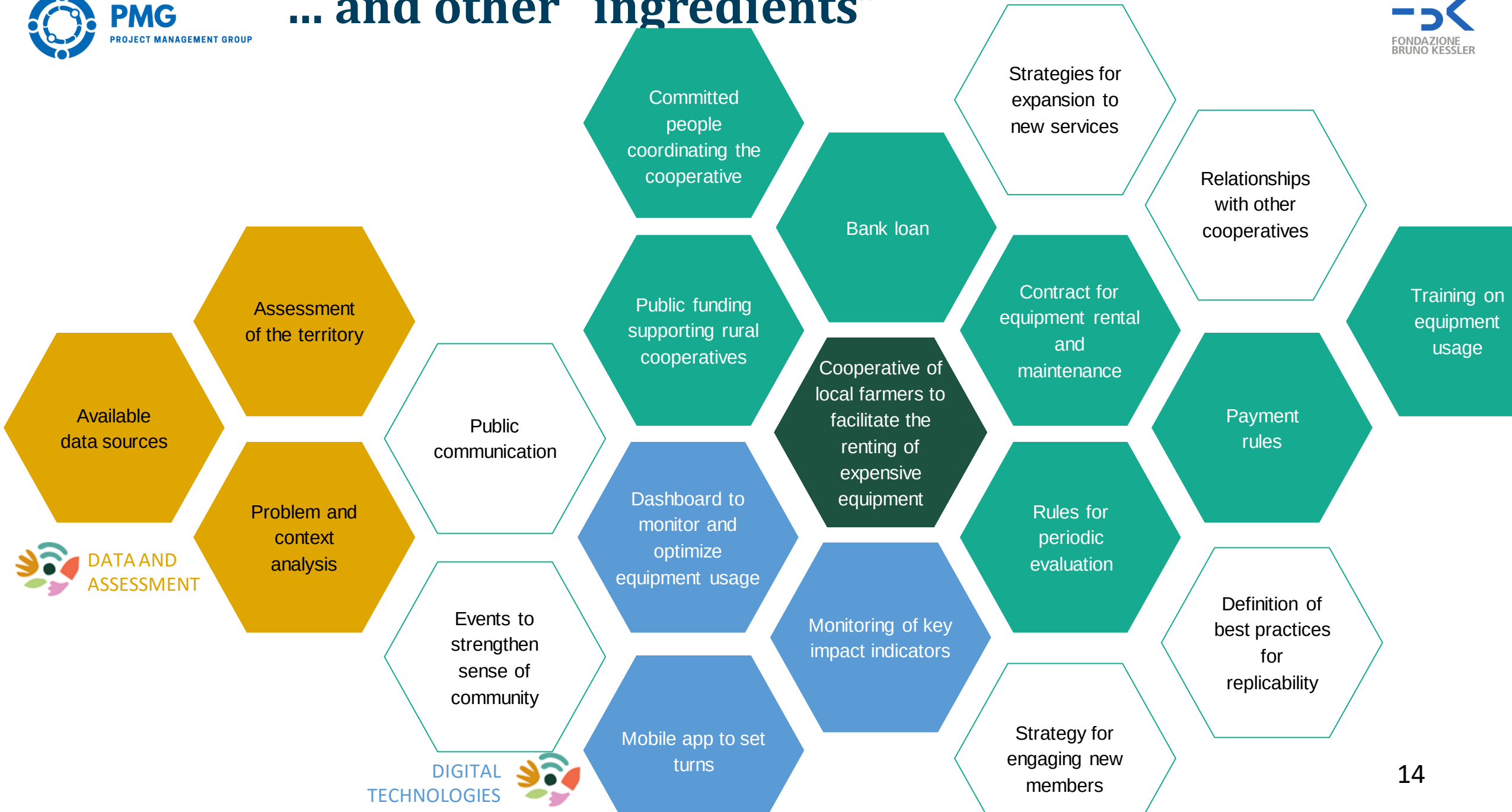
3. CRAFTING OF POSSIBLE SOLUTION



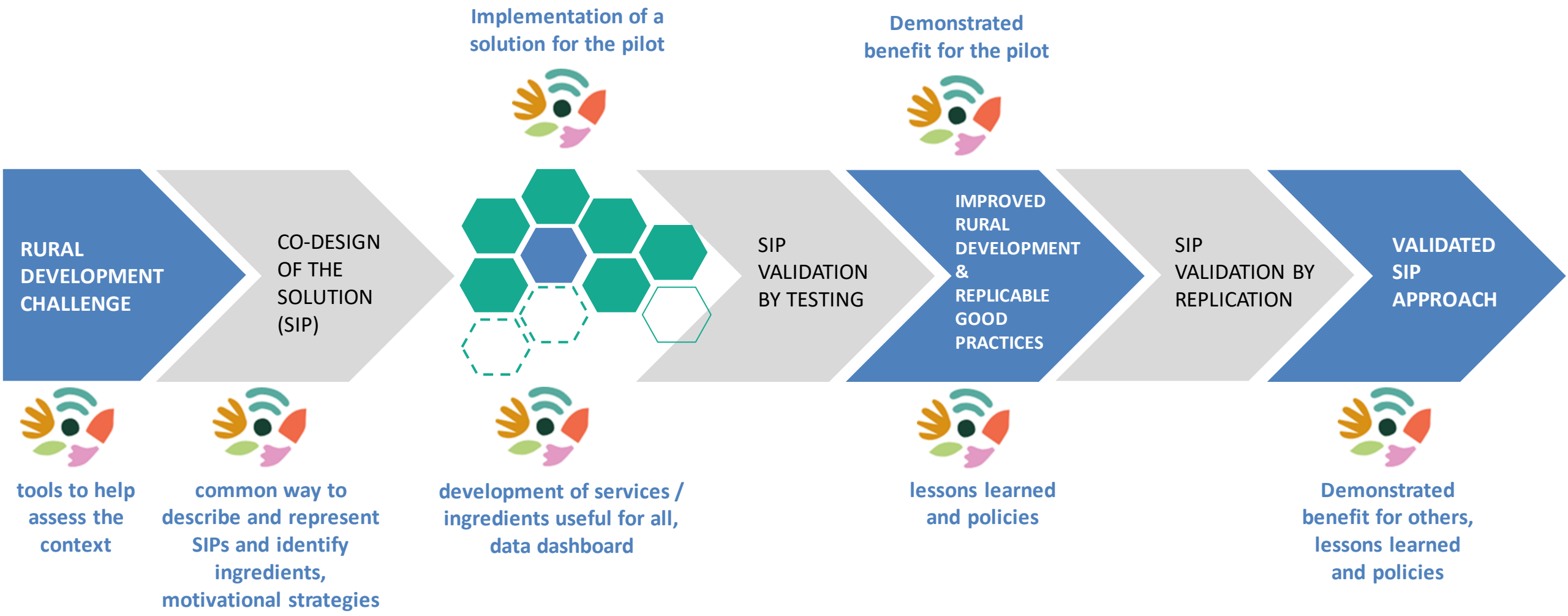
"the" solution is actually a set of solutions



… and other “ingredients”



SMART ERA vision instantiated in pilots



Thank you!
Matteo Gerosa
gerosa@fbk.eu
Head of Project Management Group – FBK