SMART·map

RoadMAPs to Societal Mobilisation for the Advancement of Responsible Industrial Technologies

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The experience of SMART-map: challenges and opportunities for Responsible Innovation Ecosystems mobilising quadruple-helix stakeholders

ROSIE (Responsible and Innovative SMEs in Central Europe) 1° Study Visit and Project Mid-term Event

Milan, 9° October 2018

An ambitious objective

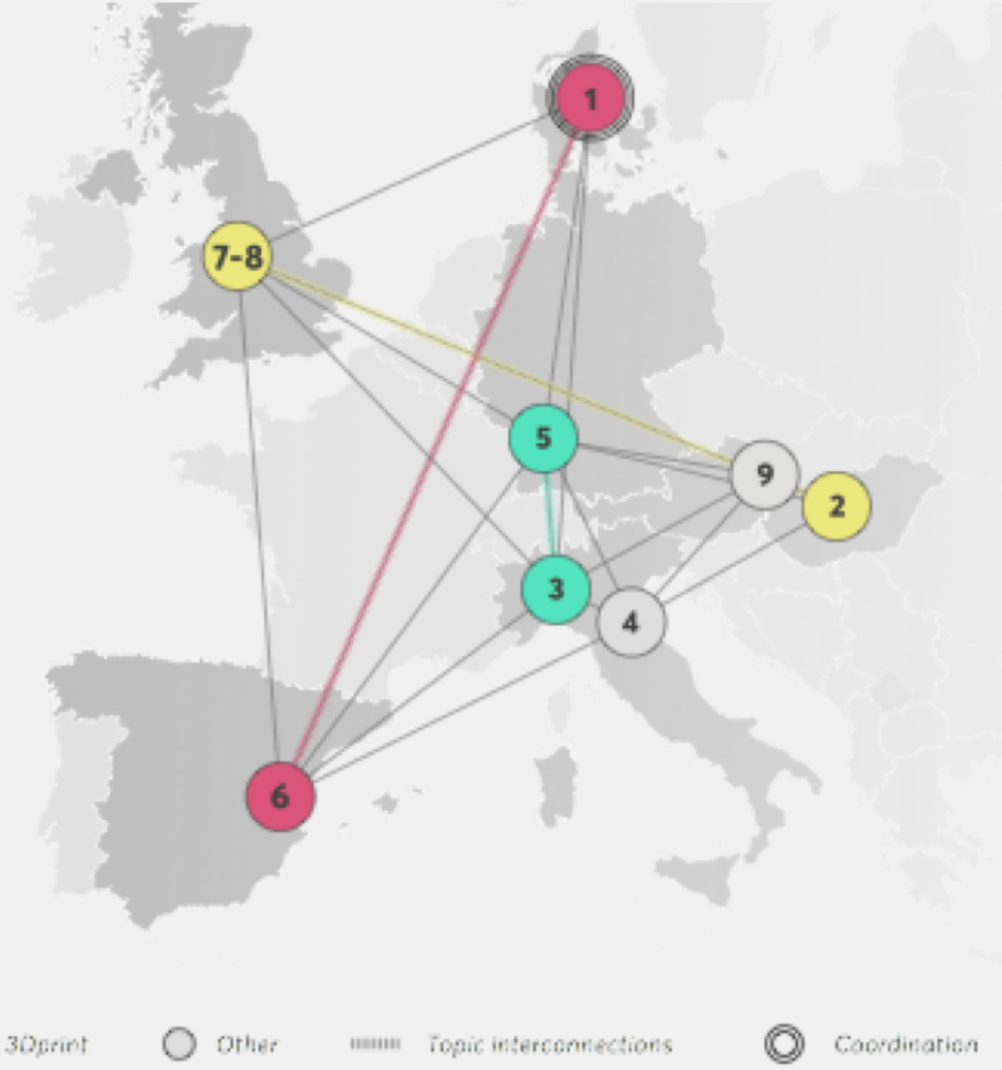
RoadMAPs to **Societal Mobilisation** for the **Advancement of Responsible Industrial Technologies**

The **goal** has been **co-designing** concrete **roadmaps** for the responsible development of technologies and services in **three key game-changing fields** (precision medicine, synbio, 3D printing in the biomedical field), **mobilising** linked **innovation ecosystem stakeholders.**

The **ambition** is **to go beyond** the three sectors explored in the project.

Our Partners

1. **Aarhus Universitet** *(Coordinator)*
   Aarhus, Denmark
2. **Közép-európai Egyetem**
   Budapest, Hungary
3. **Fondazione Giannino Bassetti**
   Milan, Italy
4. **Formicablu srl**
   Bologna, Italy
5. **Fraunhofer Gesellschaft**
   Karlsruhe, Germany
6. **Instituto de Medicina Genómica**
   Valencia, Spain
7. **Manchester Metropolitan University**
   Manchester, UK
8. **University of Manchester**
   Manchester, UK
9. **Zentrum für Soziale Innovation**
   Wien, Austria

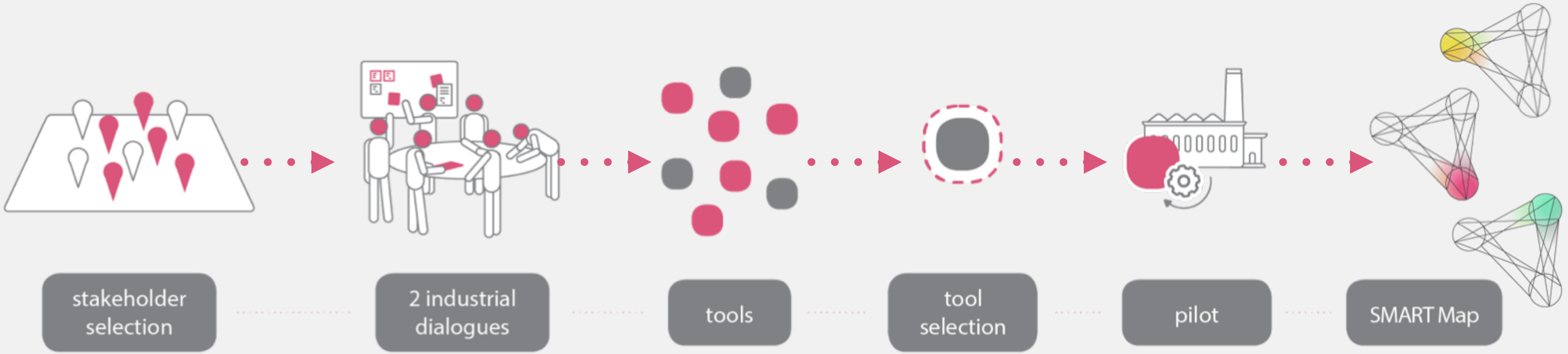


SMART-map Advisory Board

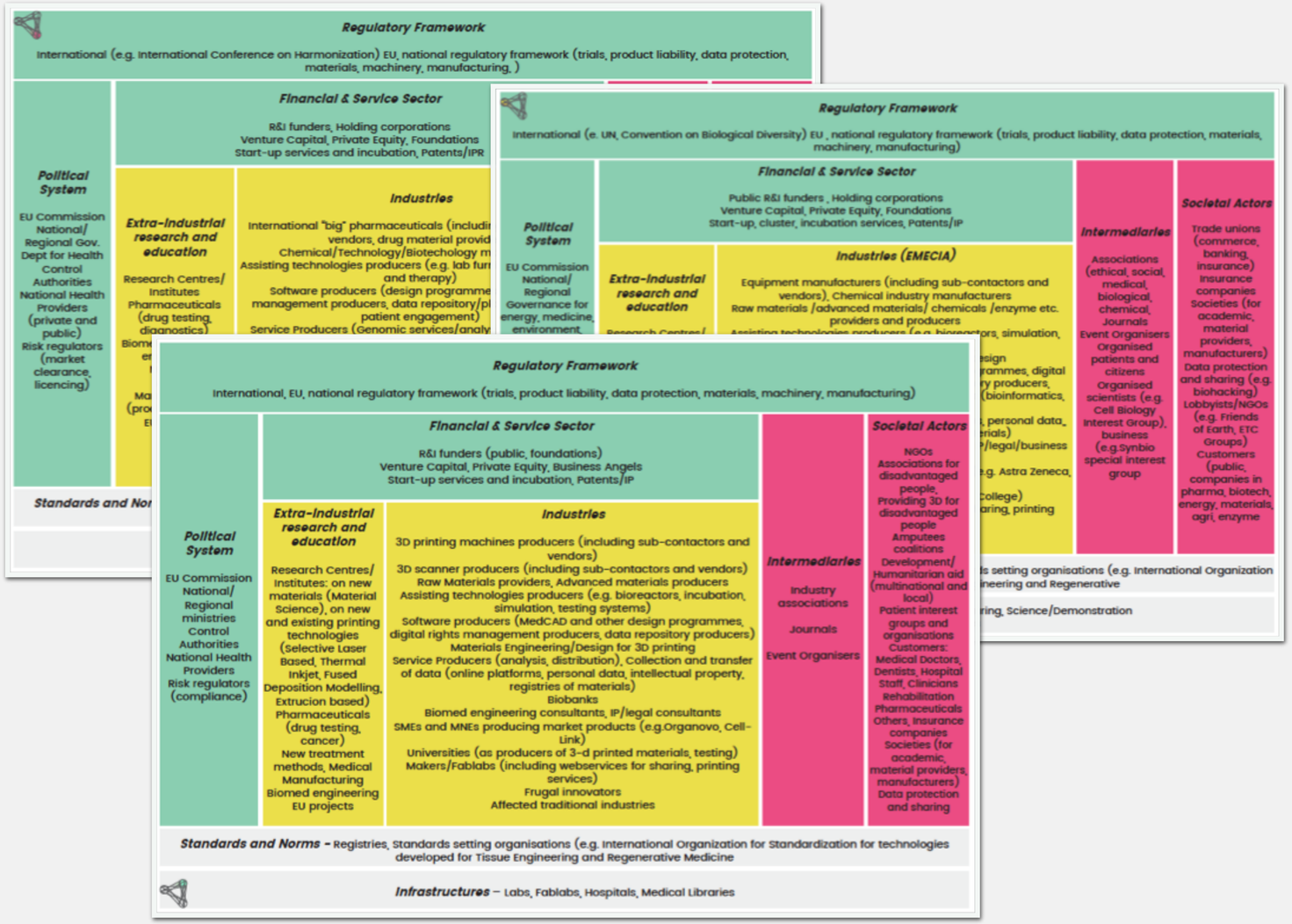
RRI Angels
High level experts from academia and entrepreneurial field in different EU countries, who represent RRI themes such as ethics, gender, public engagement, governance, science education, social justice, sustainability.

Societal Watchdog
representing civil society views - a proper watchdog to make sure societal inputs and perspectives are taken into account

An overview of the journey



Stakeholders Mapping in 6 countries



Mapped more than 700 entities, over 900 individuals

3 main categories:
Industry
CSO
Other (Regulatory, Policy, Finance, Infrastructure, Research)

6 Countries

156 Participants

Companies 51

30 Civil Society Organisations

6 Industrial Dialogues

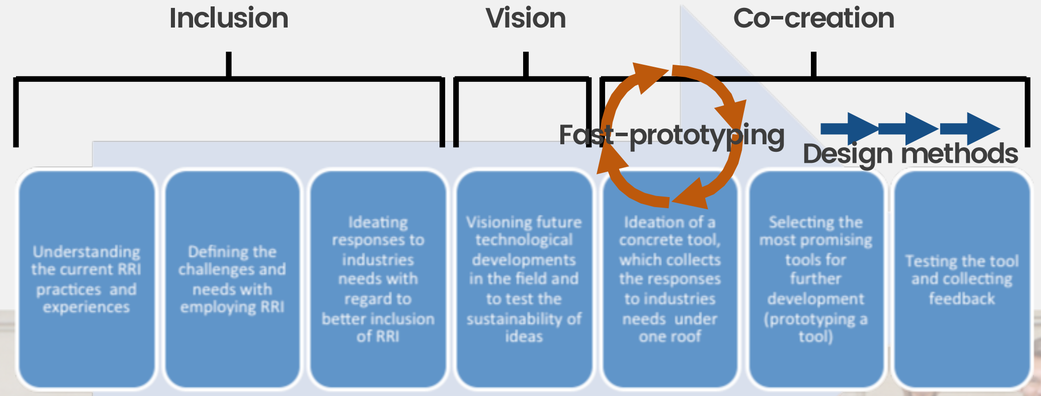
Cross-fertilisation Dialogues 3

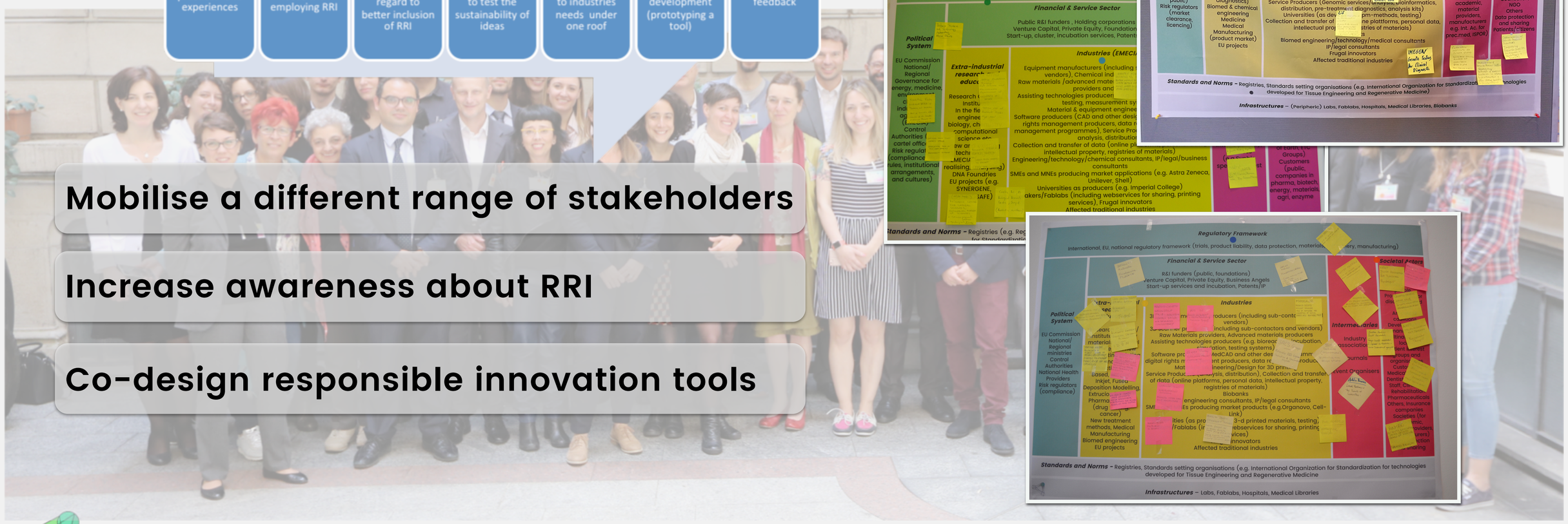
A new format for stakeholders interaction

Industry

Civil Society

Other stakeholders

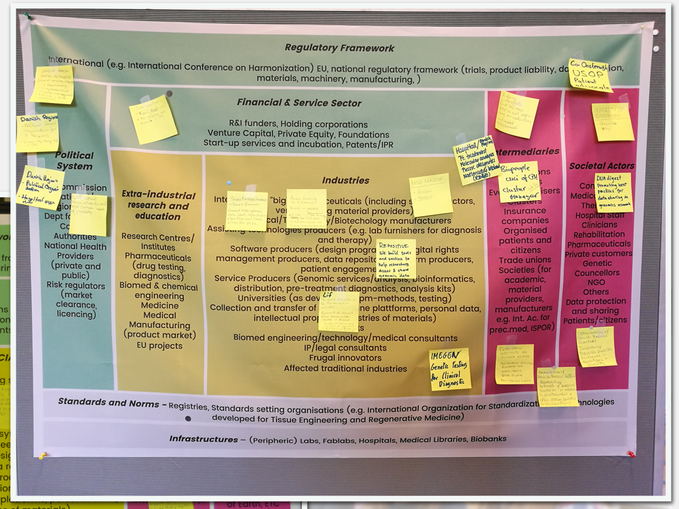


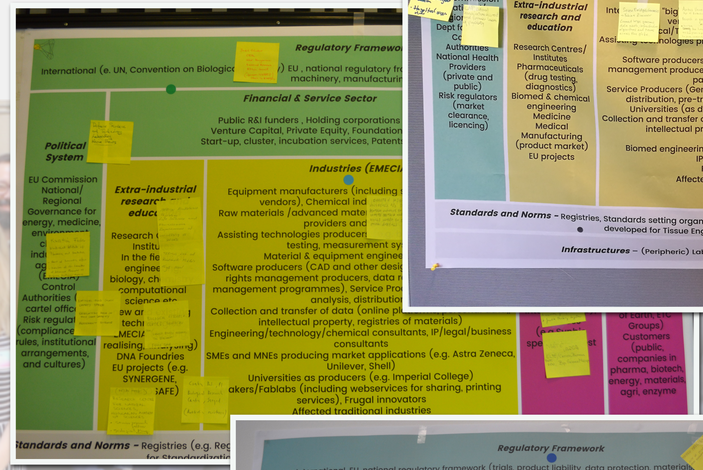


Mobilise a different range of stakeholders

Increase awareness about RRI

Co-design responsible innovation tools





Concrete co-design experiences

Participants in the dialogues challenged themselves, and pushed the experience of co-design to **build physical mockups** of their proposals.

Better **understanding** of the role **of players and their interactions within the innovation ecosystems**

Learning from the dialogues

Ecosystem of RRI

RRI is a multi-stakeholder ecosystem by definition, and the "co-constructed" proposals require the involvement of different subjects at a "systems-level"

RRI and innovation field

Often **difficult to consider RRI as separate from field-specific technical needs and challenges**

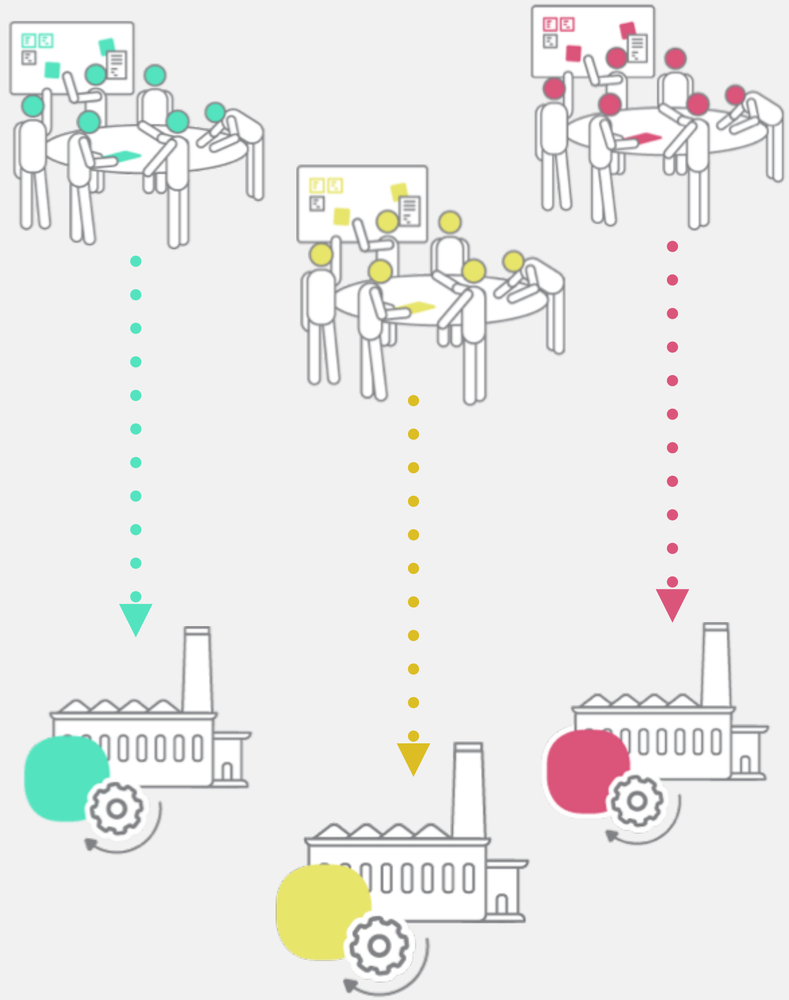
The role of Industry

New tools cannot be introduced without additional measures (incentives, funding, recognition) **and involving other players**. The focus on the sole industry is often questioned.

Overwhelming richness of proposals

Toolboxes: complex proposals, concrete, with multiple actors, aware of relationships. A concrete **translation of RRI by design**, concept and way of addressing specific challenges of the field.

From the Dialogues to the Pilots



Input:

- Ideas from Fast Prototyping
- Whole tools from mockup
- Components of mockup tools

Exclude tools addressing only technical needs

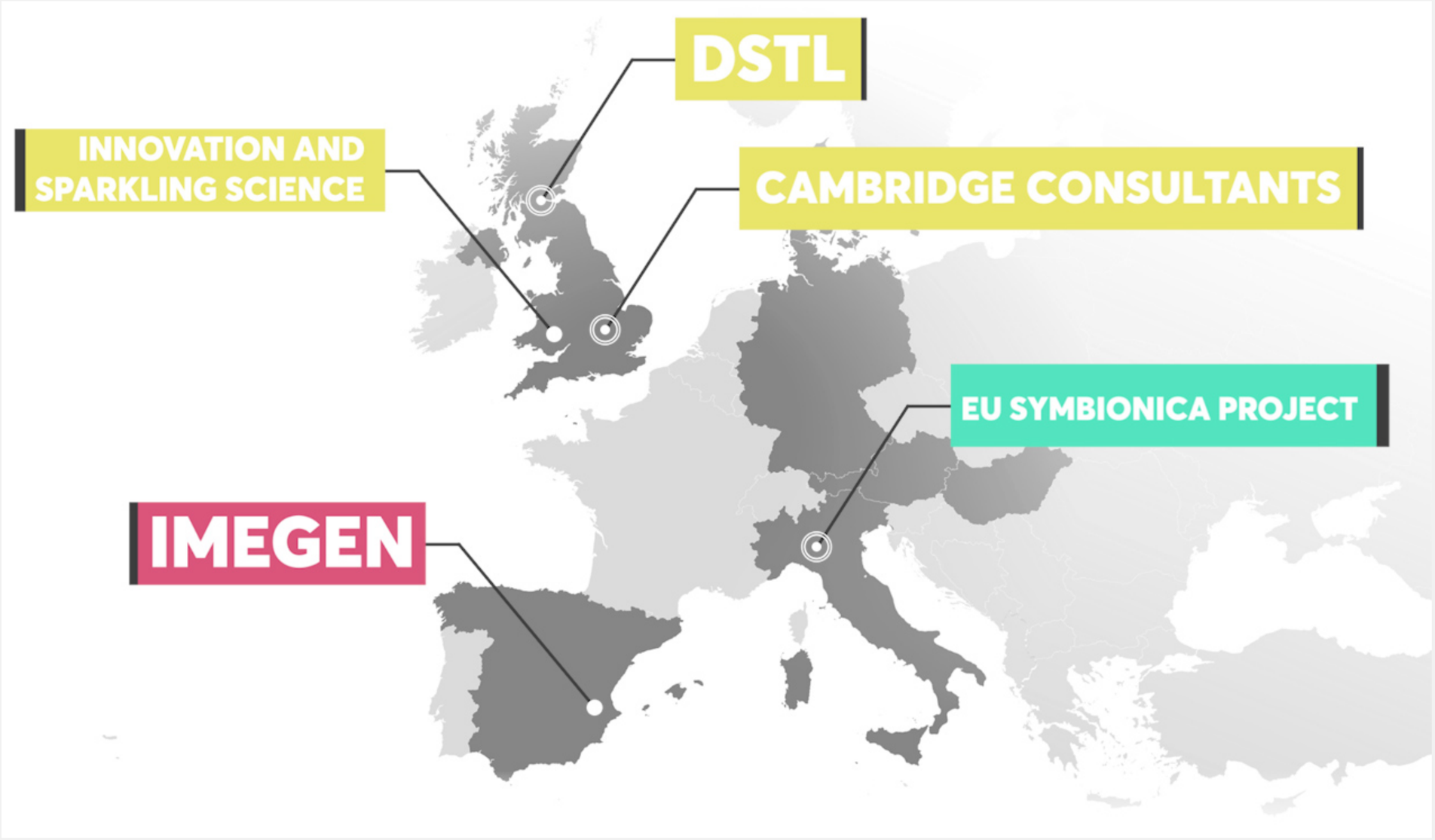
Feasibility with timeframe and resources

List of candidate tools

Can it be implemented by one company? Or in a small scale multi-stakeholder process?

Selection of Tools to be piloted as a **dialogue** with the piloting company

The SMART-map Pilots

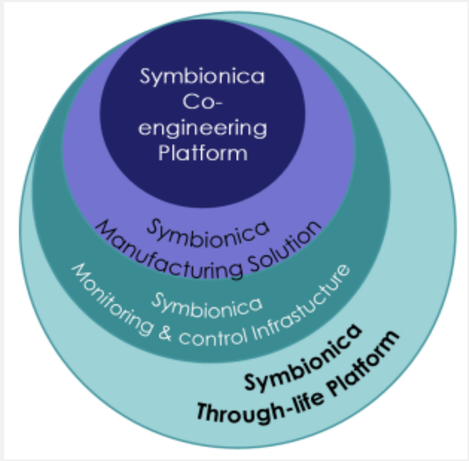


3MED – THE PILOT PROJECT

SYMBIONICA – Reconfigurable Machine for the new Additive and Subtractive Manufacturing of next generation fully personalized bionics and smart prosthetics (*Oct 2015 – Sept 2018*)

SYMBIONICA concept integrates:

- a reconfigurable machine (3DMed printer)
- a technological platform for involving all stakeholders.
- a cluster of sensors gathering information about prosthetics performance in line with human functionalities



sintea PLUSTEK s.r.l.

- SME, founded in 1987 in Milan, Italy
- Develops implants for medical field (particularly for spine orthopedic, traumatology and neurosurgery), and deploys 3D printing technology for its products
- SYMBIONICA Project coordination

SELECTED TOOLS FOR 3DMED PILOT

1) RRI Training

Main objectives:

- Training of SYMBIONICA partners on RRI principles, aligned with the SYMBIONICA project objectives;
- Convey the meaning of RRI in the industrial context (advantages, opportunities and examples);
- Collecting indications and suggestions from SYMBIONICA partners and start to co-design the next step of the pilot (multi-stakeholder workshop).

2) Multi-stakeholder Workshop

Main objective:

Workshop with external stakeholders to discuss the introduction of a certification for 3D printing in biomedicine which incorporates RRI principles

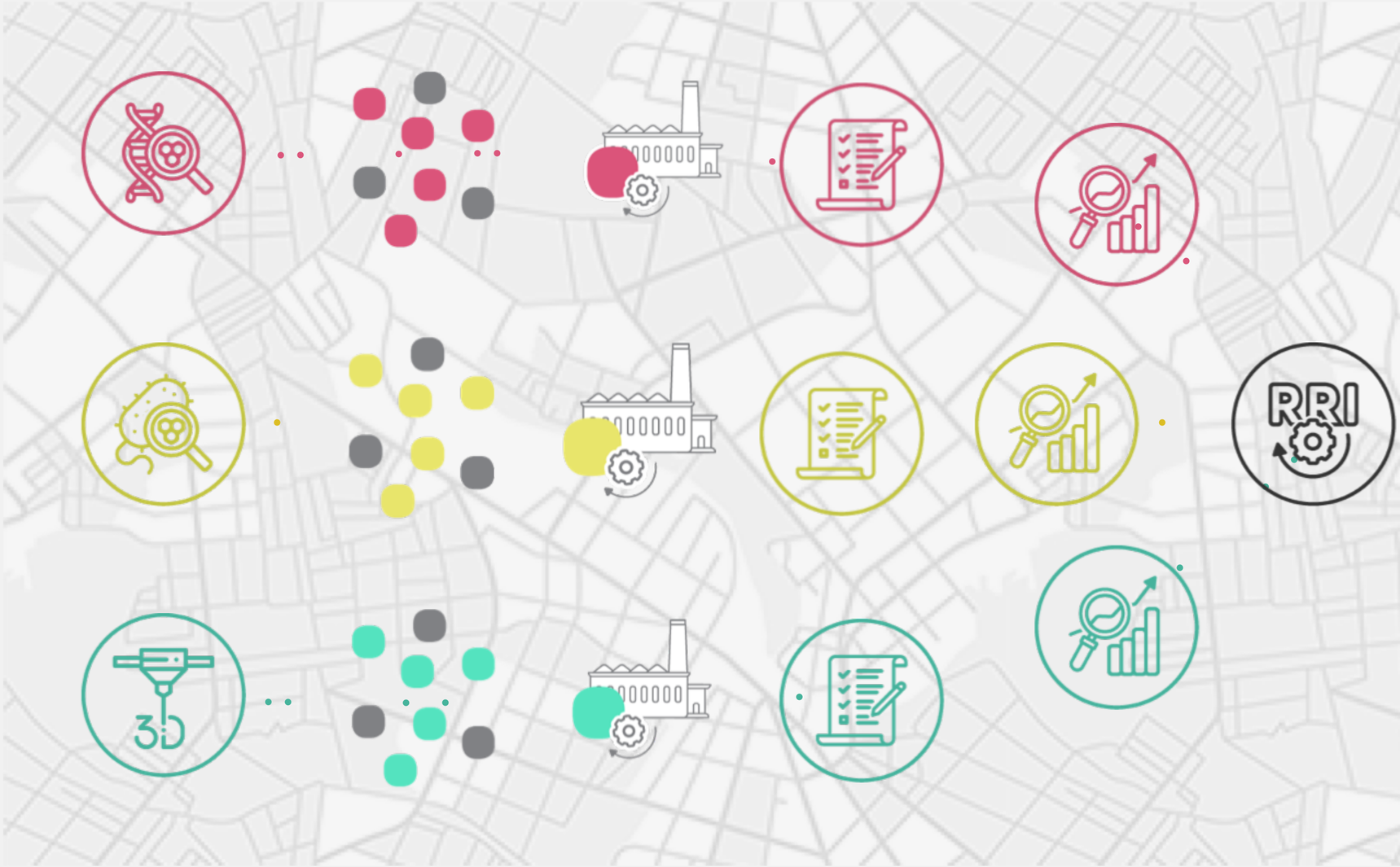
PILOTING ACTIVITIY – MULTI-STAKEHOLDER WORKSHOP

The workshop “Toward responsible rules for 3D printing in biomedicine“, March 2018, Milan, Italy

12 participants from diverse stakeholder groups

- The topic on new rules for 3D med is «hot» in the community.
- Need to re-think the existing rules both on the content and on the way they are shaped
- Responsible technical standards/certification («RRI by Design») instead of «RRI Certification» Outstanding example to look at: IEEE ethical standards and certification for autonomous and intelligent systems

Building the SMART Maps



Societal Mobilisation Goals

Approach RRI as an ecosystem

Establish framework conditions

Invest in communities

The SMART Maps are Innovation “trendy”

Emergent trends in “design”

Successful companies use “agile methods” (i.e. combine both speed and stability)

Collision of different viewpoints

Fast-prototyping

Multi-stakeholders

Co-design

Co-development

Standards & certification

End-user panels

Inclusion of different perspectives

The added value of RRI

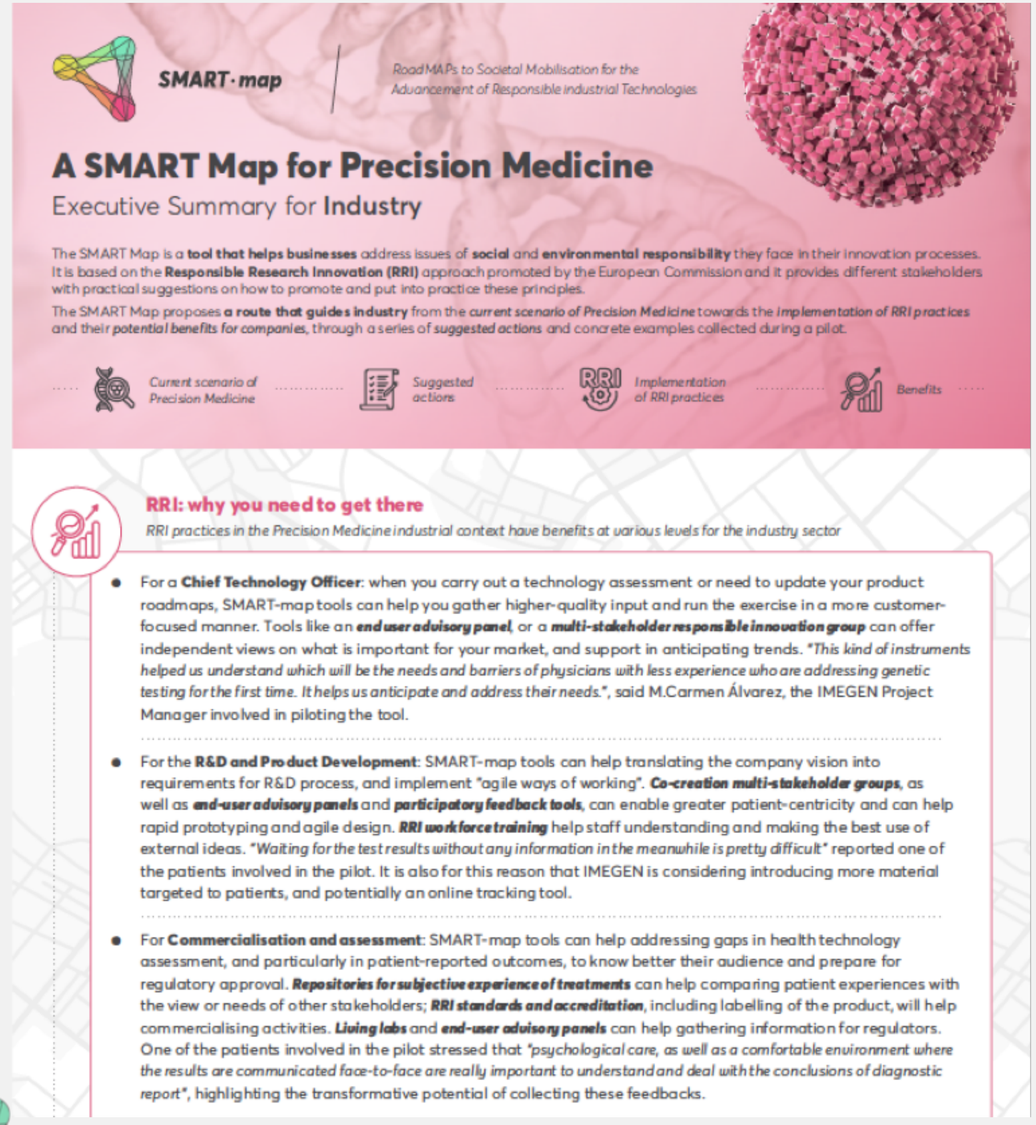
RRI **intercepts those trends** in how successful companies do innovation, but and at the same time offers a **more comprehensive**, **inclusive**, **value and society-aware** way of addressing key needs of many different areas within innovative companies

- **Better capture trends for products roadmaps**
- **Effective ways to incorporate external ideas**
- **Help translate vision into R&D requirements**
- **Propagate societal goals through organisation**
- **Strengthen readiness to regulators**

Actions and Examples

Gathered inputs from the Industrial Dialogues, and translated the experience of the Pilot, to suggest **actions** each key stakeholder could implement to contribute reaching our goal: **mainstreaming RRI**

Executive summaries for different audiences (industry, CSOs, funders, RRI community, policymakers)



SMART·map

RoadMAPs to Societal Mobilisation for the Advancement of Responsible industrial Technologies

A SMART Map for Precision Medicine

Executive Summary for **Industry**

The SMART Map is a **tool that helps businesses** address issues of **social** and **environmental responsibility** they face in their innovation processes. It is based on the **Responsible Research Innovation (RRI)** approach promoted by the European Commission and it provides different stakeholders with practical suggestions on how to promote and put into practice these principles.

The SMART Map proposes **a route that guides industry** from the *current scenario of Precision Medicine* towards the *implementation of RRI practices* and their *potential benefits for companies*, through a series of *suggested actions* and concrete examples collected during a pilot.

Current scenario of Precision Medicine — *Suggested actions* — *Implementation of RRI practices* — *Benefits*

RRI: why you need to get there

RRI practices in the Precision Medicine industrial context have benefits at various levels for the industry sector

- For a **Chief Technology Officer**: when you carry out a technology assessment or need to update your product roadmaps, SMART-map tools can help you gather higher-quality input and run the exercise in a more customer-focused manner. Tools like an ***end user advisory panel***, or a ***multi-stakeholder responsible innovation group*** can offer independent views on what is important for your market, and support in anticipating trends. *"This kind of instruments helped us understand which will be the needs and barriers of physicians with less experience who are addressing genetic testing for the first time. It helps us anticipate and address their needs."*, said M.Carmen Álvarez, the IMEGEN Project Manager involved in piloting the tool.
- For the **R&D and Product Development**: SMART-map tools can help translating the company vision into requirements for R&D process, and implement "agile ways of working". ***Co-creation multi-stakeholder groups***, as well as ***end-user advisory panels*** and ***participatory feedback tools***, can enable greater patient-centricity and can help rapid prototyping and agile design. ***RRI workforce training*** help staff understanding and making the best use of external ideas. *"Waiting for the test results without any information in the meanwhile is pretty difficult"* reported one of the patients involved in the pilot. It is also for this reason that IMEGEN is considering introducing more material targeted to patients, and potentially an online tracking tool.
- For **Commercialisation and assessment**: SMART-map tools can help addressing gaps in health technology assessment, and particularly in patient-reported outcomes, to know better their audience and prepare for regulatory approval. ***Repositories for subjective experience of treatments*** can help comparing patient experiences with the view or needs of other stakeholders; ***RRI standards and accreditation***, including labelling of the product, will help commercialising activities. ***Living labs*** and ***end-user advisory panels*** can help gathering information for regulators. One of the patients involved in the pilot stressed that *"psychological care, as well as a comfortable environment where the results are communicated face-to-face are really important to understand and deal with the conclusions of diagnostic report"*, highlighting the transformative potential of collecting these feedbacks.

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RoadMAPs to Societal Mobilisation for the Advancement of Responsible industrial Technologies

A SMART Map for 3D Printing in the Biomedical Field (3DMed)

Executive Summary for **Industry**

The SMART Map is a **tool that helps businesses** address issues of **social** and **environmental responsibility** they face in their innovation processes. It is based on the **Responsible Research Innovation (RRI)** approach promoted by the European Commission and it provides different stakeholders with practical suggestions on how to promote these principles.

The SMART Map proposes **a route that guides industry** from the *current scenario of 3DMed* towards the *implementation of RRI practices* and their *potential benefits for companies*, through a series of *suggested actions* and concrete examples collected during a pilot.

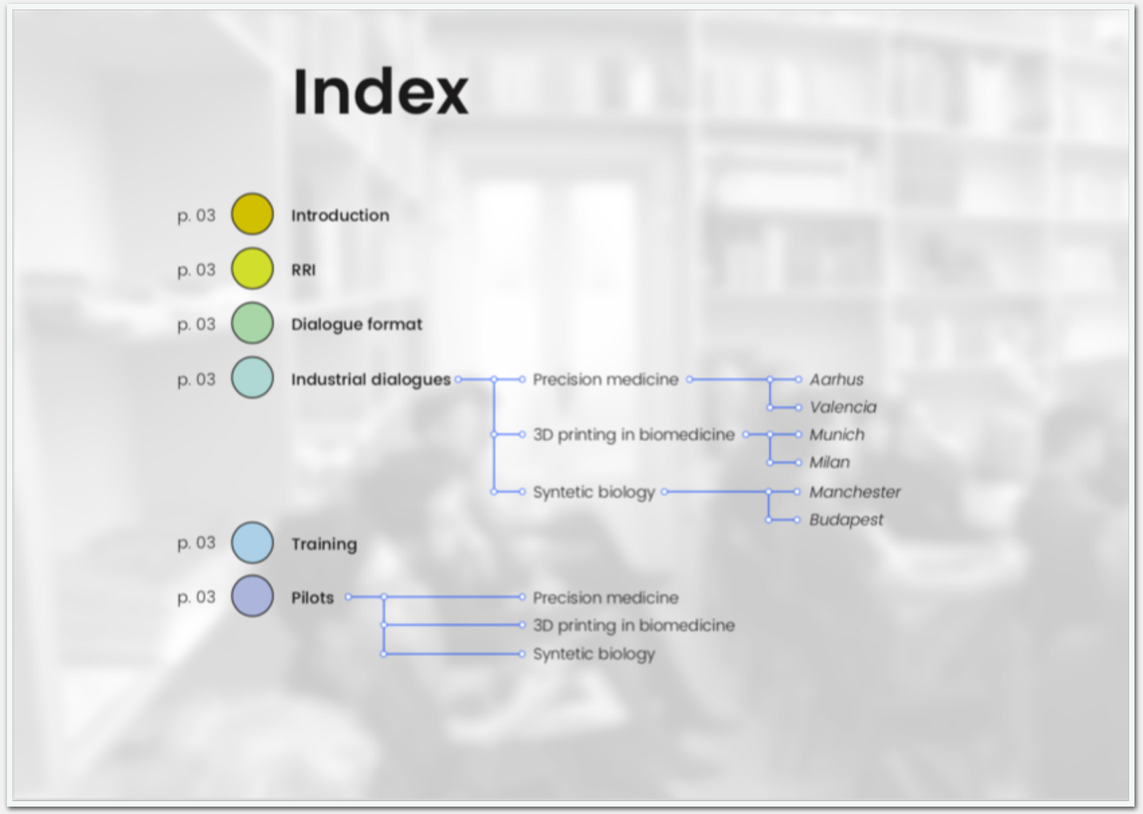
Current scenario of 3DMed — *Suggested actions* — *Implementation of RRI practices* — *Benefits*

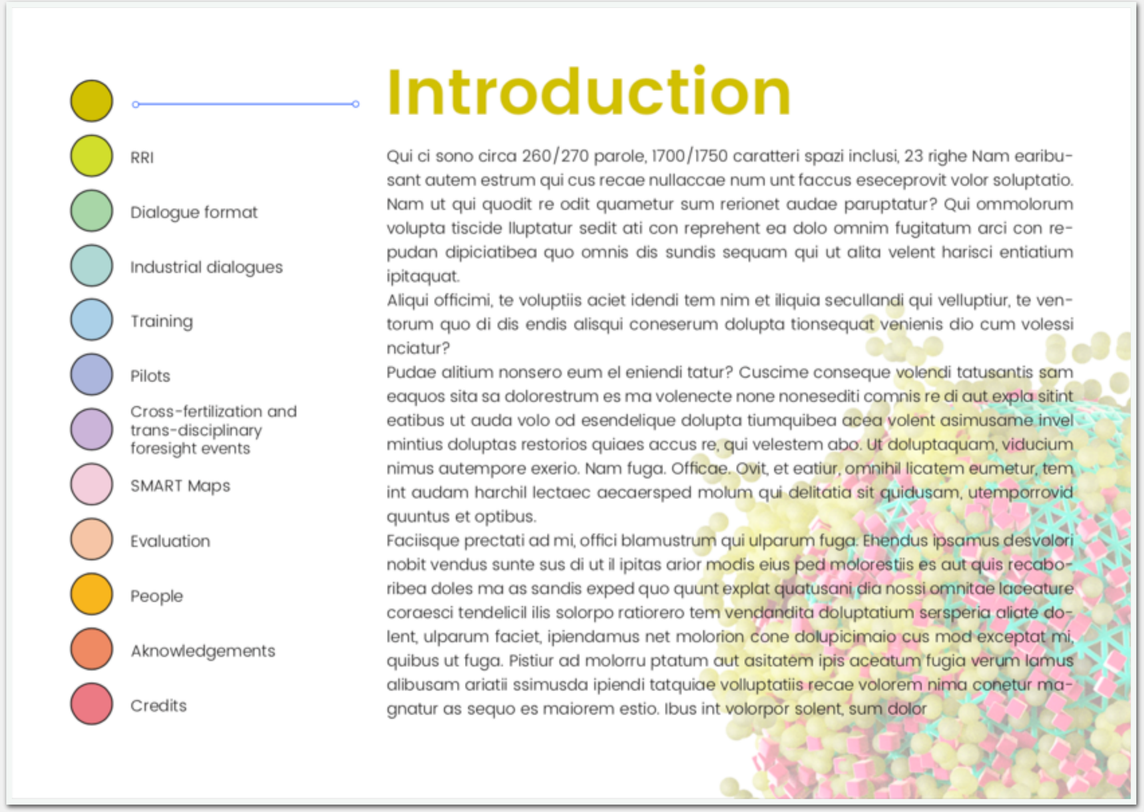
RRI: why you need to get there

RRI practices in the 3DMed industrial context have benefits at various levels for the industry sector

- For a **Chief Technology Officer**: when you carry out a technology assessment or need to update your product roadmaps, SMART-map tools can help you gather higher-quality input and run the exercise in a more customer-focused manner. Tools like a ***RRI 3DMed multi-stakeholder workshop*** can contribute to understand and anticipate uncertainties, concerns and expectations around both products and processes (for example safety, affordability and timing issues) of end users, thereby building a relation of trust with society and the market, which in turn increases the company's reputation. Furthermore, the tool can help implementing new strategies to improve the quality and the safety of products and finding new business opportunities by adopting an inclusive and participatory approach. As emerged from the 3Dmed pilot, focusing on revising standards and certification approach for the 3D printed medical devices, the ***RRI 3DMed multi-stakeholder workshop*** could be a concrete means to identify the needs of the stakeholders and to unleash the potential of 3D printing in biomedicine, also in terms of personalisation of products. "So far Medical Device Certification focused on technical aspects mainly; thanks to the collaboration with SMART-map we are now including the ethical dimension which will increase the value our companies will provide to patients, doctors and the rest of stakeholders", highlighted Alessio Giuliani, SYMBIONICA Project Coordinator, involved in the 3Dmed pilot experience.
- For **Management and the R&D and Product Development**: SMART-map tools can help translating the company vision into requirements for R&D process, and implement "agile ways of working". ***RRI training***, ***RRI self-assessment*** and ***RRI score*** can foster the self-assessment of companies so to identify new research, development and management priorities or to strengthen existing ones in line with societal needs.
- For **Commercialisation and assessment**: SMART-map tools can help addressing gaps in health technology assessment, and particularly in patient-reported outcomes, to know better their audience and prepare for regulatory approval. Tools like ***RRI training***, ***RRI self-assessment*** and ***RRI score*** can sharpen communication activities and goals, presenting RRI-compliance as an added value. Moreover, ***RRI 3DMed multi-stakeholder workshop*** can increase the companies' awareness about their innovation ecosystem, enlarging the community of stakeholders and improving the relationship with them, and positively influencing the innovation ecosystem governance both in terms of avoiding over-regulation for new technologies and including more voices that can prevent the development of a monopolistic system composed of a small number of big companies.

SMART-map e-book: launch on 29th October



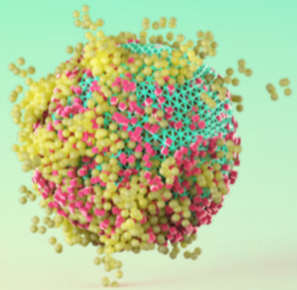


- We can show a long list of benefits in using RRI
- We proposed tools, we tested them
- We collected concrete examples, success stories
- We suggest key actions for all actors involved

Achievement 1: Impact

- We created partnerships across all over Europe
- We brought together actors from different experiences
- We’ve made them work, laugh, think
- We gave them new ideas and contacts, to bring home

Achievement 2: Mobilisation



Thank you

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