

Digital Innovation Hubs in Robotics and services offered to the robotics community

Reinhard Lafrenz

2018-10-04

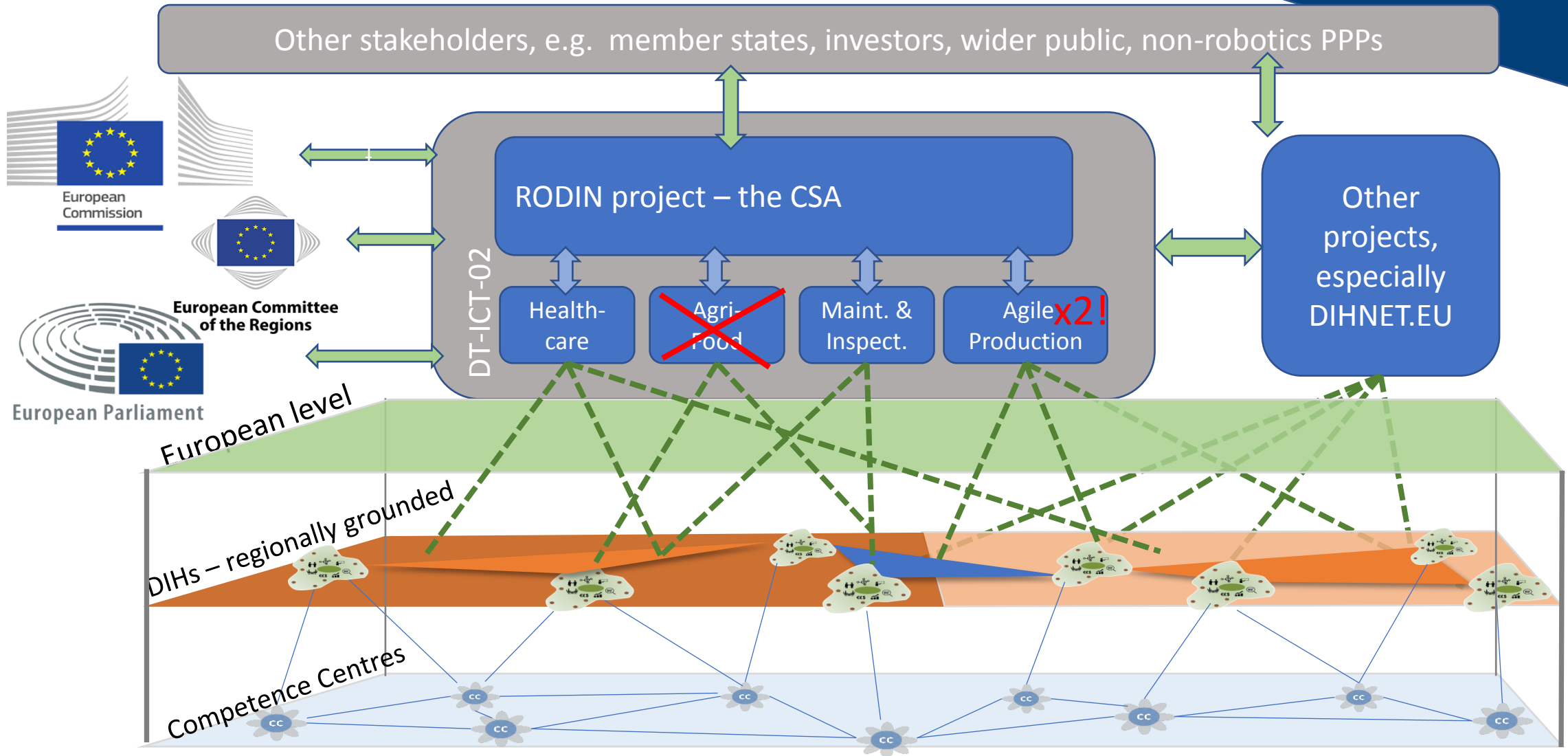
IROS 2018 Forum on Robotics in the European Artificial Intelligence strategy and funding opportunities



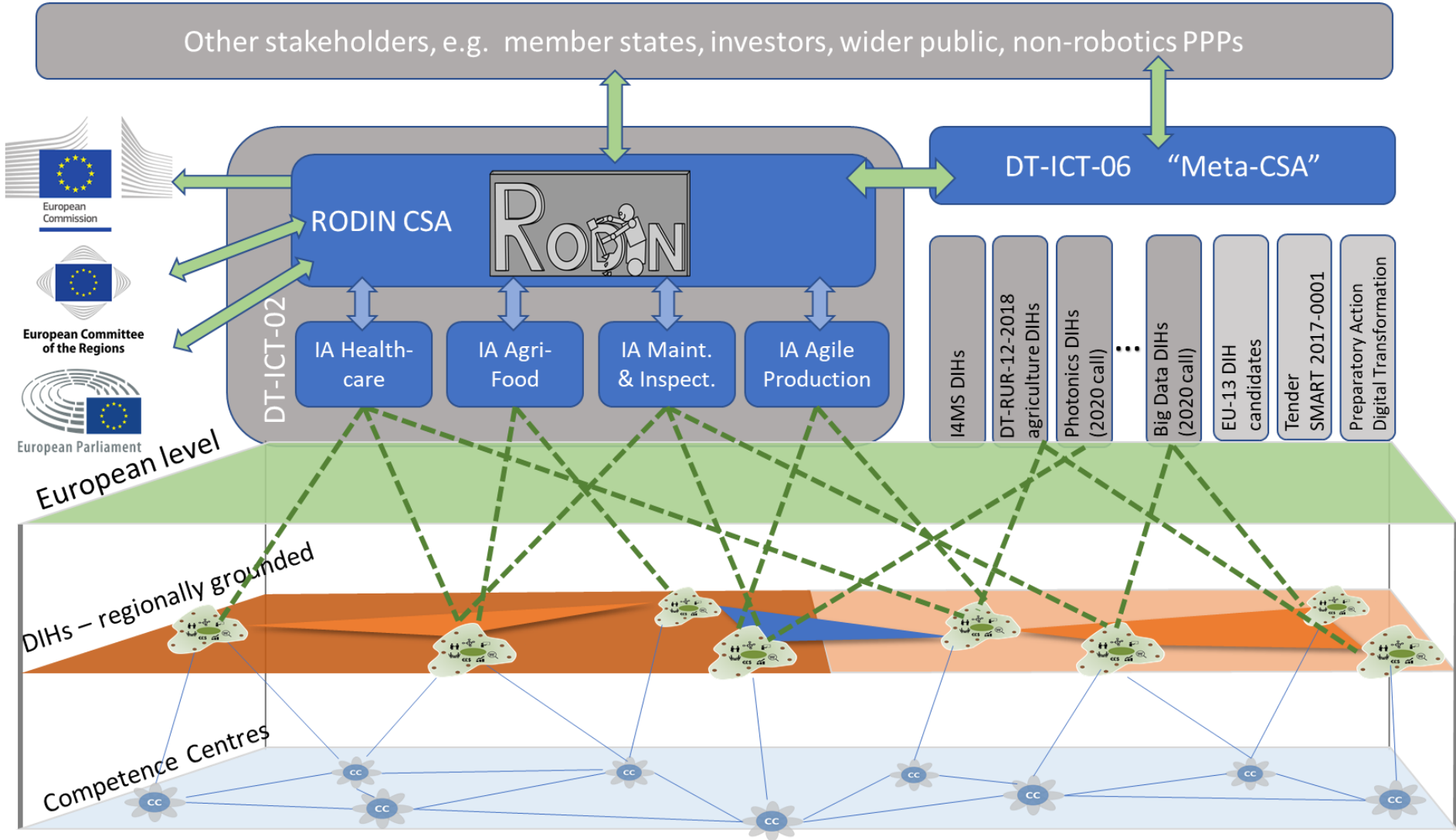
DISCLAIMER:
All information is preliminary
DIH projects are in
grant preparation phase



The future DIH landscape – Robotics view



The full future DIH landscape



Intro to the IAs, common goals and services expected

- From the Work program:
 - “provide **easy access** to the latest digital innovations and experimentation facilities to potential users “
 - “DIHs offer **services to test and experiment** with advanced technologies, to manufacture innovative products or **act as broker** between user companies and technology suppliers”
 - “Activities should aim at **long-term sustainability** and include a business plan for the digital innovation hubs, a plan to attract investors, to address training and skills development needs and dissemination”
 - DIHs should address **ethical, data privacy and protection issues**, and consider cyber-security issues (including security by design). DIHs should **support the development of use-case demonstrators** at TRL 5 and above, preferably based on open system platforms.

Easy Access

Test and experiment

Act as Broker

Sustainability

Investment

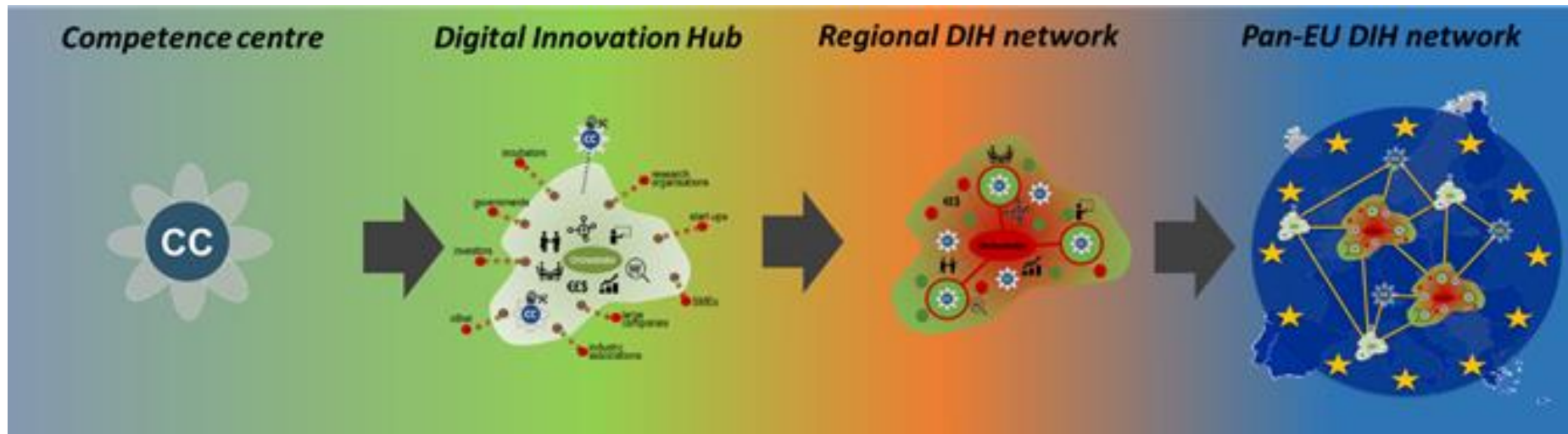
Skill development

Ethics data data protection

Use-case demonstrators

RODIN – What is the goal?

To **coordinate** activities within the different PAA Innovation Actions and **support** them by **increasing the efficiency and effectiveness** of their activities, as well as improve their **cross-PAA collaboration**.



RODIN – What is the goal?

- The dissemination of **best practices**
- **Collaboration between the DIH networks**
- Combined **communication and outreach** from the four PAA DIH networks.
- **Assessment** of DIH networks and feedback to the consortia to **improve operations.**
- **Coordinate access** to assets, platforms, pilots and demonstrators.
- Cross-PAA **strategic development** including funding synchronization.
- The enabling of **industry-led standards** development.

What is RODIN actually doing?

Within the network of Hubs

- Harmonisation of the different hub networks
 - Terminology
 - Handling of third party funding
 - Cross-cutting issues such as contribution to standards
- Mentoring
- Dissemination of best practice
- Access to a broader network and crosslinks

For potential users

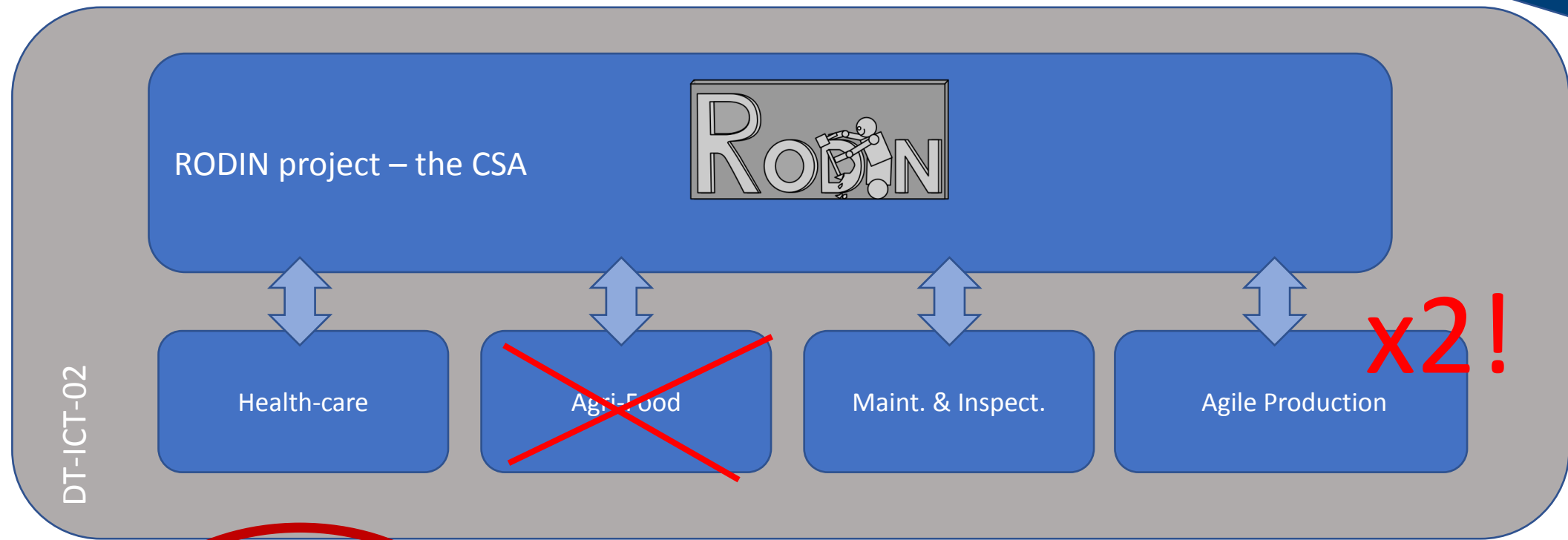
- Single entry point into the network of networks
- Creating awareness and trust in such as complex system

What would you like us to do for you?

Some details of RODIN

- FSTP coordination
 - Timing of call deadlines (avoid clumping)
 - Same terminology
 - Guides for applicants harmonized
 - Evaluation criteria harmonized
 - Common handling of proposals and results
 - Shared evaluator database (workload)
- Common look and feel (keeping the individual project character)
 - Collaborate on branding and brand sharing
 - Helps unifying dissemination material
 - Created cohesion, also for applicants

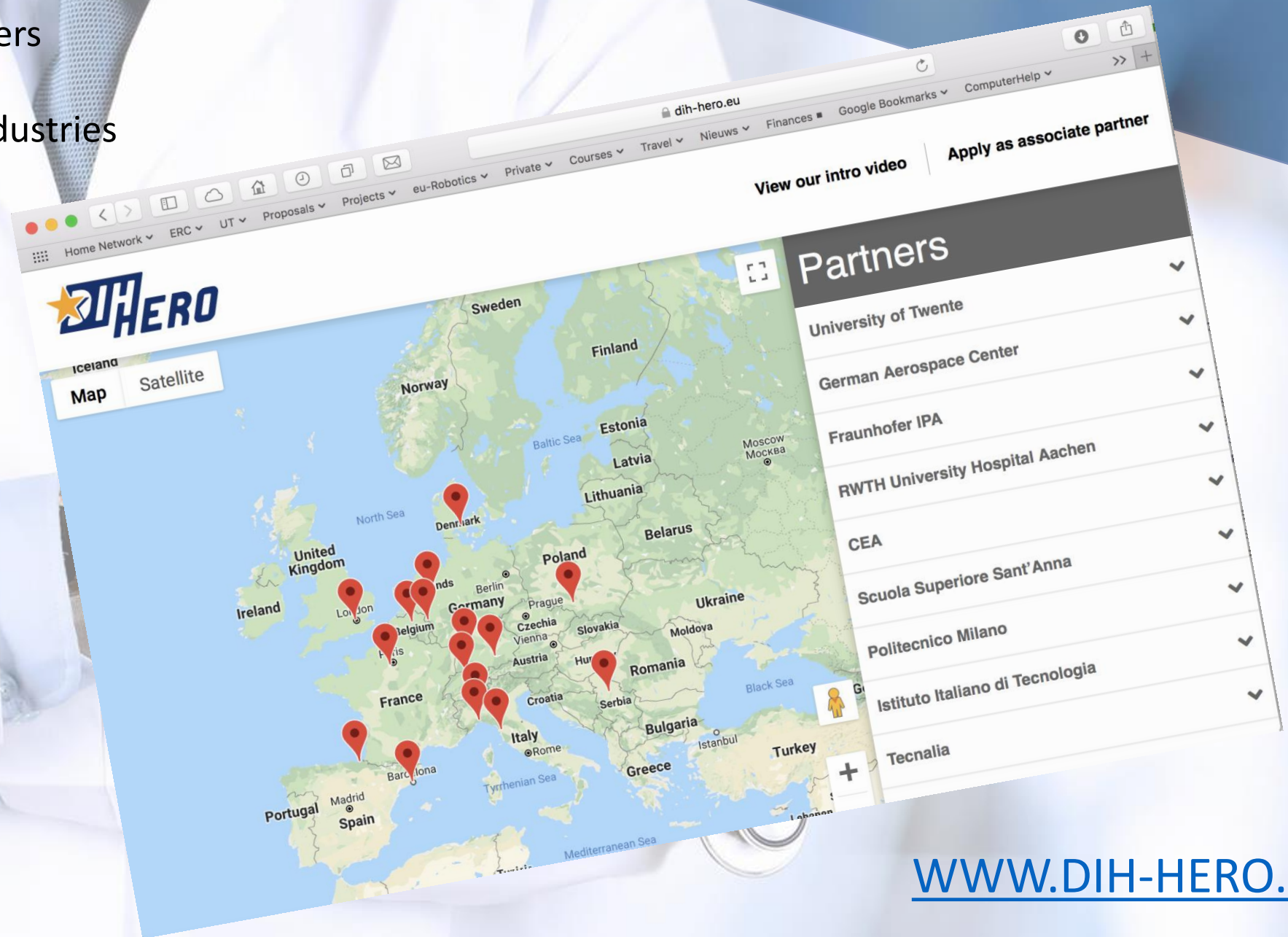
Some words on the upcoming Innovation Actions



Healthcare - DIH-Hero



- 17 Core partners
- 174 Associate Partners
- 14 Regions
- 20 Associations / Industries



The screenshot shows the website dih-hero.eu in a browser window. The page features the DIH HERO logo, a map of Europe with red location pins indicating partner locations, and a list of partners. The browser's address bar shows the URL and various navigation icons. The map includes labels for countries like Sweden, Finland, Norway, Denmark, Germany, France, Italy, Spain, and others. The partner list on the right includes:

- University of Twente
- German Aerospace Center
- Fraunhofer IPA
- RWTH University Hospital Aachen
- CEA
- Scuola Superiore Sant'Anna
- Politecnico Milano
- Istituto Italiano di Tecnologia
- Tecnalia

An Innovating Community
of Digital Innovation Hubs
In Healthcare Robotics

Analyse & share
Best Practices in
Healthcare Robotics

Engage in standards
and share information
& expertise

Overview of DIH Services
offered, Create connected
cross-border Services &
shared expertise

Connect DIH's by
Innovation Brokers;
stimulate network learning

DIH-HERO Portal for
improved access to
knowhow & brokerage

Professionalize DIH's by
sharing best practices &
expertise within DIH-HERO

Improve connectivity
by removing travel
barriers for SME's

Development of Demonstrators:

- Educate companies by innovation coaching
- Use innovation coaching to learn from projects & stimulate cross DIH learning

Main application domains Healthcare Robotics

Diagnostic
Robotics

e.g. Robots for human
function analysis
Automated imaging robots

Interventional
Robotics

e.g. Surgical robotics
Image guided robotics
Training robots

Rehabilitation
Robotics

e.g. Wearable exoskeletons
Stationary devices
Mobile training devices

Robotics
supporting
patients

e.g. Functional support
robots
Robot Assistants
Communication robots

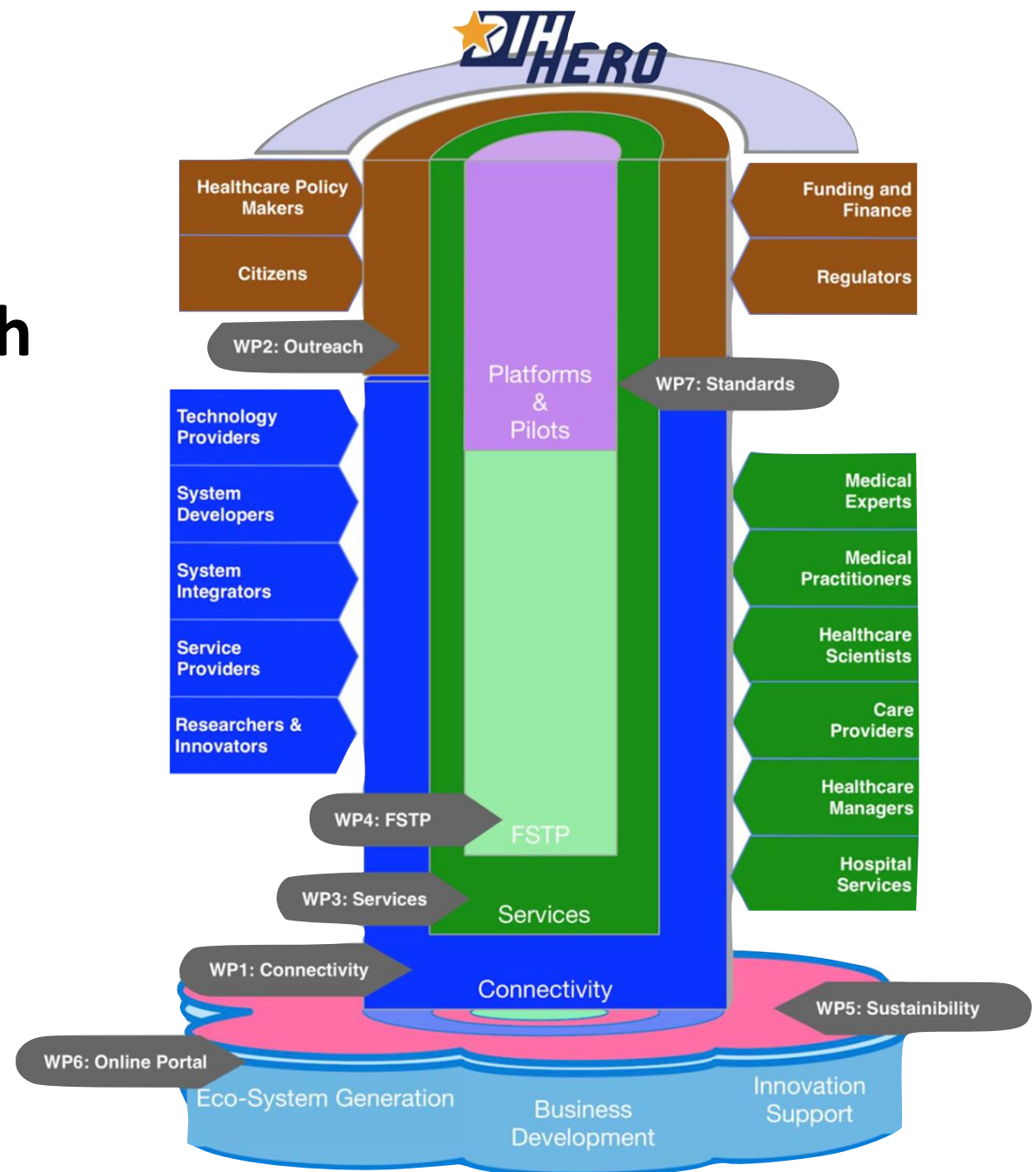
Robotics
supporting
healthcare
professionals

e.g. Ergonomical robots
Telepresence robots
Workflow optimization

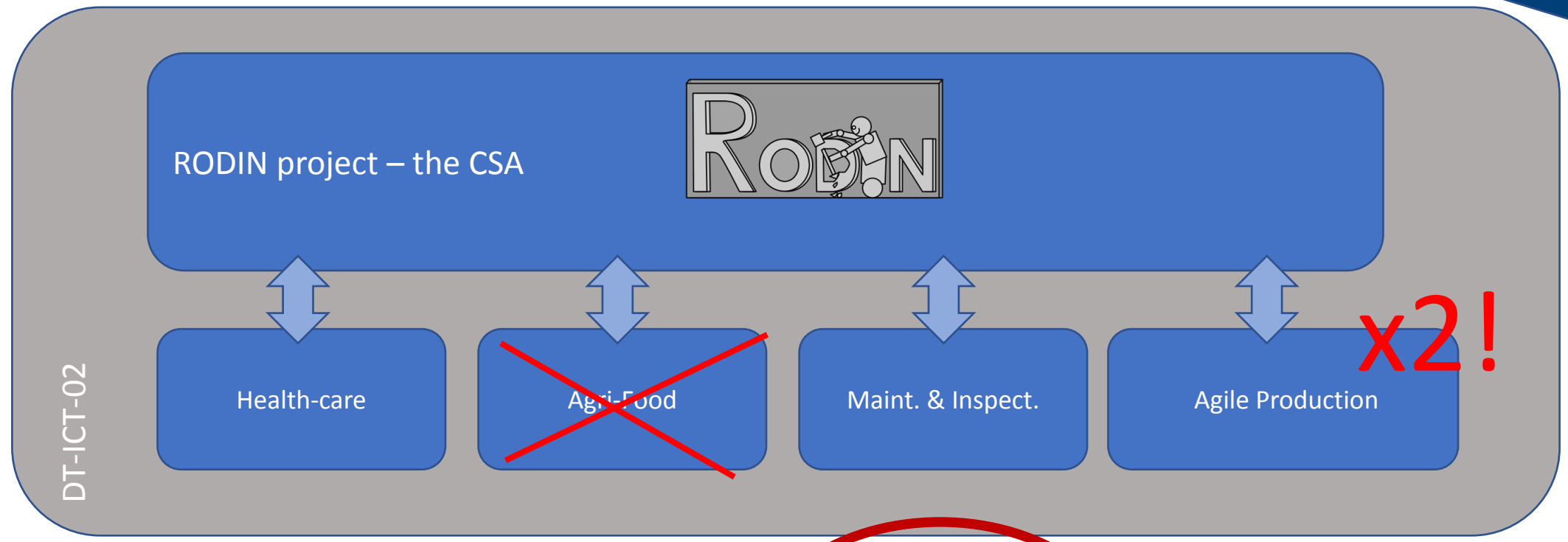
Expected Impacts



WP nr.	WP Title
1	Connectivity
2	Engagement & Outreach
3	Services
4	FSTP
5	Sustainability
6	Online Portal
7	Standards
8	Management



Some words on the upcoming Innovation Actions



Maintenance & Inspection - RIMA



RIMA

Robotics for Inspection
and Maintenance

Infrastructures

Enable people's life in a society

I&M spans across many sectors

450 B€ market

Lower parts of a construction
(opposite to superstructure).

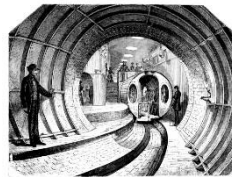
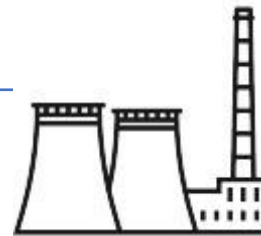
All economic or technical equipment.

Communicating,
Getting energy,
water,
Moving

Energy,
Transport,
Civil engineering,
etc.

EU hosts over 50% of I&M robotics offer

Bottleneck
connecting offer to the market and high potential applications





Energy generation and distribution. Including off shore and on-shore infrastructure, including renewables, supply infrastructure and generating facilities.



Water and waste processing; clean water storage and distribution, waste infrastructure and processing. Covering dams, reservoirs and natural water resources.



Road infrastructure; bridges, tunnels, roads etc.



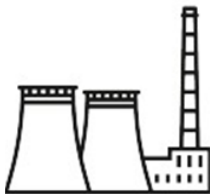
Rail infrastructure, including local transport systems such as trams, covering; track and trackside equipment, rolling stock, stations and geo-physical maintenance.



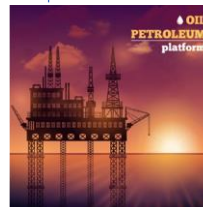
Transport hubs; ports, airports and interchanges.



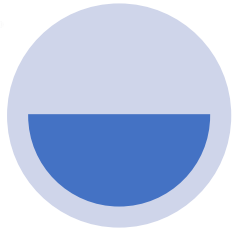
Cities; transport, waste management and fixed infrastructure



Nuclear infrastructure, including decommissioning, waste disposal, maintenance and life extension.

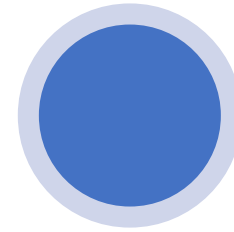


Oil and Gas extraction, refining and distribution infrastructure, including off-shore infrastructure and decommissioning.



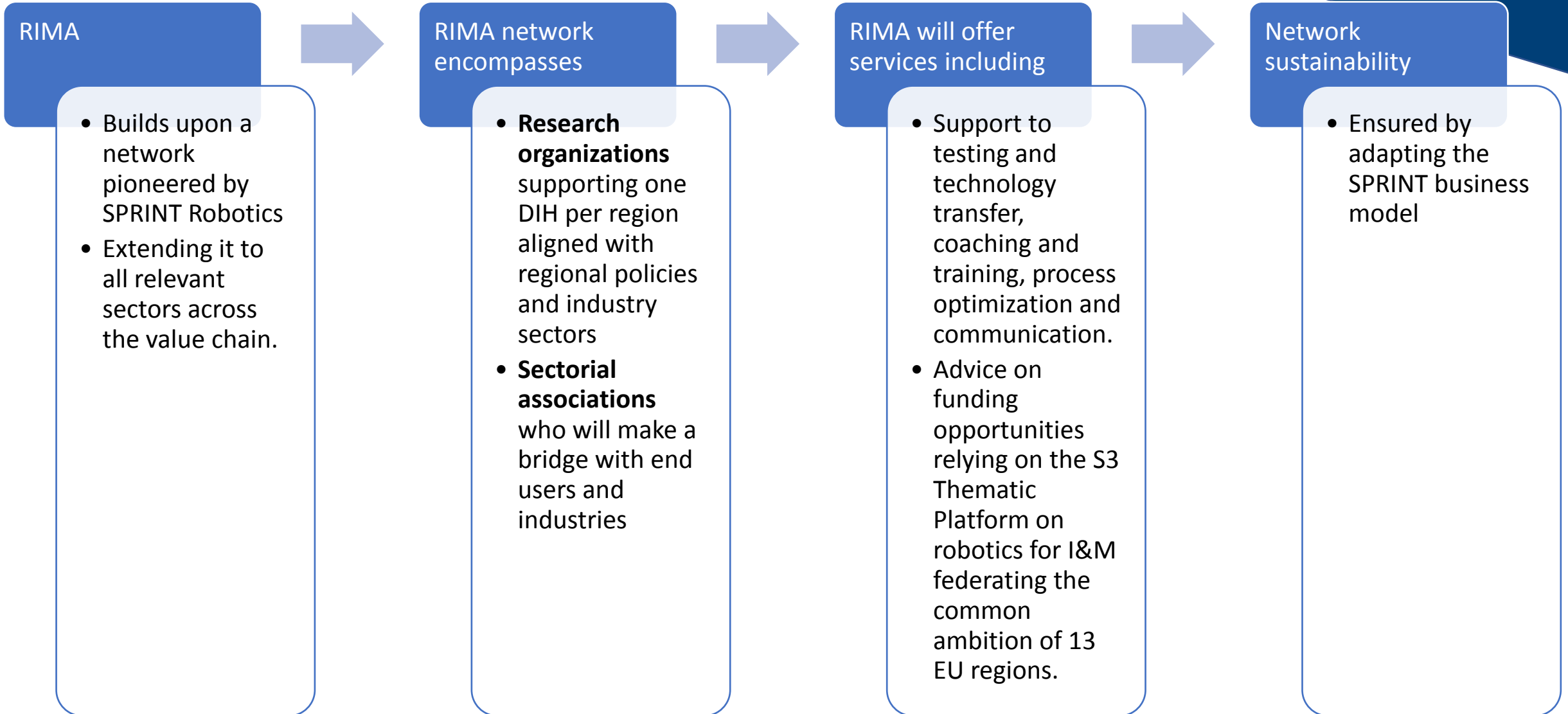
RIMA

- 4-year project
- Network of **13 Digital Innovation Hubs (DIH)** on robotics
- Sharing **best practices**
- Services **facilitating uptake** of robotics
- 8M€** for SME experiments



Challenges

- Reinforce connection** between stakeholders
- Provide **education and training** on robotics
- Connect the value chain**: research, technology & service providers, end users, investors, certification bodies

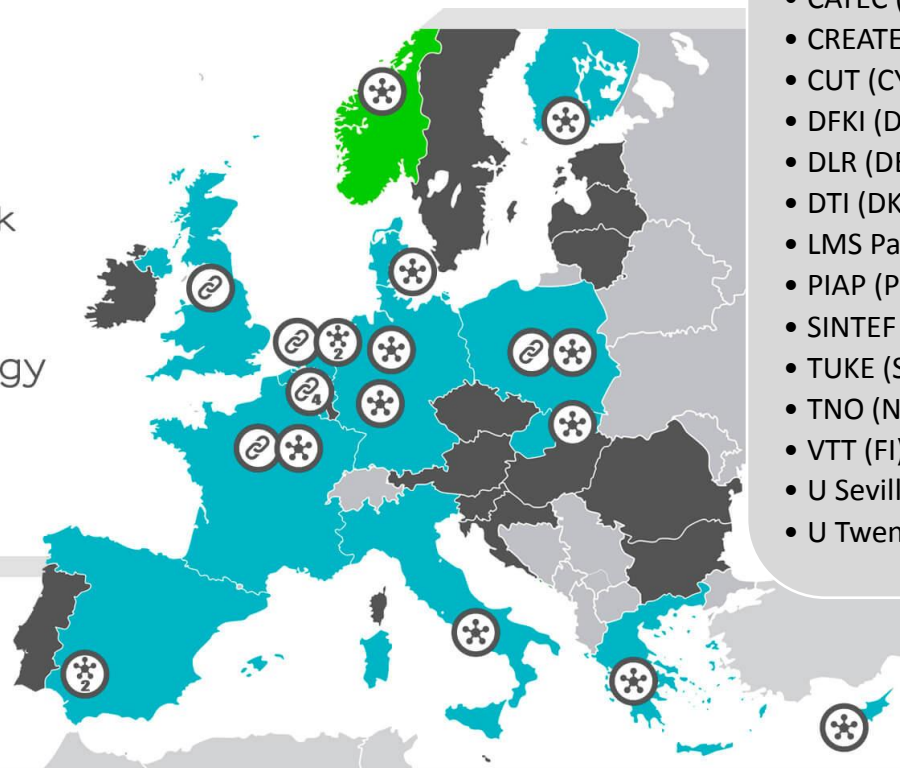


Overall concept

BUDGET SHARE

- ▶ 8.1M€ FSTP support to SMEs
- ▶ 16M€ total buget
- ▶ Sustainability model for DIH network

- ▶ 13 DIHs
- ▶ 50 Technology Transfer & Technology Demonstrator experiments
- ▶ Cross border experiments
- ▶ Involving SMEs



Current DIH (13)

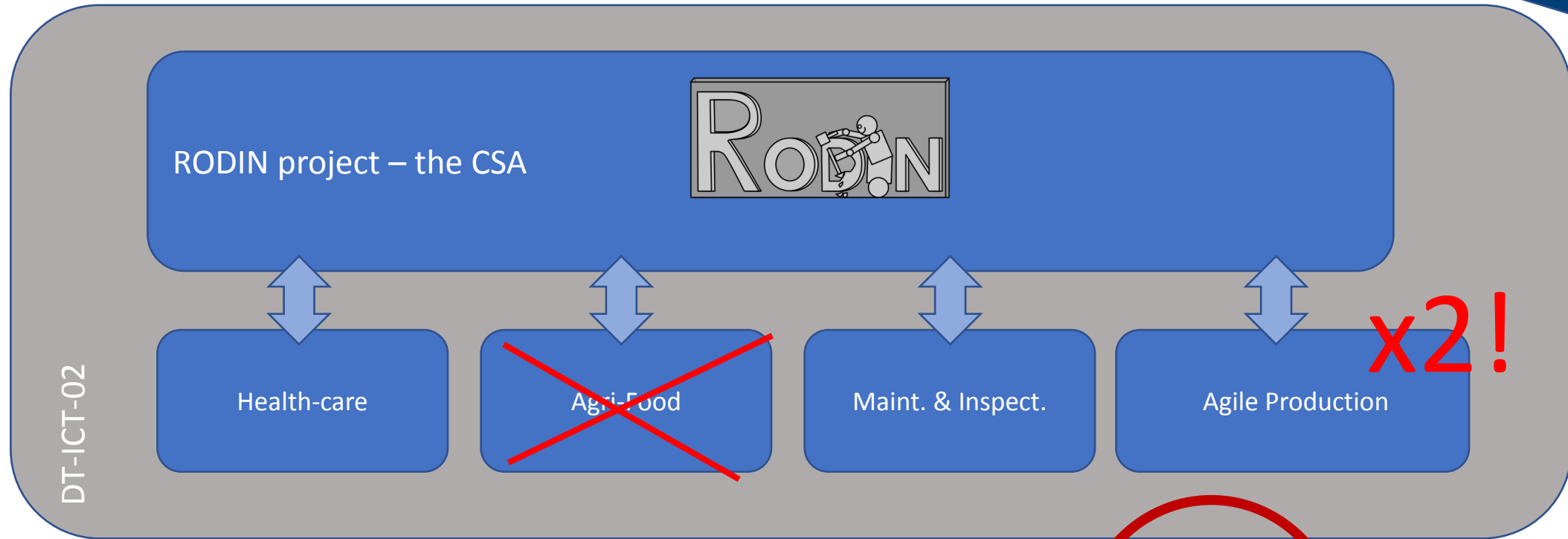
- CEA (FR)
- CATEC (SP)
- CREATE (IT)
- CUT (CY)
- DFKI (DE)
- DLR (DE),
- DTI (DK)
- LMS Patras (GR)
- PIAP (PL)
- SINTEF (NO)
- TUKE (SK)
- TNO (NL)
- VTT (FI)
- U Seville (ES)
- U Twente (NL)

Facilator and networking

- FundingBox (PL)
- SprintRobotics (NL)
- U YORK (UK)
- FORATOM (BE)
- FERHL (BE)
- EFNDT (BE)
- WSSTP (BE)
- SYSTEMATIC (FR)

- DIH
- FACILITATOR
- EU RIMA PARTNER
- NON-EU RIMA PARTNER
- EU COUNTRY
- NON-EU COUNTRY

Some words on the upcoming Innovation Actions

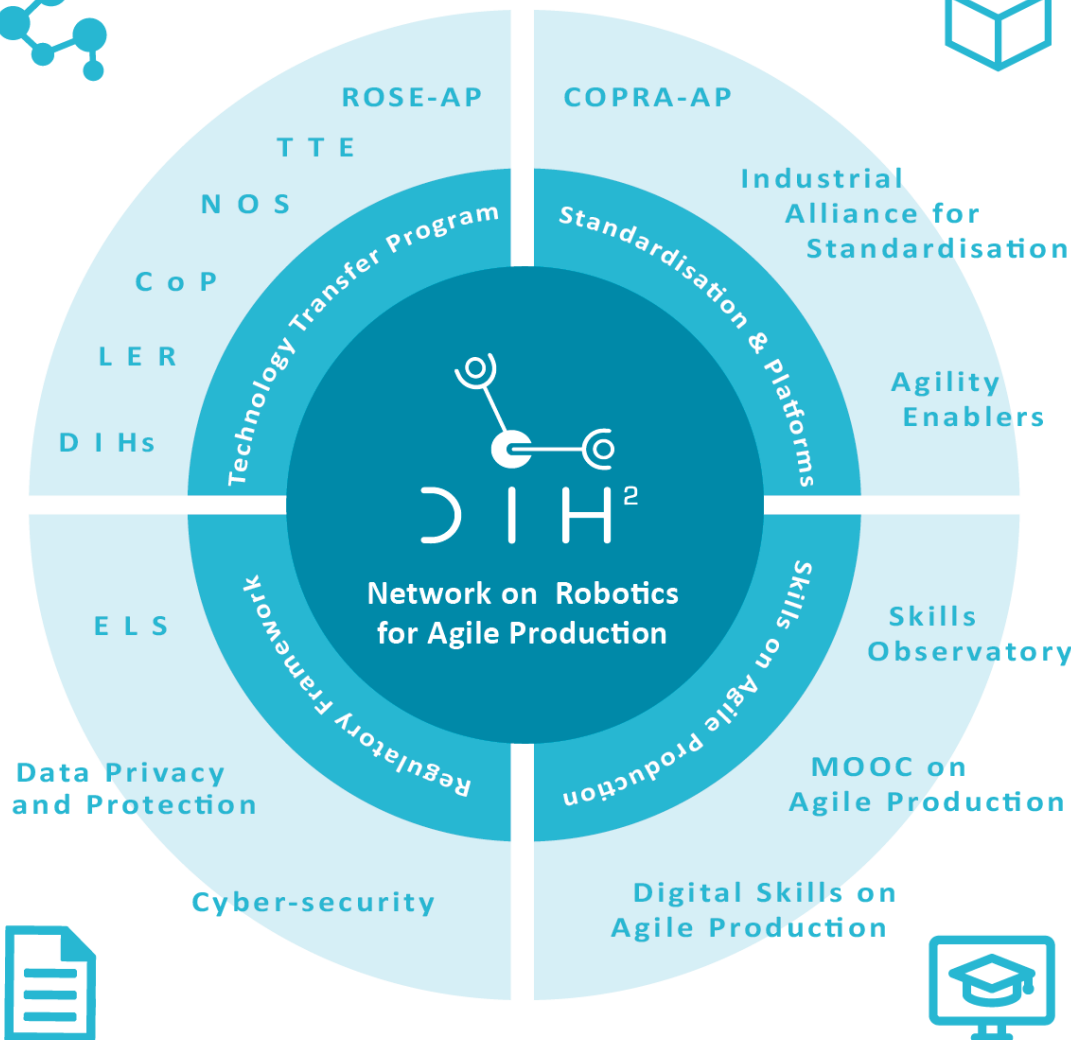
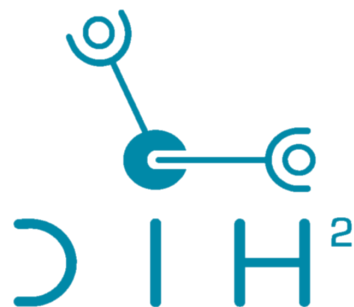


Agile Production #1 – DIH²



DIH²

A Pan-European Network of Robotics DIHs for Agile Production

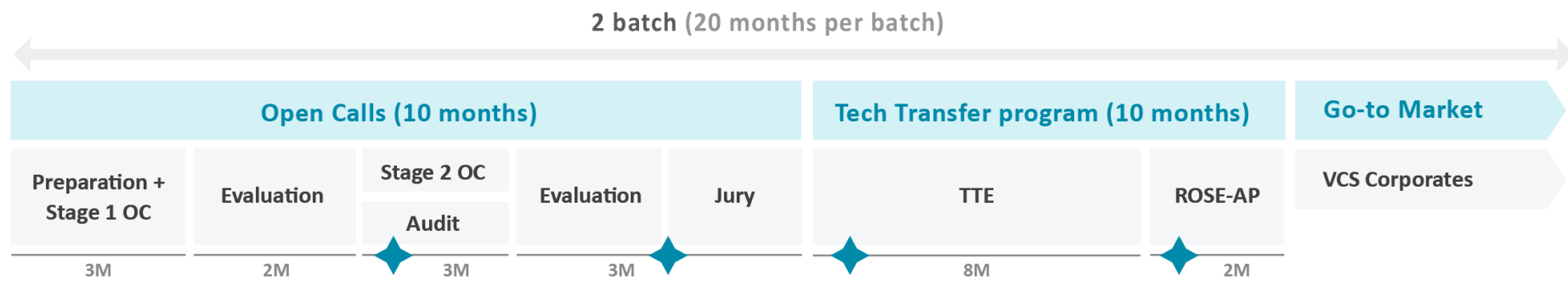


DIH² Contact info

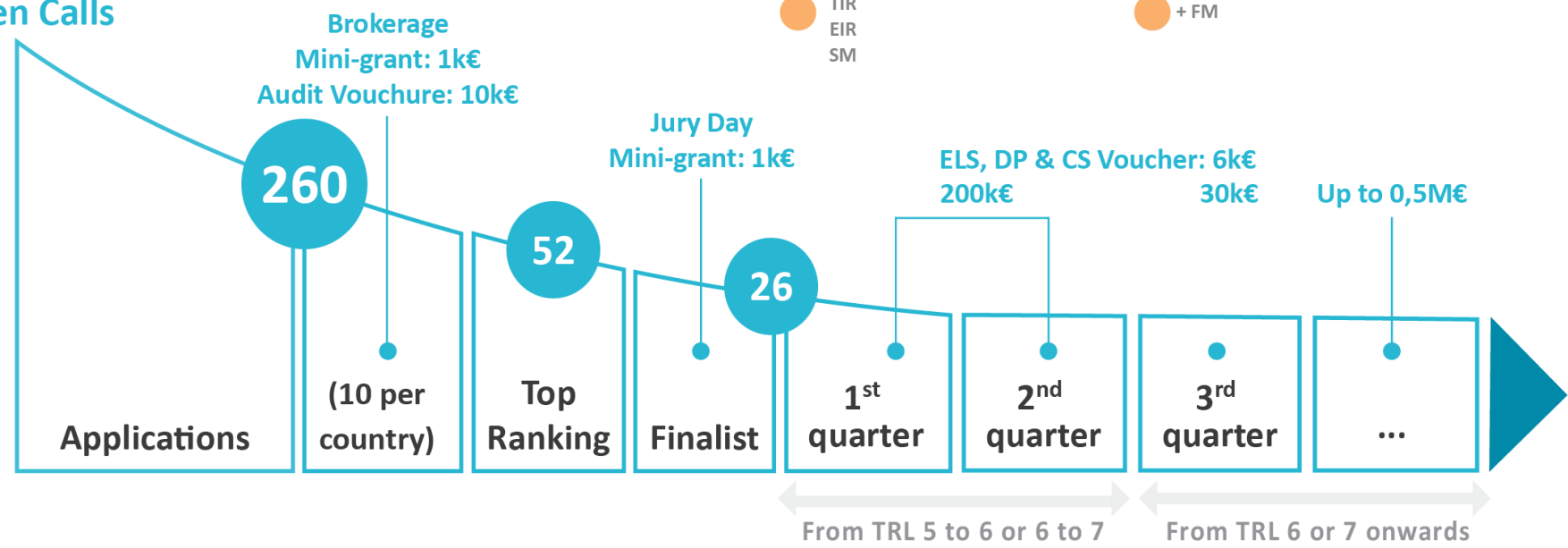
Ali Muhammad

ali.muhammad@vtt.fi

DIH² Technology Transfer Program



Open Calls



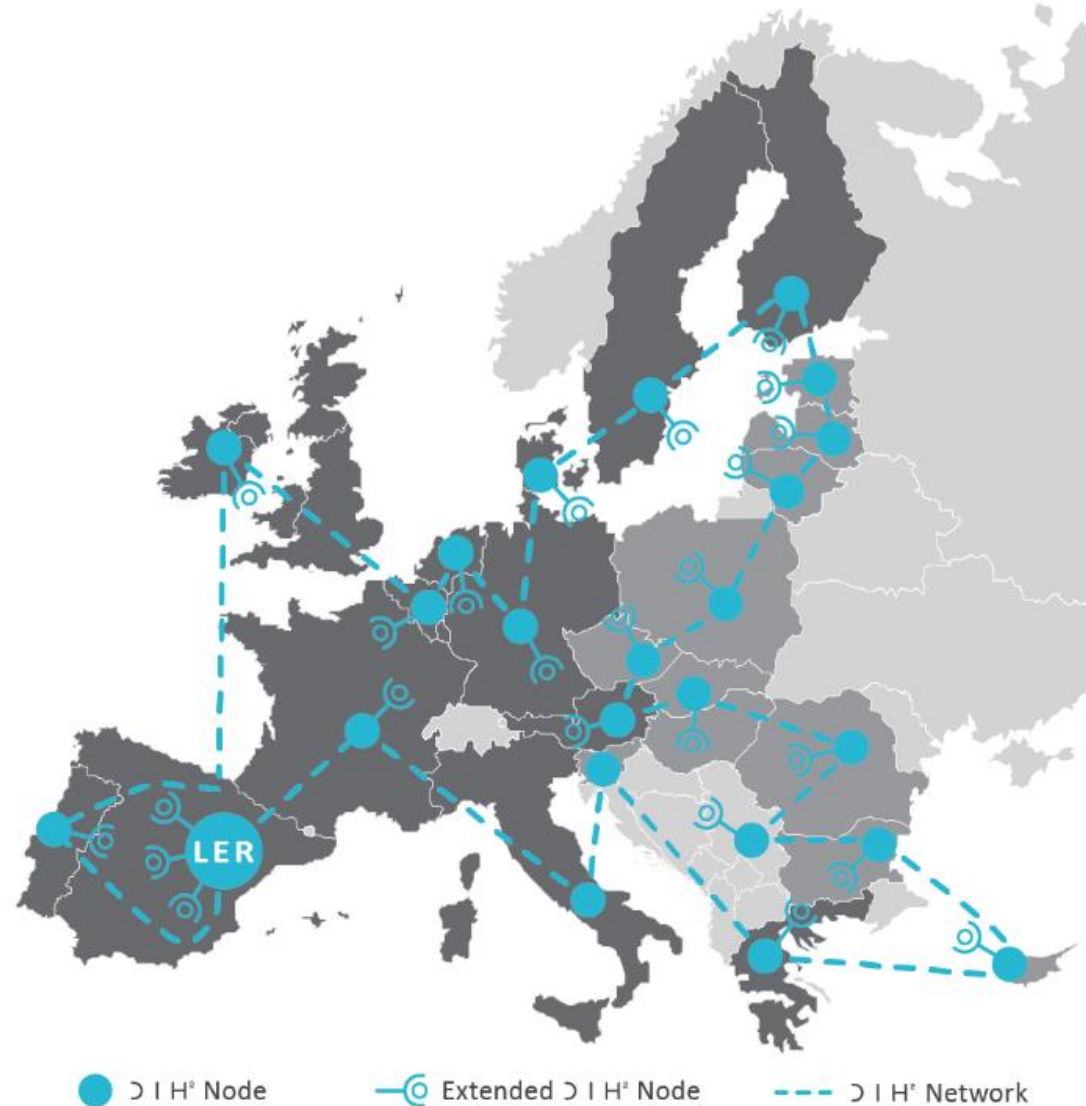
- N° of Beneficiaries per stage
- ◆ Networking events
- Mentors: Research-in-Residence [RiR], Entrepreneur-in-Residence [EiR], Standardisation Mentors [IM] and Fundraising Mentors [FM]

DIH² network

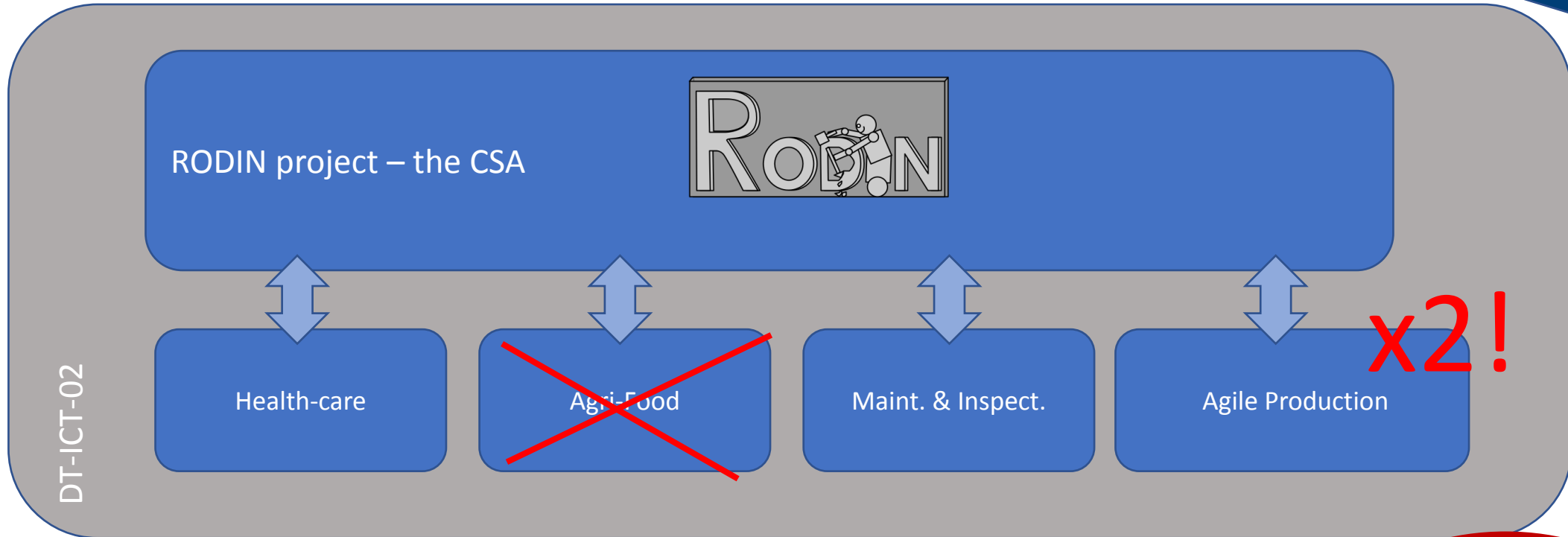
26 DIHs Nodes

10 Operational Partners

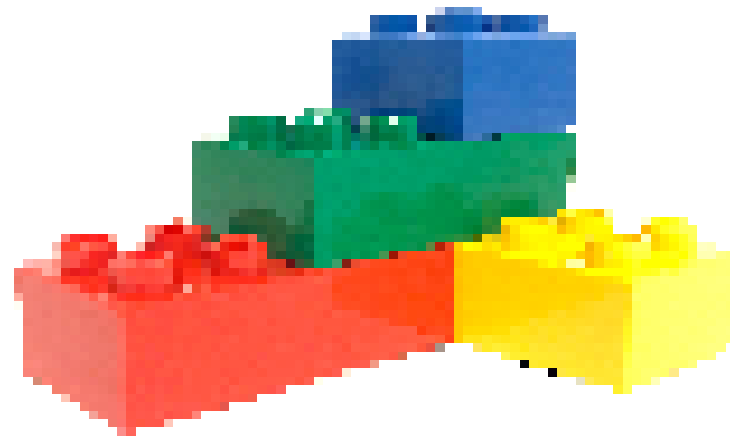
- *Marketplace development*
- *Open platform development*
- *Standardization*
- *FSTP management*
- *Business acceleration*
- *Digital training*
- *Dissemination and Branding*
- *Governance structure*
- *Cross IAs and CSA collaboration*



Some words on the upcoming Innovation Actions



Agile Production #2 – Trinity



TRINITY

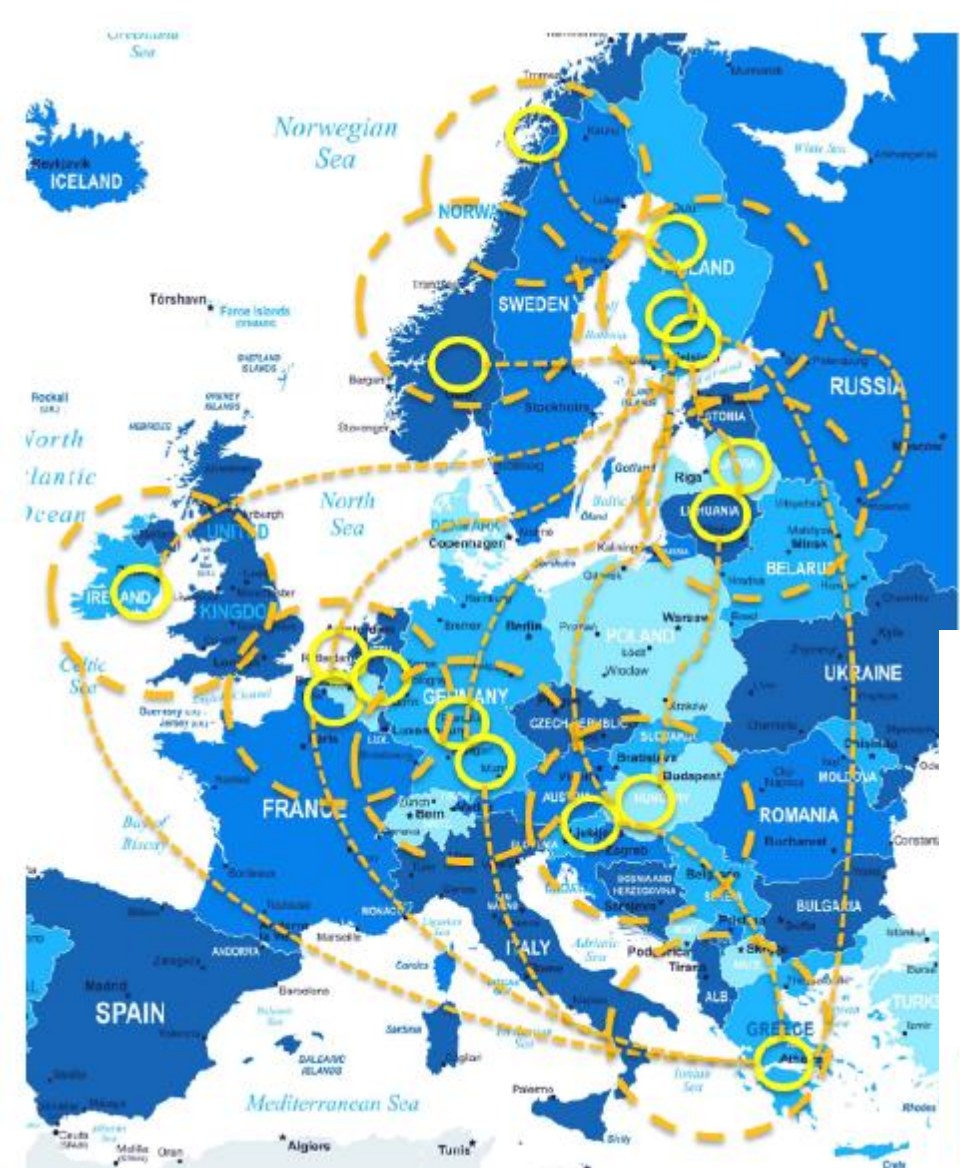


TRINITY: Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production in Future European Manufacturing Ecosystems

Contact: Professor Minna Lanz
Tampere University of Technology
EMAIL NEEDED

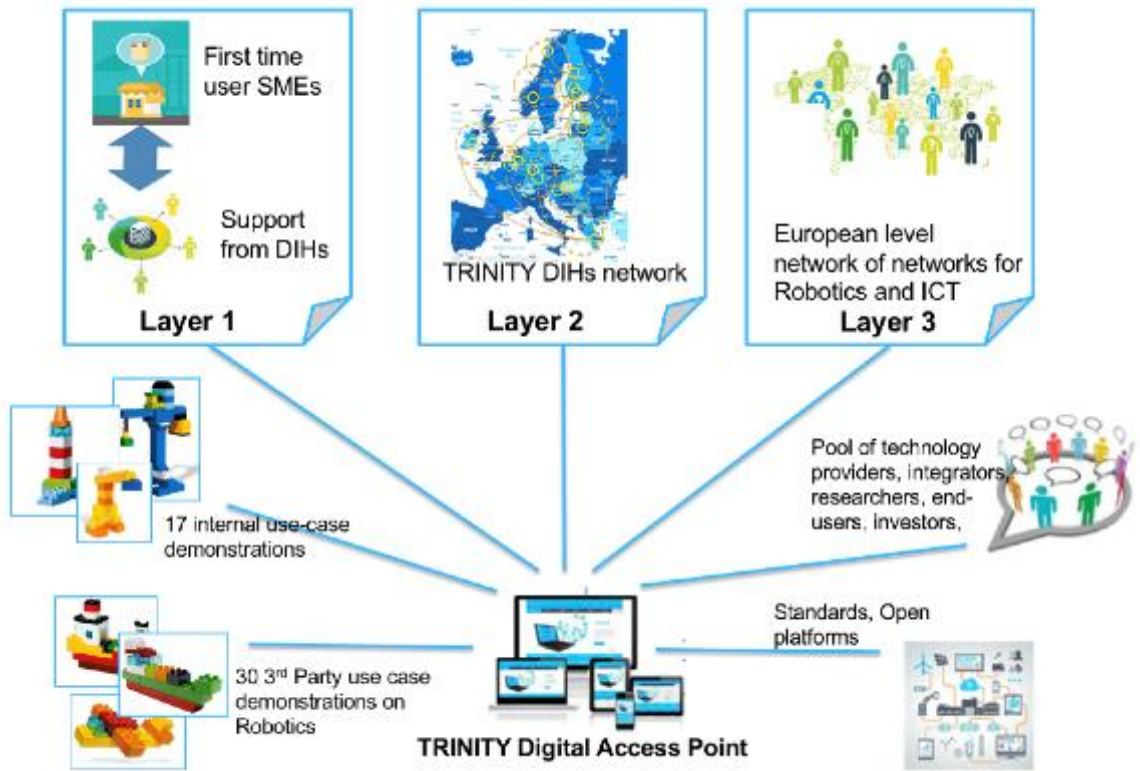
<http://www.trinityrobotics.eu/>

 @eu_trinity



List of participants:

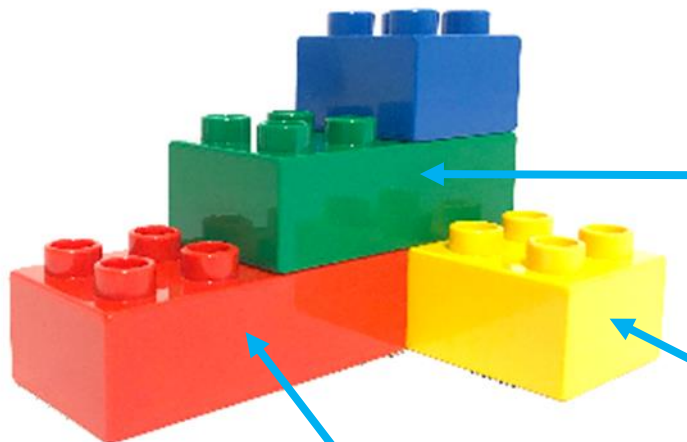
Participant no.	Participant Organisation Name	Participant short name	Country
1 (CO)	Tampere University of Technology	TUT	Finland
2	Centria University of Applied Sciences	CENT	Finland
3	UiT – The Arctic University of Norway	UiT	Norway
4	Jozef Stefan Institute	JSI	Slovenia
5	LMS University of Patras	LMS	Greece
6	Budapest University of Technology and Economics	BME	Hungary
7	Fraunhofer Gesellschaft	FhG	Germany
8	Flanders MAKE	Flanders MAKE	Belgium
9	Elektronikas un datorzinatnu instituts	EDI	Latvia
10	Leuven Security Excellence consortium I-SEC vzw	I-SEC	Belgium
11	Fastems	FASTEMS	Finland
12	LP Montagetechnik	LP	Germany
13	F6S	F6S	Ireland
14	UAB CIVITTA	CIVITTA	Lithuania
15	European Association of the Machine Tool Industries	CECIMO	Belgium
16	DIGITALNORWAY Toppindustrisenteret AS	DNT	Norway



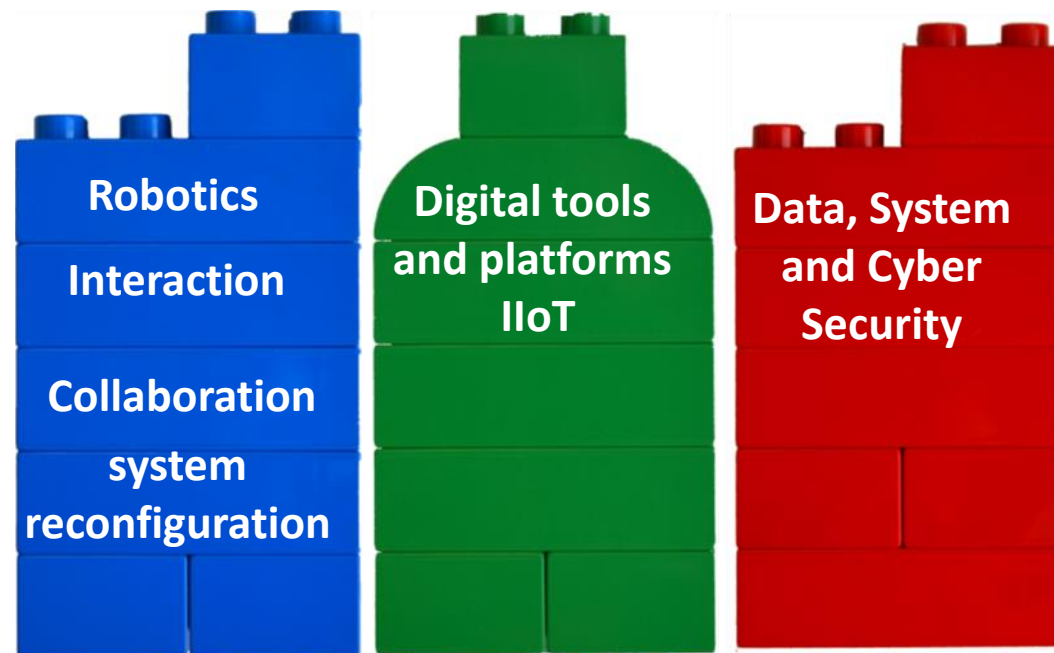
TRINITY Main components:

Lead with example – learn by doing

Target: over 47 modular use case solution blocks by the end of 2022



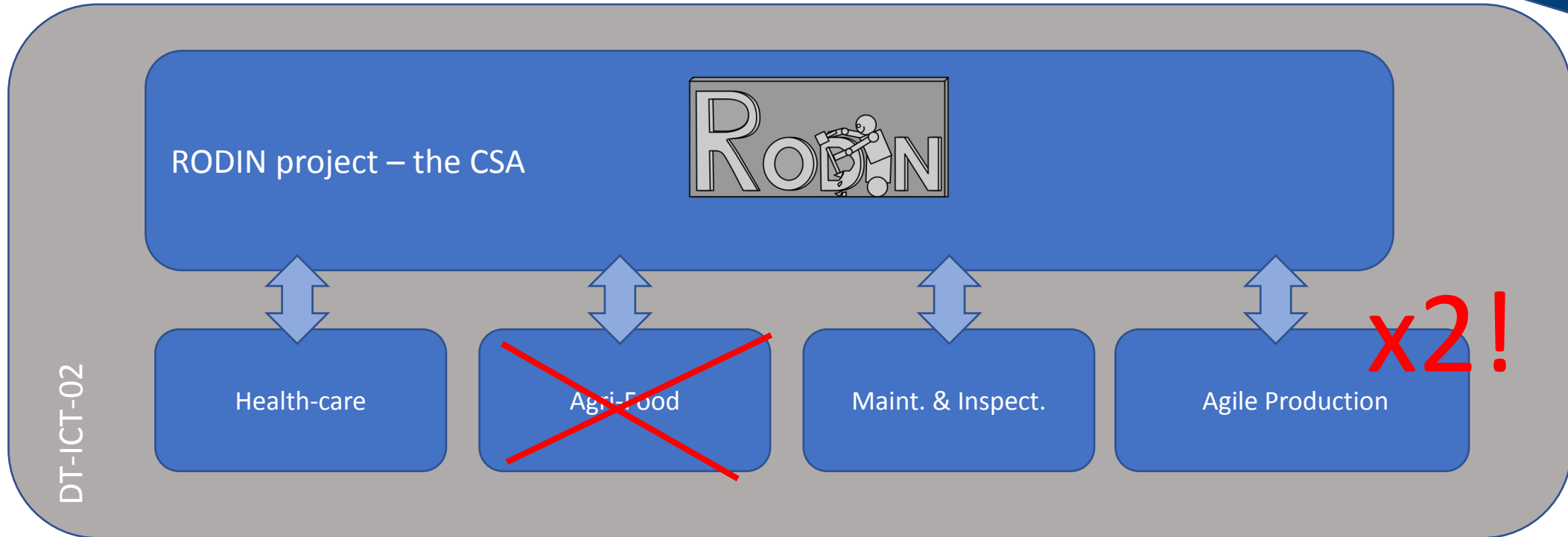
1. Well defined and documented interfaces based on standards and open source models
2. Documented and openly demonstrated case in research facility or industrially relevant environment
3. Online education package including how to replicate the demonstration and basic training on how to operate the system.



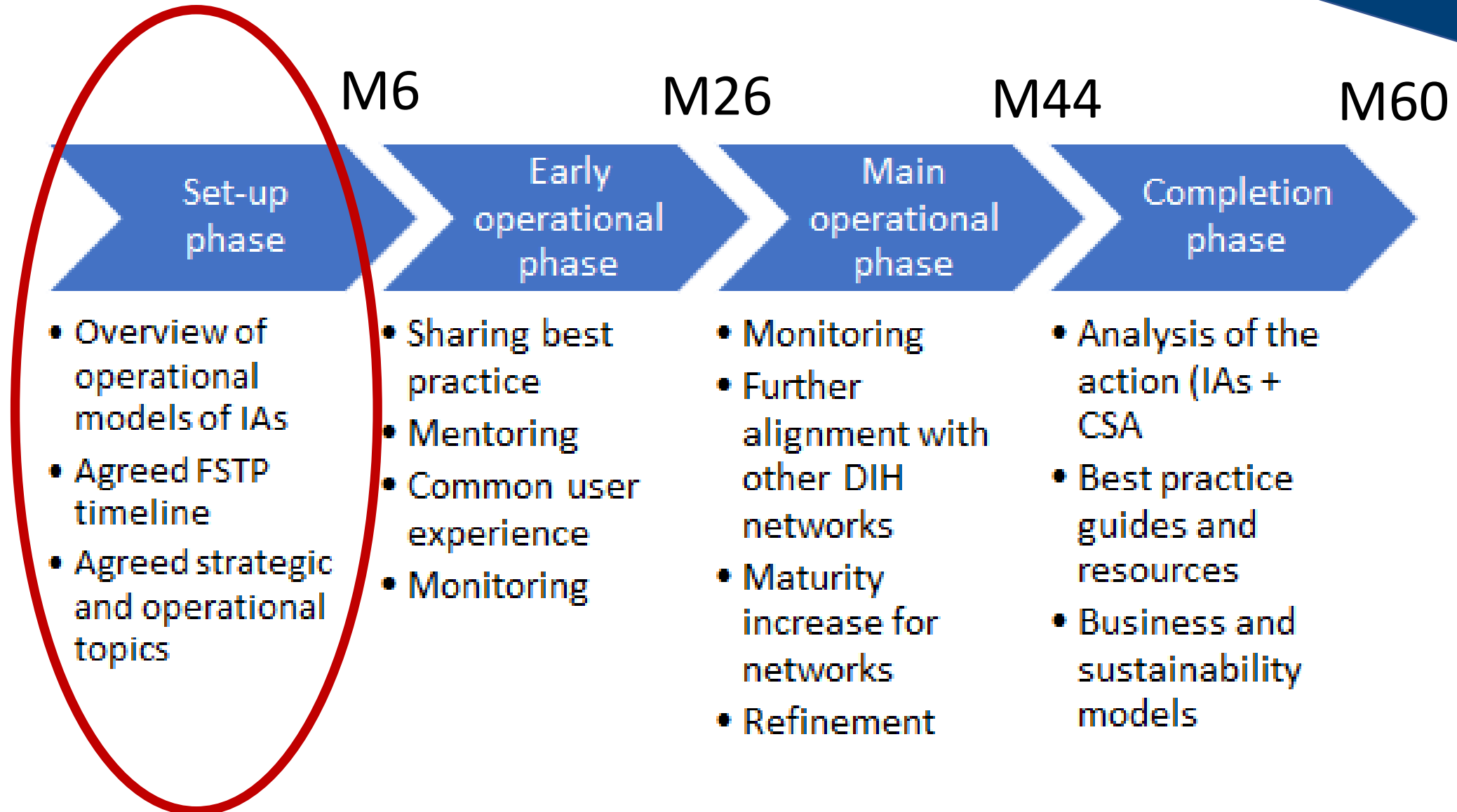
2 Open calls in 2020-2021



Back to the RODIN CSA



Phases of the project



Wider context

RODIN will be embedded into the overall DIH and the broader EC enabled innovation landscape:

- Links to the I4MS DIH network
- Links to other infrastructure projects
- Link to the upcoming AI on demand platform
- Link to research networks
- Link to the Robotics Flagship initiative

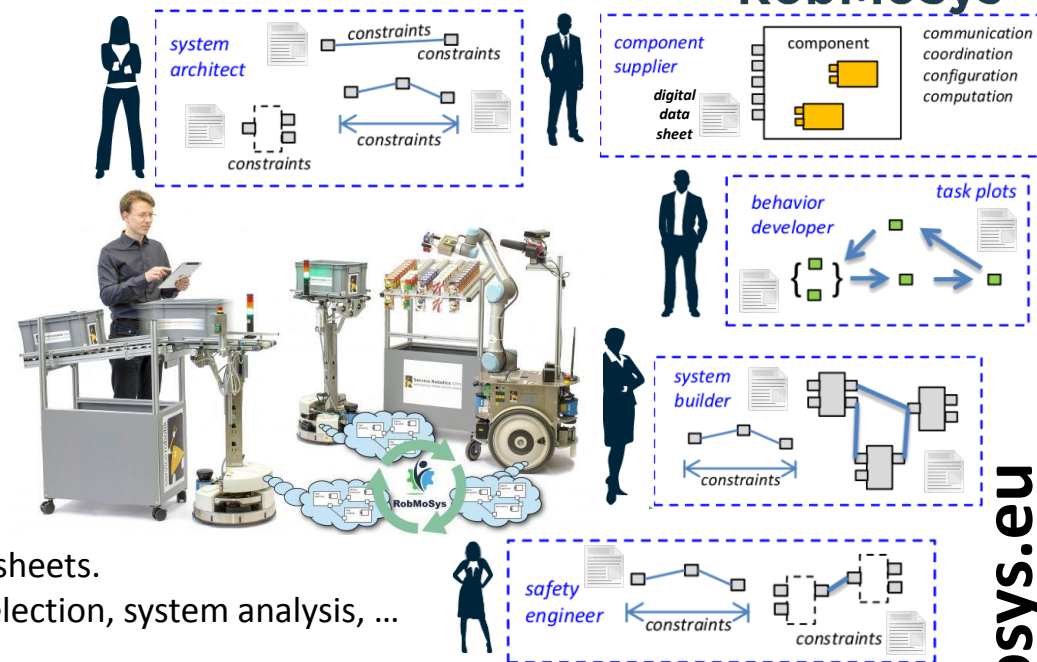
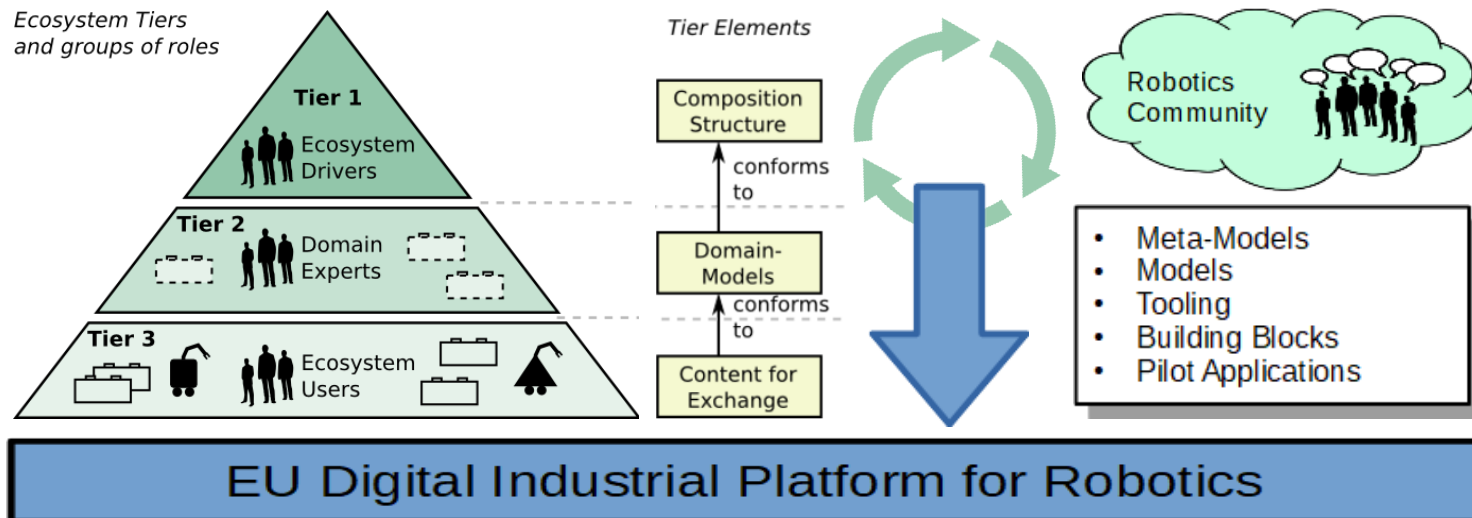


Better Models, Better Tools, Better Systems



RobMoSys

Ecosystem Tiers and groups of roles



www.robmosys.eu

Service robotic systems with predictable properties, plausibility at run-time, justifiability at inspection time by **composing** commodity software building blocks which come with digital data sheets.

- **Eclipse based model-driven tooling** for component developers, system builders, component selection, system analysis, ...
- Software building blocks for robotics, e.g. navigation, manipulation, etc.
- Pilots to illustrate the strengths of model-driven approaches for composability, predictability, separation of roles etc.
- Open Calls for Community Involvement

16.10.2018 ACM/IEEE 21st Int. Conf. on Model Driven Engineering Languages and Systems (MODELS), RobMoSys Tutorial T9, Copenhagen

02/2019 completion of the 6 ITPs resulting from the RobMoSys Open Call 1

01.02.2019 **Opening of the RobMoSys Open Call 2, open for 3 months until 30.04.2019, then start of proposal review and ITP selection**

13.02.2019 RobMoSys Brokerage Day, Munich, Germany

ROSIN Project

www.rosin-project.eu

4 years, ~8 million EUR



IT UNIVERSITY OF COPENHAGEN



- Speed-up the industrial uptake of advanced robotics applications in EU
- Robot Operating System (**ROS**) for an open-source **EU Digital Industrial Platform for Robotics**
- ROS-Industrial Europe community: self-sustaining and **leading** world-wide

3+ Million EUR funding

- For ROS-I devel. and education.
- 4 calls a year:

Nov 16



Software Quality Assurance

- Community involvement
- Continuous Integration
- Code scanning
- Model-in-the loop



Package Summary

Release	Continuous Integration: 52 / 52	Documented
The actionlib	Build history (last 5 of 12 builds)	or interfacing
tasks. Example	#14 28-Apr-2018 05:16 52 / 52	target locator
scan and retu	#13 27-Apr-2018 18:10 52 / 52	the handle
• Maintai	#12 17-Apr-2018 15:10 52 / 52	idation DOT
• Maintai	#11 14-Mar-2018 19:10 52 / 52	
• Author:	#10 09-Feb-2018 22:06 52 / 52	
• License:		
• Bug / feature tracker:	https://github.com/ros/actionlib/issues	
• Source:	git https://github.com/ros/actionlib.git (branch: indro	

ROS Education

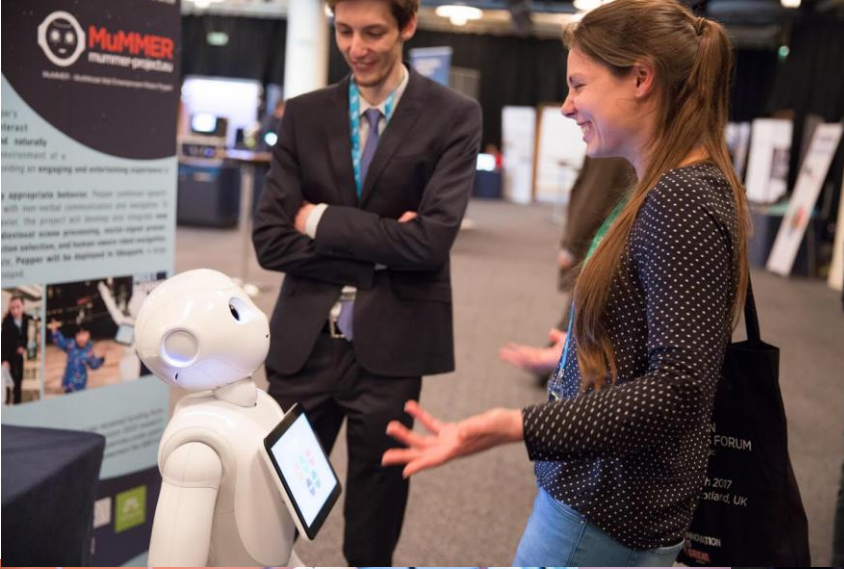
- Academy for professionals
- School for students



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 732287.

What do we need from you?

Collaboration ... collaboration ... and more collaboration



Join Us! - Upcoming public events



EUROPEAN ROBOTICS WEEK

Brought to you by SPARC

16-25 Nov
Central event in
Augsburg, Germany



EUROPEAN ROBOTICS FORUM

Brought to you by SPARC

20-22 March 2019,
Bucharest,
Romania





Thank you!



eu ROBOTICS



SPARC

The Partnership for
Robotics in Europe