AIM-NET

AI REGIO

AI and Manufacturing SMEs: the role of I4MS and Digital Innovation Hubs

https://www.airegio-project.eu/

May 24th 2023, Sergio Gusmeroli
POLITECNICO di MILANO
sergio.gusmeroli@polimi.it

H2020 Innovation Action - This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N. 952003

The AI REGIO H2020 Innovation Action

SAVE the DATE
September 27th 2023
AI REGIO Final Event
Blue Point Brussels

AI REGIO - Regions and DIHs alliance for AI-driven digital transformation of European Manufacturing SMEs

GRANT AGREEMENT: 952003 (Innovation Action)

START DATE: 1 OCTOBER 2020

DURATION: 36 MONTHS

TOTAL FUNDING: 8 Millions EUR

CONSORTIUM: 36 FULL BENEFICIARIES

COORDINATOR: Politecnico di Milano (Sergio Gusmeroli)

AI REGIO

AI REGIO

The AI REGIO four KEYWORDS
REGIO DIH AI SME

8 REGIONAL Authorities

VANGUARD INITIATIVE
NEW GROWTH THROUGH SMART SPECIALISATION

13 VAN

a

EDIH
GEARING UP TOWARDS
EUROPEAN DIGITAL INNOVATION HUBS

IH4INDUSTRY
The EU Network of DIHs in the Manufacturing domain

4+19 TECHNOLOGY Platforms & AI As

AI on Demand

AI4EU

17+3+18 DIH and SME EXPERIMEN

AI REDGIO 5.0

I4MS

36 FULL BENEFICIARIES from 11 countries

8 WORK PACKAGES beyond State-of-the-art

AI REGIO

The ICT38-2020 Cluster of Research & Innovation Actions

AIM-NET

AI4MANUFACTURING

AI-PROFICIENT
Artificial intelligence for improved production efficiency, quality and maintenance

ASSISTANT

teaming.ai

COALA
Your Factory Assistant

MAS4AI

XMANAI
MAKING AI UNDERSTANDABLE

knowlEdge

STAR

EU-Japan.AI

ICT-38-2020 projects are addressing key R&I aspects of AI for Manufacturing,
federated learning
trustworthiness
explainability
ethical regulatory issues
human-AI interaction teams
generative AI
AI-driven digital assistants
AI cyber-security
AI at the edge
Multi Agent Systems

TWIN TRANSITION 2021 07: AI for sustainable agile Manufacturing

De- and Re-manufacturing of Li-Ion battery packs in e- mobility

Remanufacture and the re-use of the disassembled cells with proper residual characteristics into second-life stationary applications

De- and Re- manufacturing of consumer WEEE

Overcome limitations in the de-manufacturing and re-manufacturing of consumer WEEE

Petrol-Chemical Pilot: Hybrid Circular Twins for Process Industry

Reduce the CO2 emissions and energy consumption from the production of Ethylene Oxide and Ethylene Glycol

Circular TwAIn

AIDEAS

SXAIPI

The I4MS & I4MS2.0 Cluster of SME-driven AI Experiments

AIM-NET

I4MS

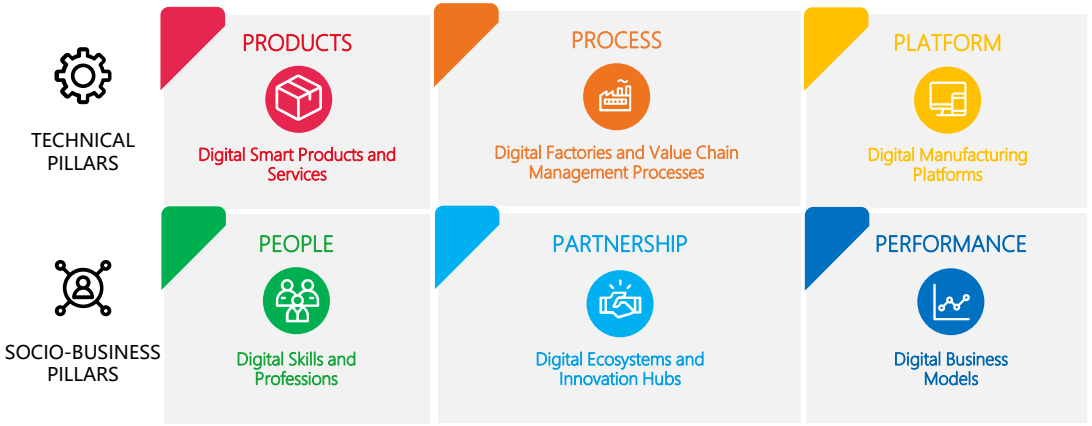
ICT Innovation for Manufacturing SMEs

DIH4INDUSTRY
The EU Network of DIHs in the Manufacturing domain

AI REGIO

EDIH
GEARING UP TOWARDS
EUROPEAN DIGITAL INNOVATION HUBS

KITT4SME



AI REDGIO 5.0

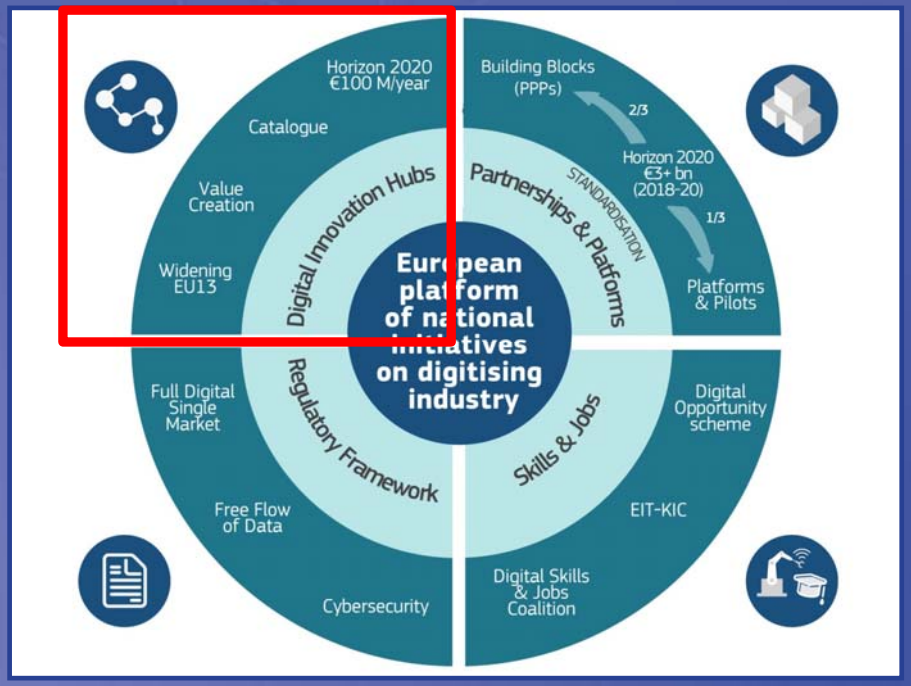
AIRISE.EU

WASABI

AI matters

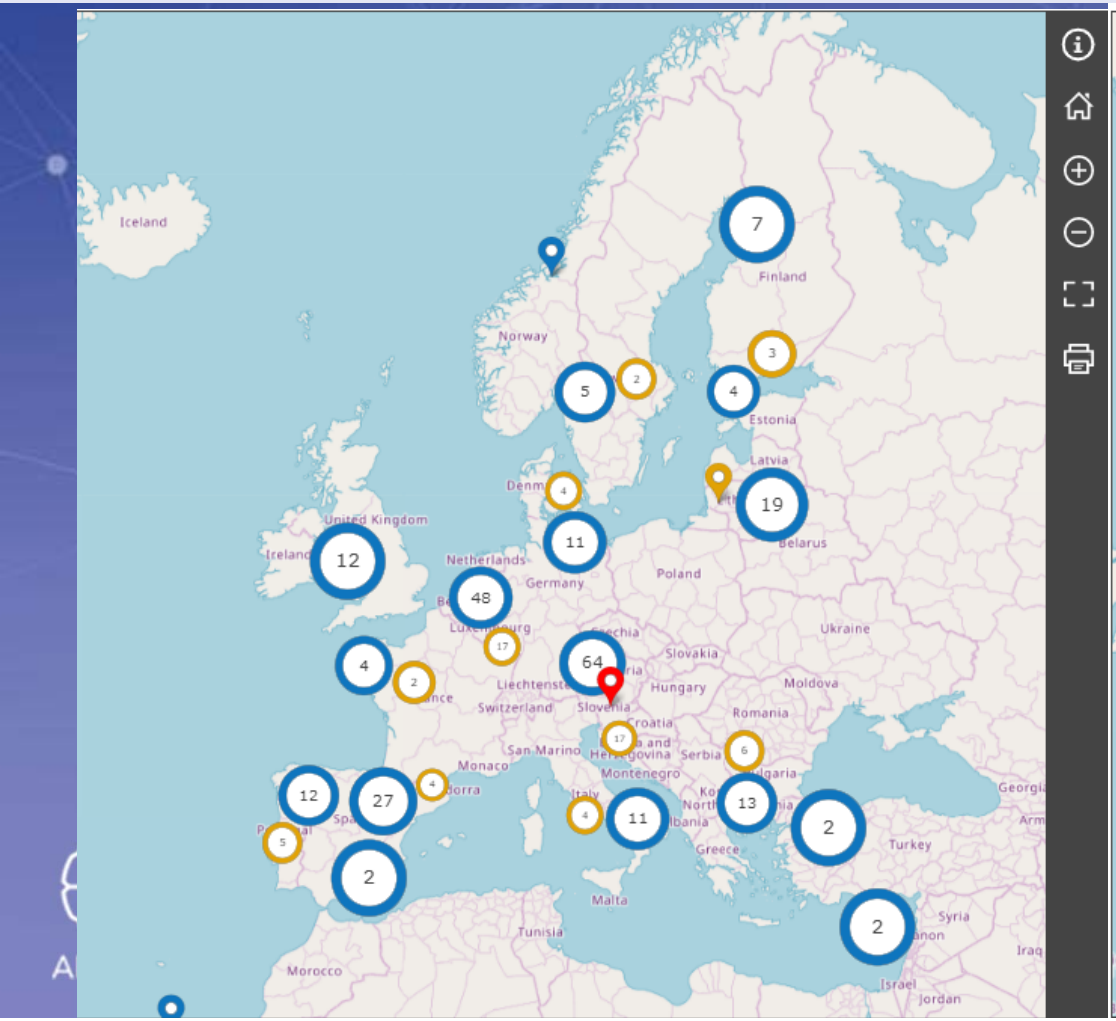
Digitising EU Industry Communication

The DEI Communication on April 2016: The purpose of this Communication is to reinforce the EU's competitiveness in **digital technologies** and to ensure that ***every industry in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations***.



AI REGIO

AI for Manufacturing DIHs (317, 116)



The EDIH4MANU Network and TWG Data in Manufacturing

LEADING DIGITAL AND SUSTAINABLE INDUSTRY TRANSFORMATION IN EU MANUFACTURING REGIONS

25 EDIH | 25 Regions | 15 States

1. EDIH Lombardia [Lombardia - IT]
2. DIGITALIS - [Flanders, BE]
3. EDIH SNL [South Netherland - NL]
4. EDIH DIGIHALL [Ile de France - FR]
5. POLITRONICS [Auvergne Rhone - Alpes - FR]
6. DIH4CAT [Catalunia - ES]
7. CIDIHUB - Innovalia [Canary islanss - ES]
8. Produtech DIH [Norte - PT]
9. NEURAL [Veneto - IT]
10. EXPAND [Piedmont - IT]
11. MANUHUB - LMS [Patras - GR]
12. Six Manufacturing EDIH [West Finland - FI]

13. MADE [DK]
14. ShiftLabs [Stockholm West Sweden, East Middle Sweden - SE]
15. EDIH REIHNLAND [Reihnland- DE]
16. EDIH CASSOVIUM [East Slovak - SK]
17. DIGITIZATION.BEYOND.BW [Baden Wuerttemberg - DE]
18. EDIH FRANKEN & SCHWABEN [Bayern- DE]
19. Hubs4Industry [Malopolska - PL]
20. EDIH Ostrava [Ostrava - CZ]
21. DIH Basque [Basque Country - ES]
22. DIH NEB [North East Bohemia - CZ]
23. DIHGIGAL [Galicia - ES]
24. Walhub [Wallonia, BE]
25. Artificial Intelligence EDIH [Hungary]

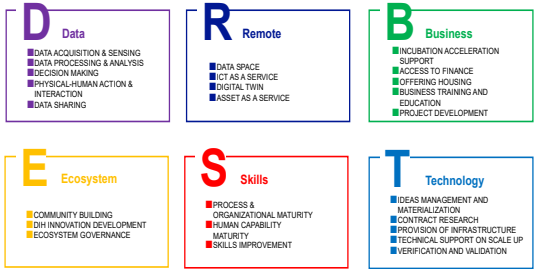
AI REGIO

The Pre-PAI AIoD Platform DIH ecosystem

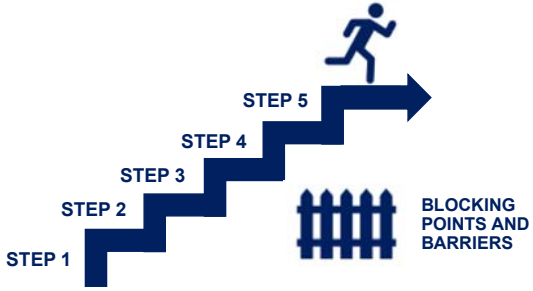
AI REGIO

DIH METHODIH – a METHOdology for DIHs

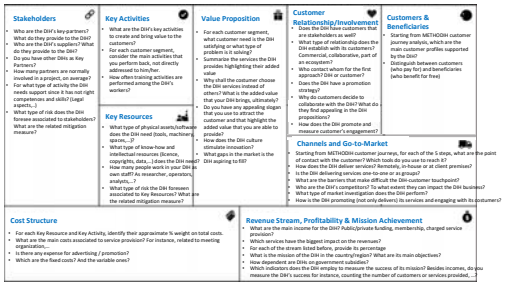
SERVICE PORTFOLIO



CUSTOMER JOURNEYS

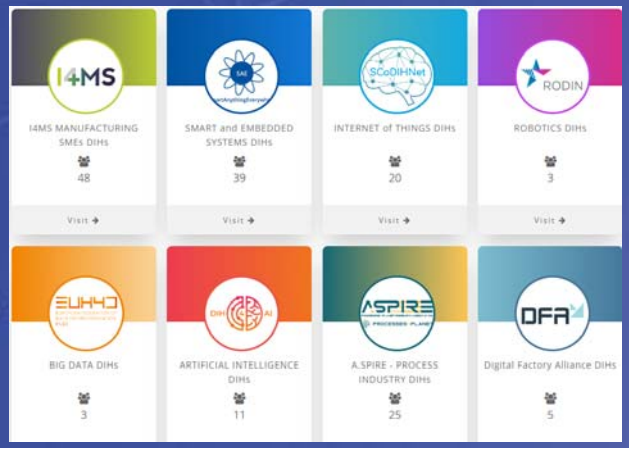


BUSINESS MODEL



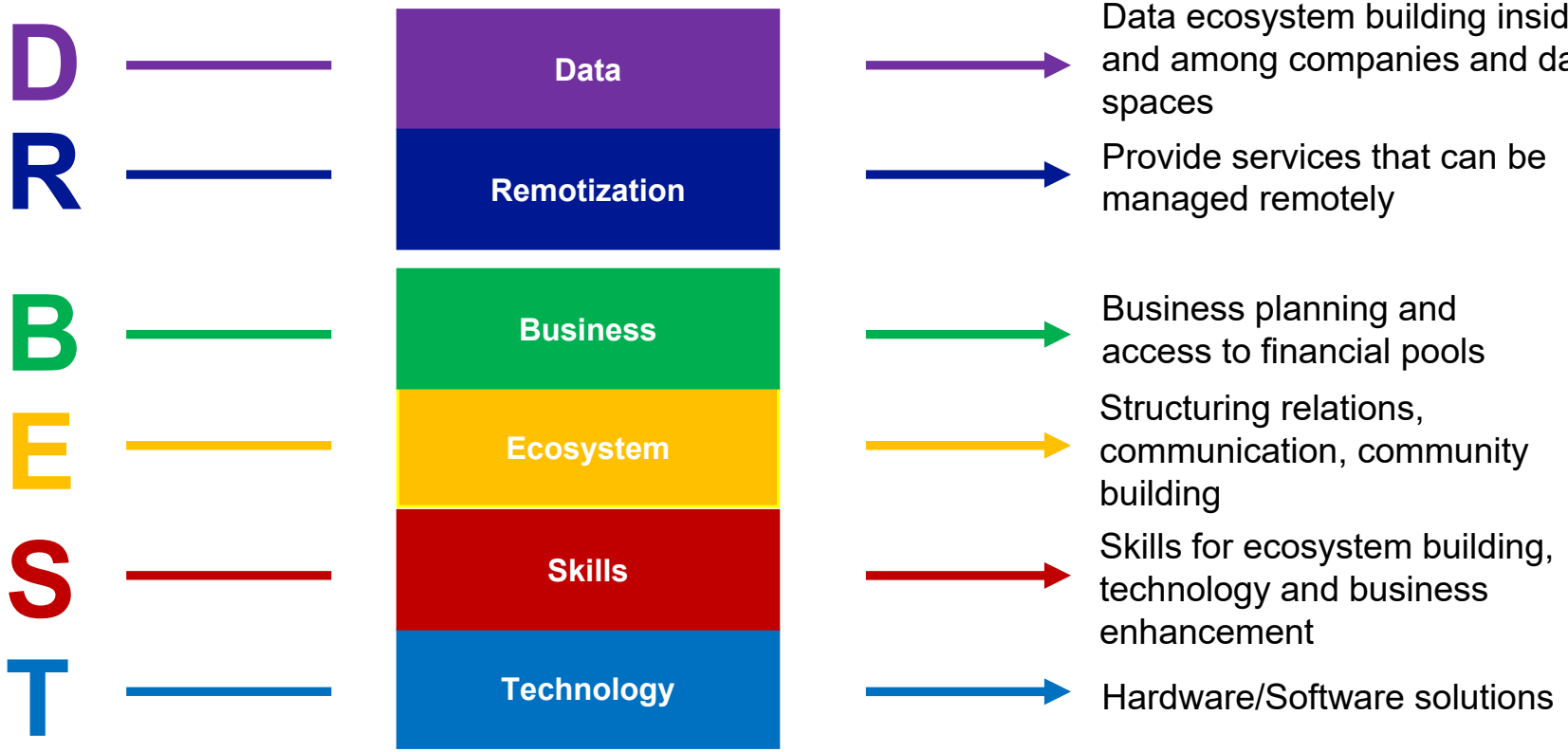
To describe the DIH offering according to a structured framework

To analyse the DIH customer base, to identify main barriers and needs



To describe the DIH business, as a multi-stakeholder and no-profit organisation

SERVICE PORTFOLIO – LEVEL 1



AI REGIO

SERVICE PORTFOLIO – LEVEL 2

D Data

- DATA ACQUISITION & SENSING
- DATA PROCESSING & ANALYSIS
- DECISION MAKING
- PHYSICAL-HUMAN ACTION & INTERACTION
- DATA SHARING

R Remote

- DATA SPACE
- ICT AS A SERVICE
- DIGITAL TWIN
- ASSET AS A SERVICE

B Business

- INCUBATION ACCELERATION SUPPORT
- ACCESS TO FINANCE
- OFFERING HOUSING
- BUSINESS TRAINING AND EDUCATION
- PROJECT DEVELOPMENT

E Ecosystem

- COMMUNITY BUILDING
- DIH INNOVATION DEVELOPMENT
- ECOSYSTEM GOVERNANCE

S Skills

- PROCESS & ORGANIZATIONAL MATURITY
- HUMAN CAPABILITY MATURITY
- SKILLS IMPROVEMENT

T Technology

- IDEAS MANAGEMENT AND MATERIALIZATION
- CONTRACT RESEARCH
- PROVISION OF INFRASTRUCTURE
- TECHNICAL SUPPORT ON SCALE UP
- VERIFICATION AND VALIDATION

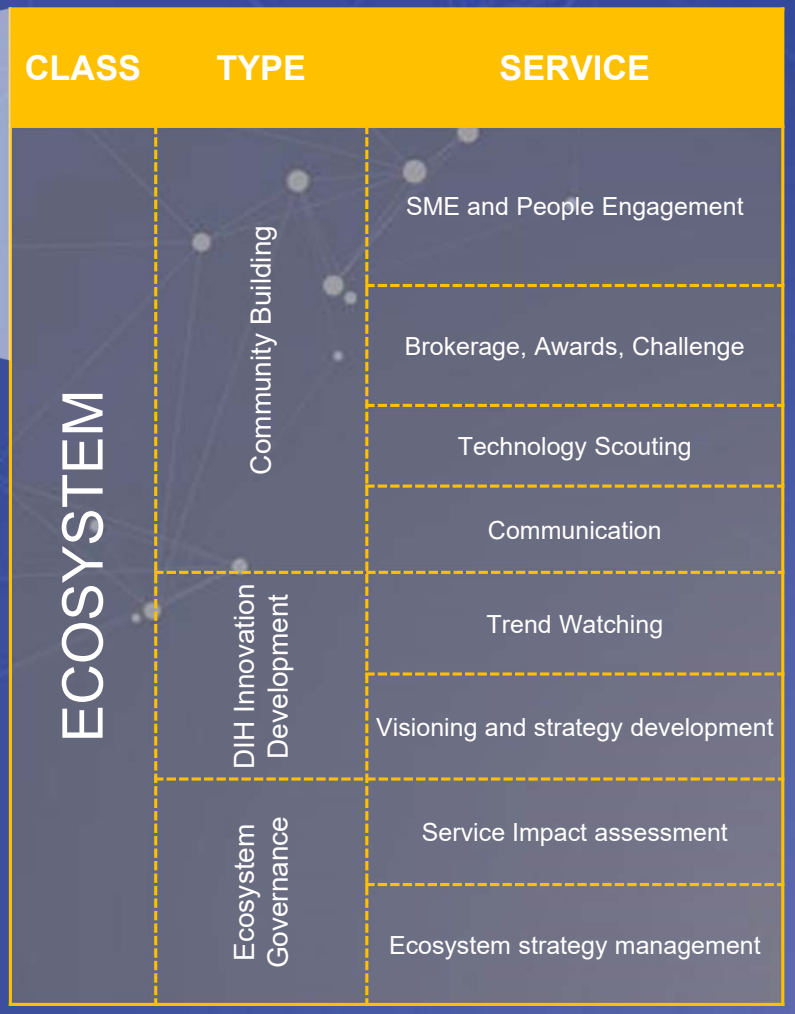
AI REGIO

SERVICE PORTFOLIO – example: ECOSYSTEM

E Ecosystem

- COMMUNITY BUILDING
- DIH INNOVATION DEVELOPMENT
- ECOSYSTEM GOVERNANCE

Spanning over the 6 classes, almost 70 services are classified!



LEVEL 1: class of service (DRBEST)

LEVEL 2: type of service

LEVEL 3: the general service

The DIH service

AI REGIO

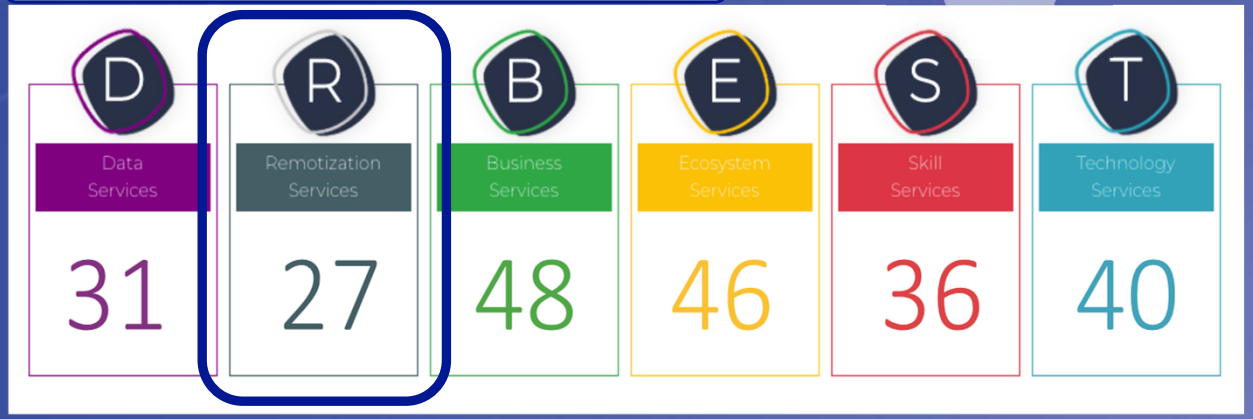
The AI REGIO ecosystem's Service Portfolio

Digital Innovation Hubs

The 63% of the Service Portfolio is covered by Business and Ecosystem Services

Data, Skills and Technology services cover the 60% of the Portfolio

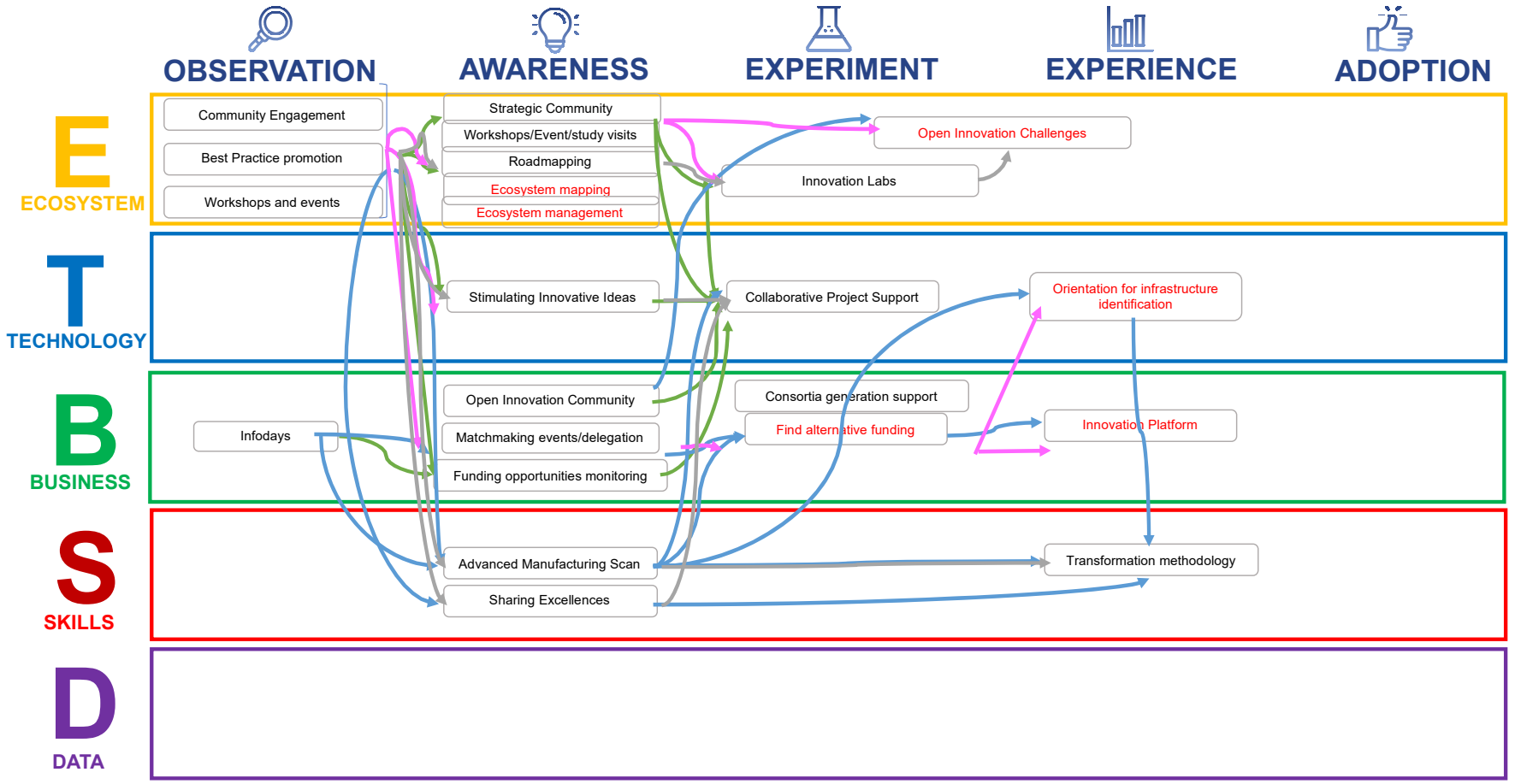
Didactic Factories



AI REGIO

https://airegio-portal.eu/

CJ PIPELINE for TECH USERS– an example



User looking for R&I opportunities

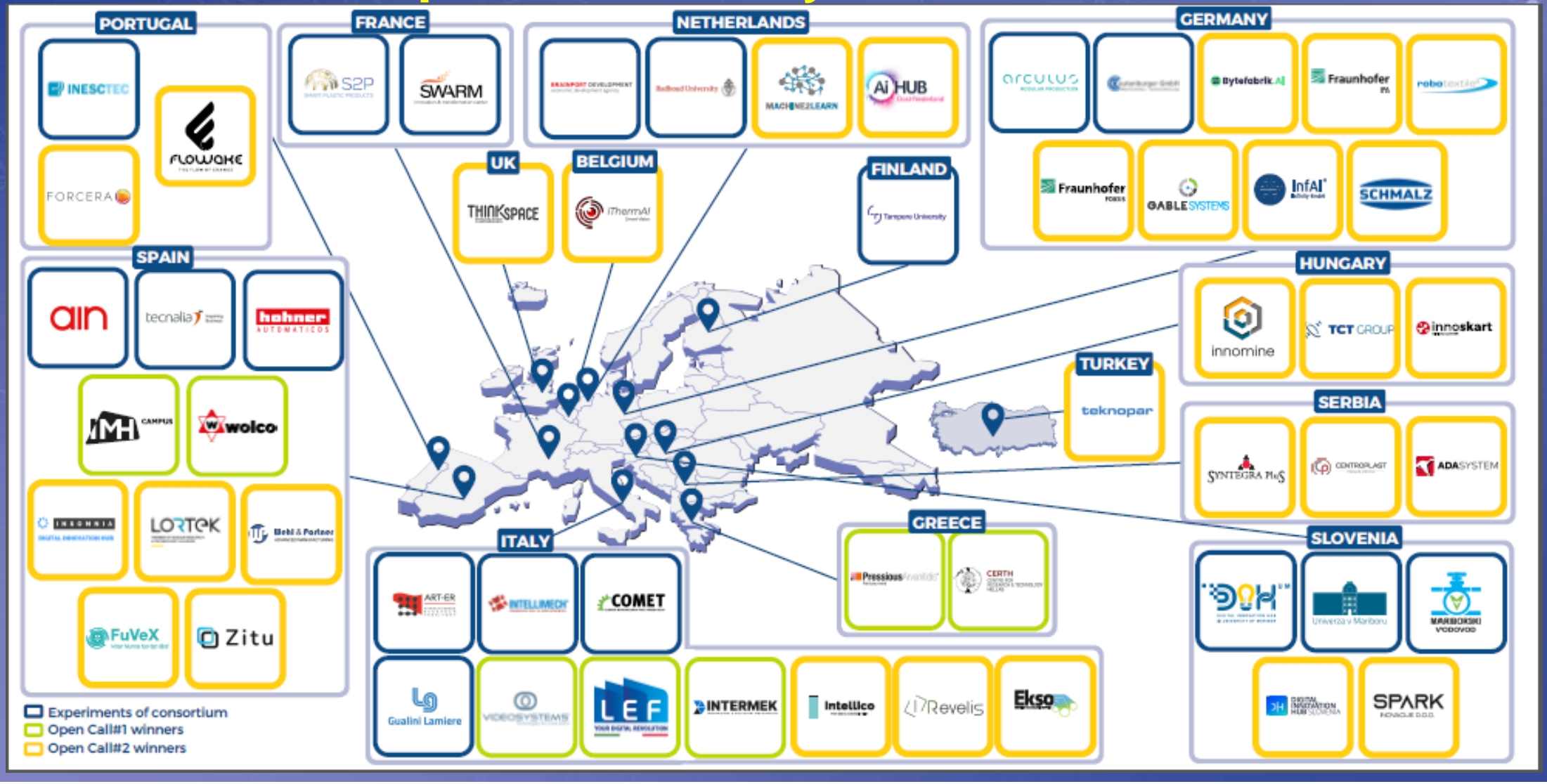
User looking for business partnerships and market access

User looking for support in digitalizing business and willing to experience the technology

User willing to shape its innovation strategy

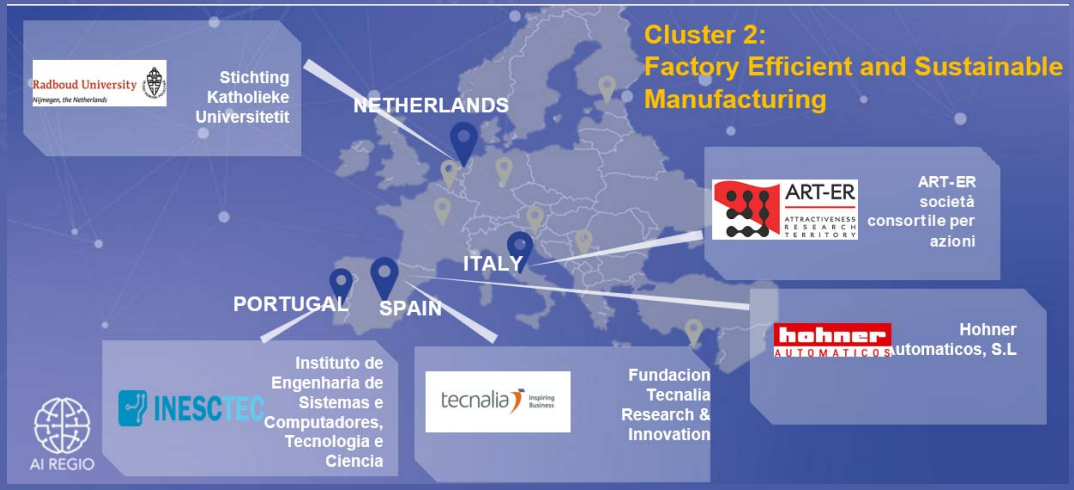
AI REGIO

The AI REGIO Experiments ecosystem

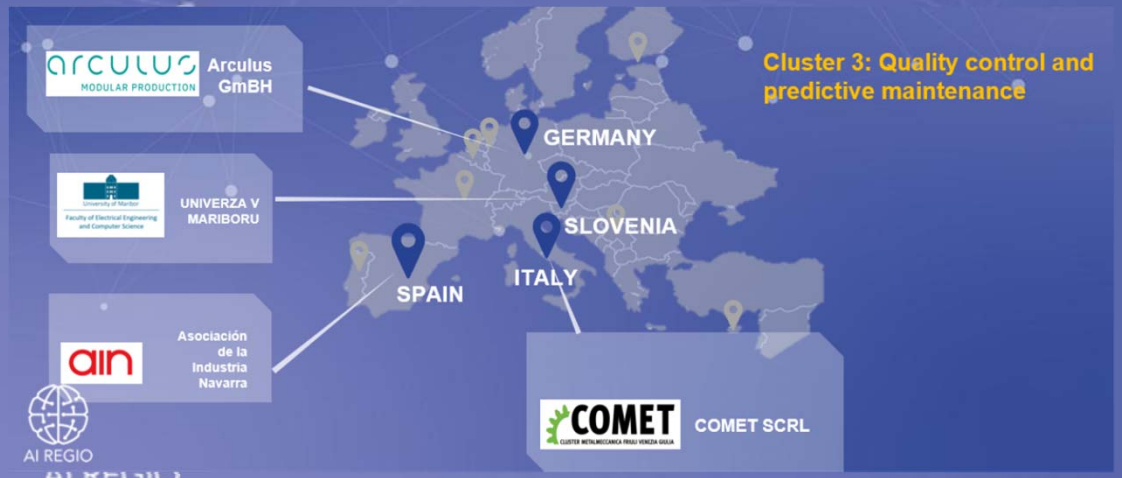


SME Application Experiments (17 in four clusters)

Cluster 1: Product Engineering and lifecycle management



Cluster 2: Factory Efficient and Sustainable Manufacturing



Cluster 3: Quality control and predictive maintenance

Cluster 4: Robotics and Human Interaction

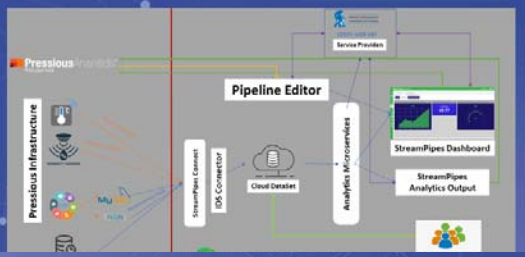
SME Open Calls for experiments

AI REGIO OC1 – Pressious Data Space (PDS)

Lead SME:
PressiousArvanitidis S.A. (PRES)

Participating partners:
National and Kapodistrian University of Athens (NKUA)
nZEB Smart Home (CERTH/ITI)

OC1 topic:
Manufacturing Data Spaces ar
Data4AI Pipelines



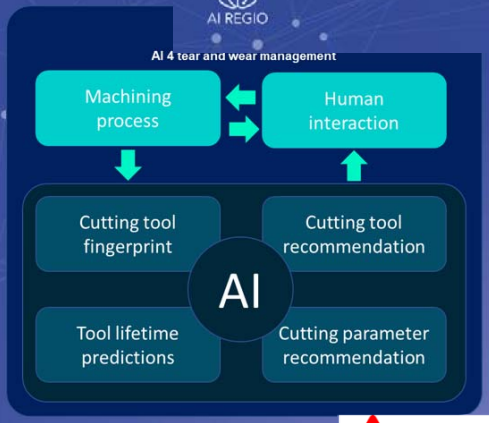
AI REGIO

AI REGIO OC1 -00012-AIMAN- AI 4 tear & we

Lead SME:
WOLCO

Participating partners:
WOLCO, IMH, and ZITU

OC1 topic:
Industry 5.0 and Collaborative Intelligence AI-driven solutions.



AI REGIO

AI REGIO OC1 - AIPRESTO

Lead SME:
INTERMEK Srl

Participating partners:
LEF 4.0
Video Systems Srl

OC1 topic:
Industry 5.0 and Collaborative Intelligence AI-driven solutions

AI REGIO

AI REGIO

The 6Ps DT model at a glance

TECHNICAL PILLARS

SOCIO-BUSINESS PILLARS

PRODUCTS

Digital Smart Products and Services

PROCESS

Digital Factories and Production Processes

PLATFORM

Digital Manufacturing Platforms

PEOPLE

Digital Skills and Professions

PARTNERSHIP

Digital Ecosystems and Innovation Hubs

PERFORMANCE

Digital Business Models

AI REGIO

Each Pillar is made of 6 dimensions of analysis
with 5 levels of maturity (from 1-INITIAL to 5-EXPLOITED)

6Ps SURVEY AMONG 17 AI-REGIO PILOTS

The 6Ps methodology was tested on the 17 experiments of AI REGIO.
After the experiments had completed their online survey, interviews were held to discuss and refine the outcomes.

CLUSTER 01
Product Engineering and Lifecycle Management

EXP.02
NLP for Troubleshooting

EXP.04
AI for better life cycle and project management for plastronic product

EXP.03
Anti-tampering devices for connected objects

EXP.15
Water Leakage Detection

CLUSTER 02
Factory Efficient and Sustainable Manufacturing

EXP.05
AI-based predictive dynamic production planner

EXP.12
Intelligent Computer Vision for Digital Twin and Reinforcement Learning for Assembly Line Balancing

EXP.10
AI-based process control ARMAC

EXP.17
Industrial processes AI-based Optimization

CLUSTER 03
Quality Control and Predictive Maintenance

EXP.07
Predictive Analytics Based on Few-Shot Learning

EXP.09
AI-based quality control of measurement system

EXP.13
AI-enhanced control strategy for production environment

EXP.14
Smart Predictive Maintenance Toolbox for drawing lines of car body elements

EXP.16
IDSS for predictive quality assurance

CLUSTER 04
Robotics and human interaction

EXP.01
Machine Vision for warehouse optimization

EXP.06
AI-supported robot trajectory optimization

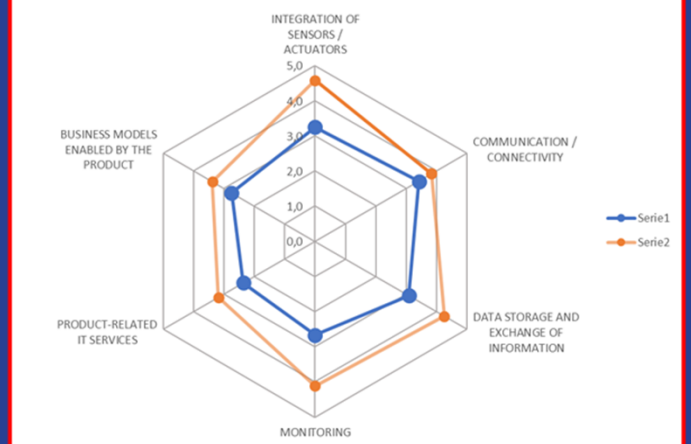
EXP.08
AI-based AR in Assembly

EXP.11
Automatic capability matchmaking for re-configurable robotics platform

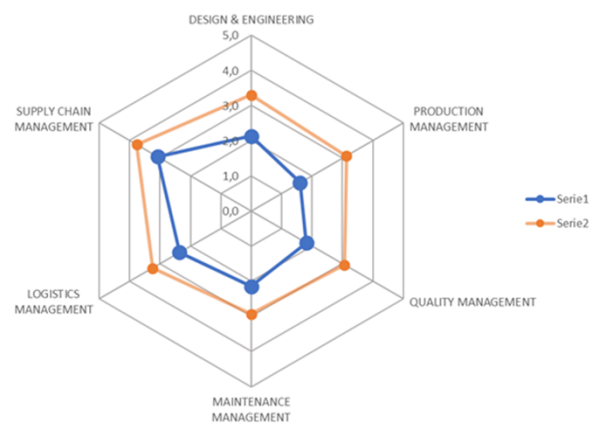
AI REGIO

AGGREGATE RESULTS (17 PILOTS)

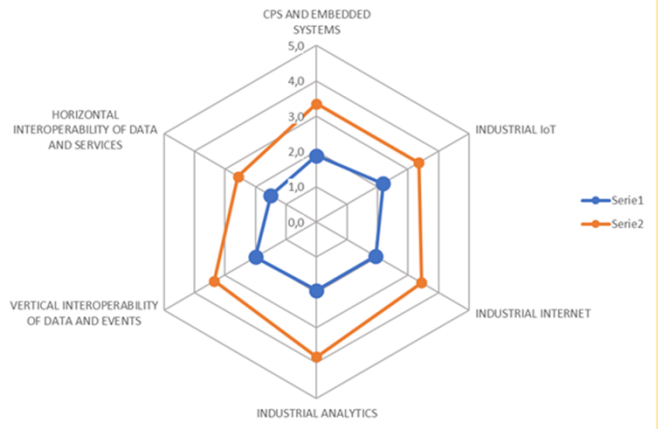
PRODUCT



PROCESS

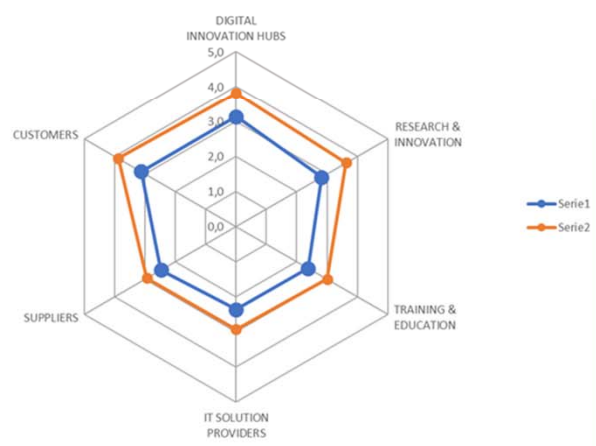


PLATFORM

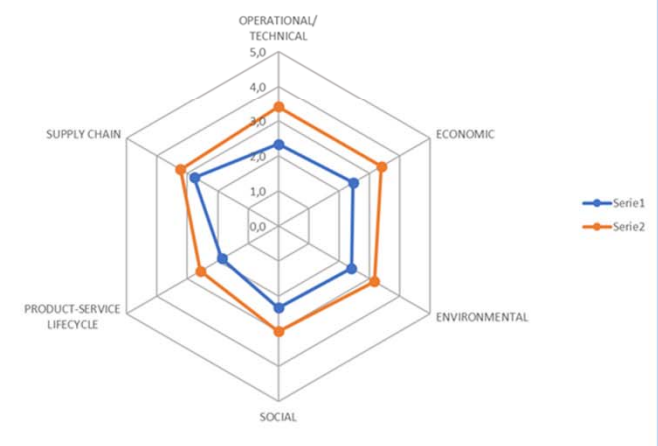


PEOPLE

PARTNERSHIP

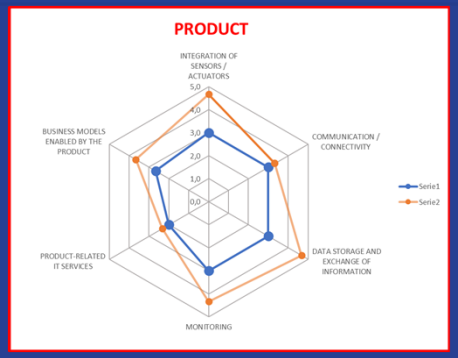


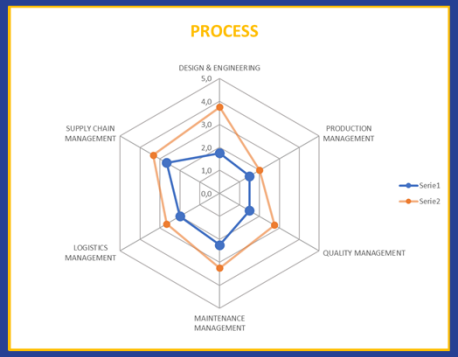
PERFORMANCE

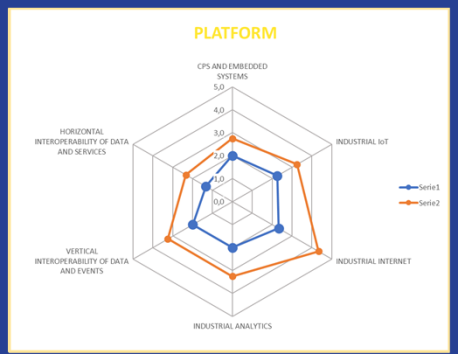


TECHNICAL PILLARS

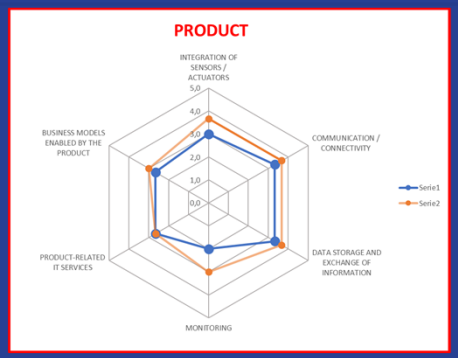
01 Product Engineering and Lifecycle Management

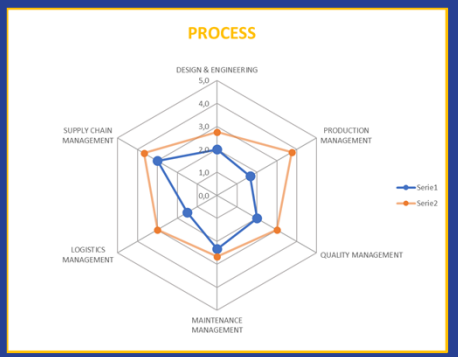


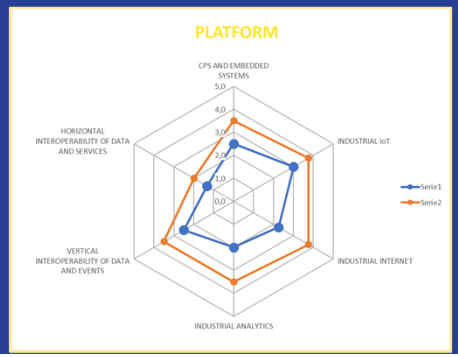




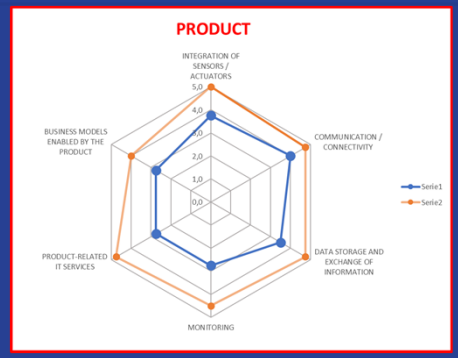
02 Factory Efficient and Sustainable Manufacturing

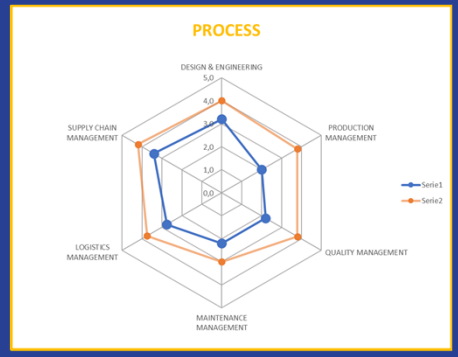


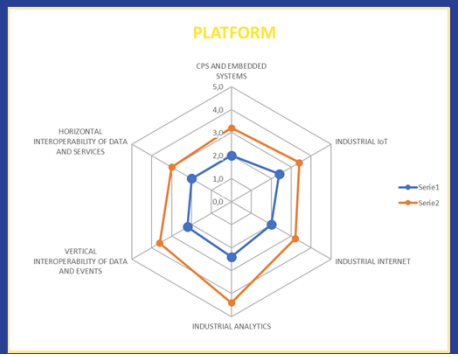




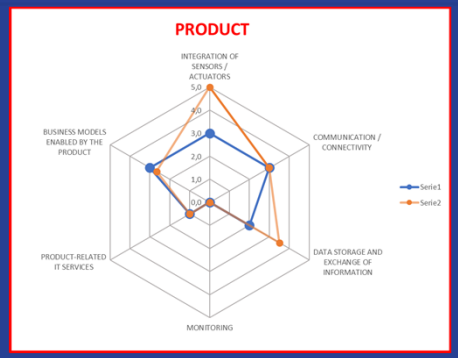
03 Quality Control and Predictive Maintenance

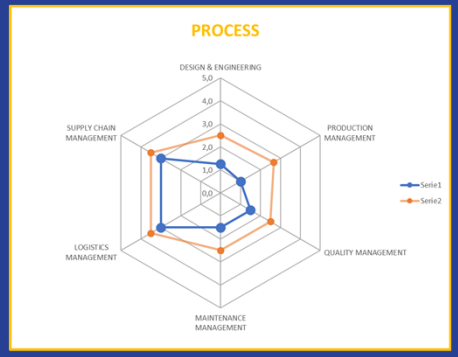


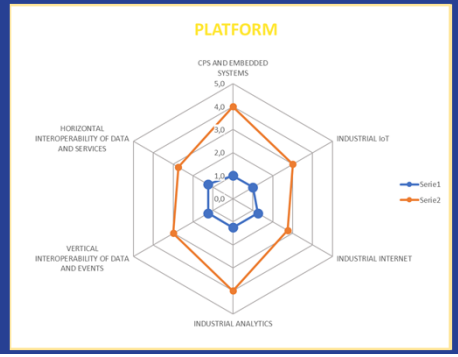




04 Robotics and human interaction



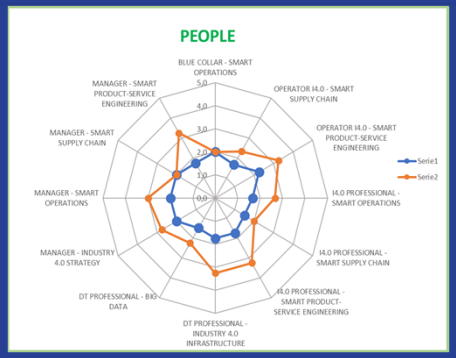


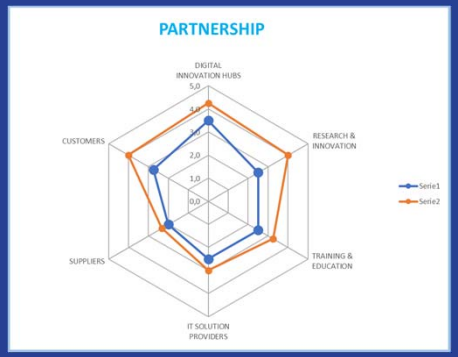


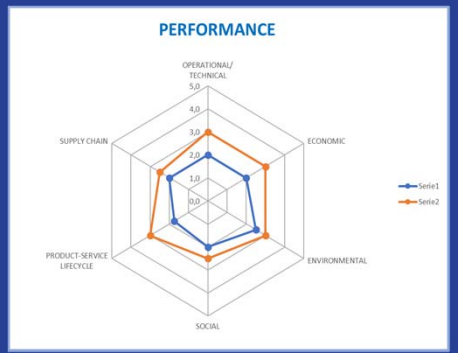
AI REGIO

SOCIO-BUSINESS PILLARS

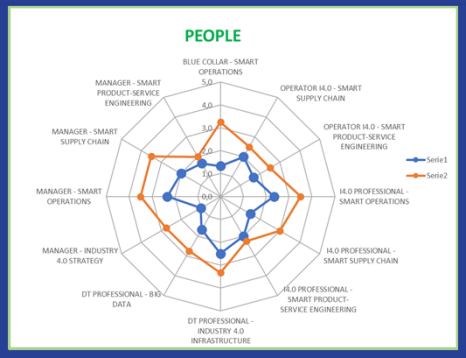
01 Product Engineering and Lifecycle Management

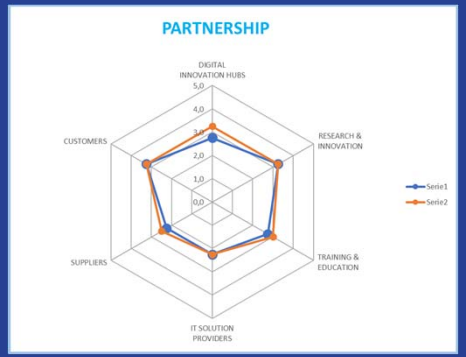


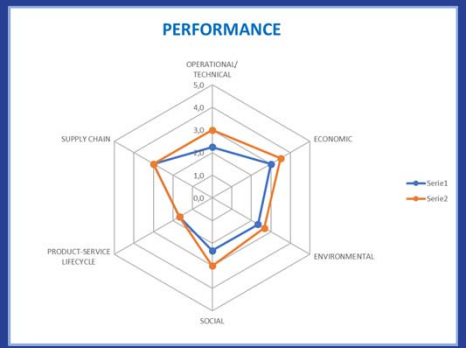




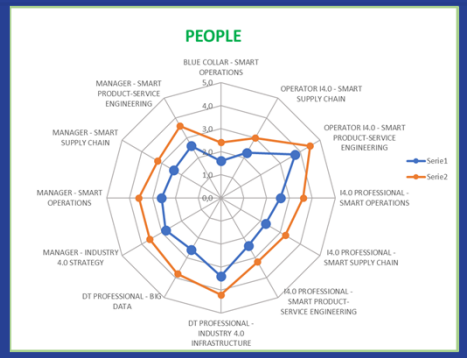
02 Factory Efficient and Sustainable Manufacturing

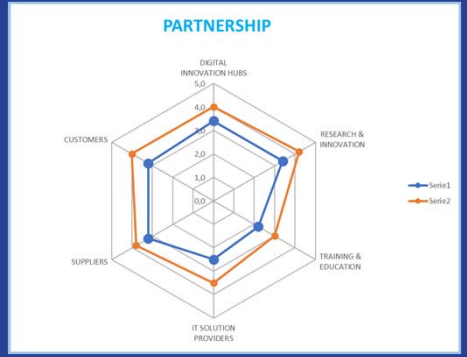


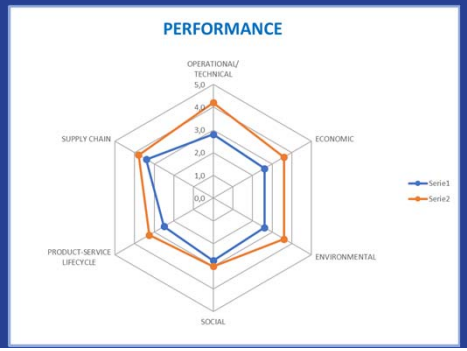




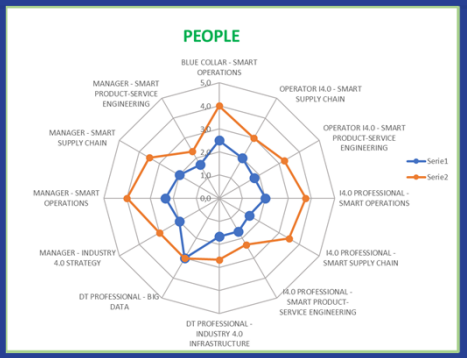
03 Quality Control and Predictive Maintenance

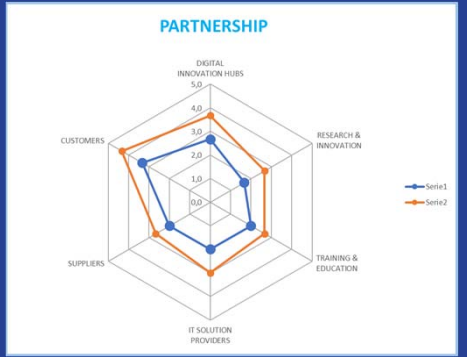


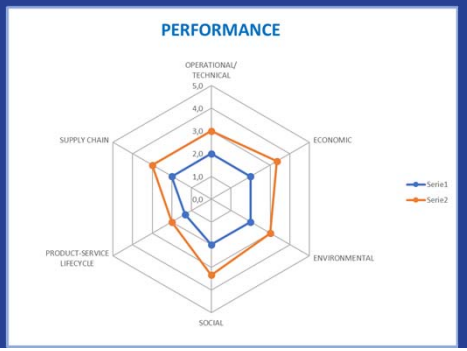




04 Robotics and human interaction

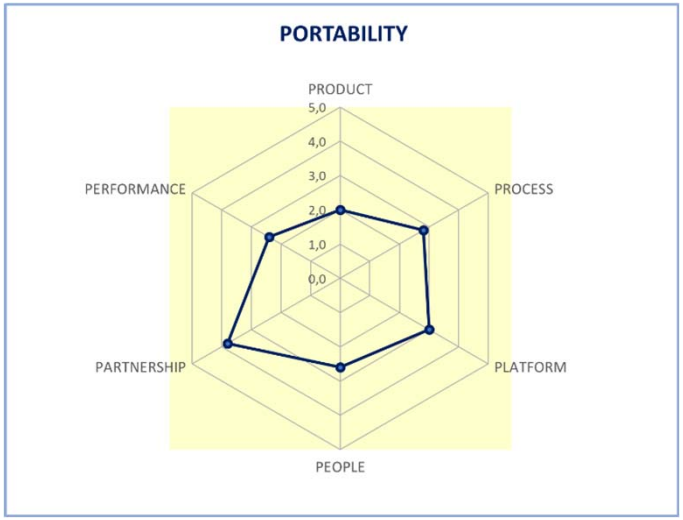


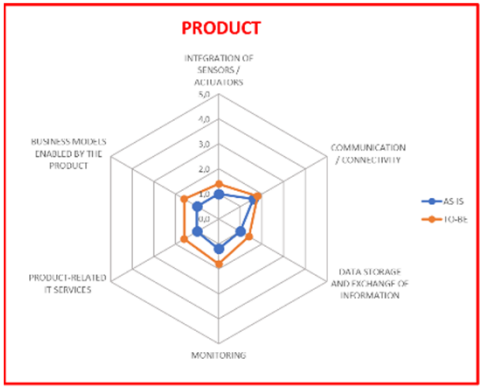


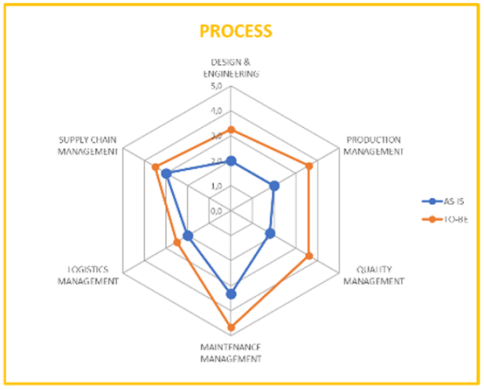


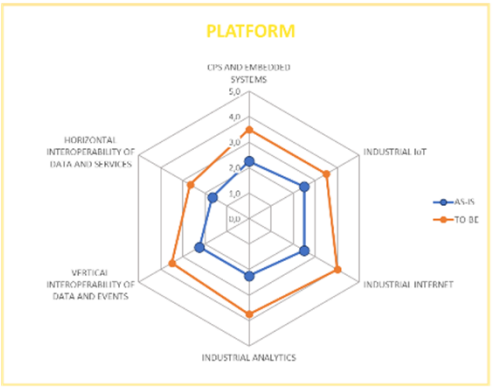
AI REGIO

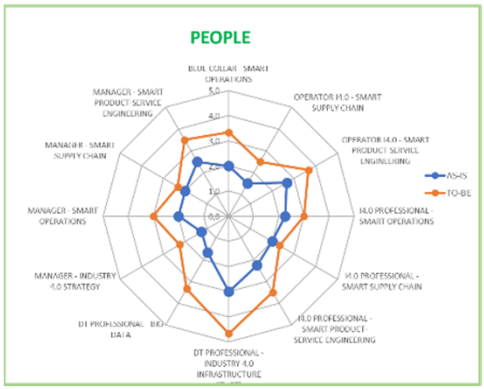
Portability & Scalability (5 Application Cases)

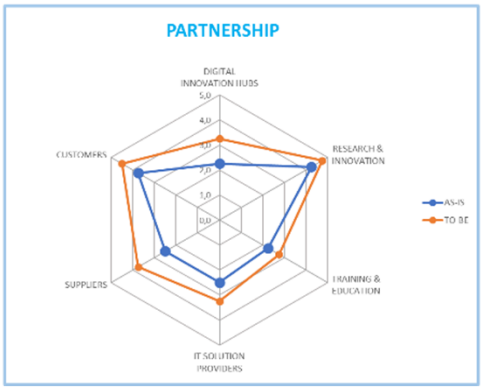


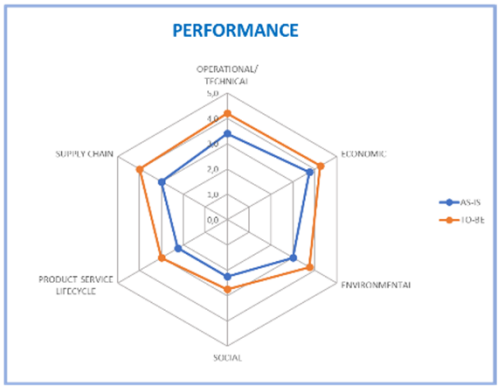












MAIN INSIGHTS

- Highest **leaps** in PLATFORM and PROCESS
- PRODUCT achieves low scores because pilots are focused on processes
- **PORTABILITY** is consistent with the 6Ps analysis. **Need for Product (DPP) and People (EDIH)**

OPENDEI

THANKS

Sergio Gusmeroli
sergio.gusmeroli@polimi.it
www.airegio-project.eu

AI REGIO