Competence Center Industry 4.0

Big data   +

Innovation   +

Research   +

Excellence   =

_____

BI-REX

Bi-Rex: Consortium's goal

A competence centre collecting know-how
of a highly technological network,
to develop solutions with high TRL
(especially for SMEs)

Shareholders

12 Institutions

Università di Bologna
Università di Ferrara
Università di Modena Reggio Emilia
Università di Parma
Università Cattolica del Sacro Cuore

Consiglio Nazionale delle Ricerche
Istituto Nazionale di Fisica Nucleare
Istituti Ortopedici Rizzoli
CINECA

Bologna Business School
Fondazione Golinelli (Host CC Headquarter)
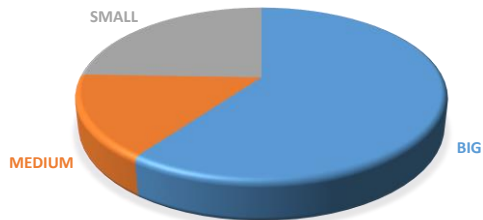
ART-ER (RER)

28 End User Enterprises

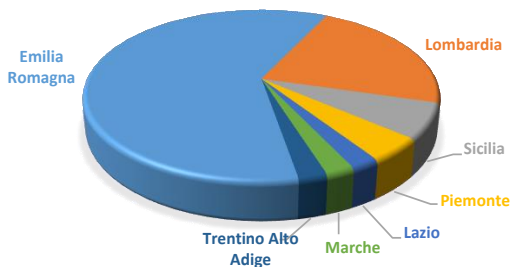|			
Philip Morris	Poggi-polini	Marposs	Circle
IMA	Aetna Group	Conad	Marposs Italia
Samp	Rekeep	Hera	CRIF
Bonfiglioli	CNS	Eni	Euro Coating
Sacmi	Modis	Ducati	Filippetti
Ferrara Bio	UPMC	Rem Tec	Nano-surfaces
		Camst	Alascom
		Link Italia	Service

17 Provider Enterprises

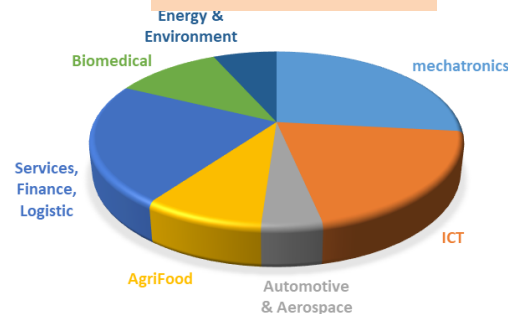|		
Intesa Sanpaolo	Eascon	Juno Design
Altair	IBM	Kaitec
PTC	Data River	Nier
Manz		DVP
TIM		Nextema
Siemens		Energy Group
		Etna Bio
		Fancy Pixel

"Multi" Partnership

DIMENSIONAL CLASS
- SMALL
- MEDIUM
- BIG

GEOGRAPHICAL DISTRIBUTION
- Emilia Romagna
- Lombardia
- Sicilia
- Piemonte
- Lazio
- Marche
- Trentino Alto Adige

INDUSTRIES
- Energy & Environment
- Biomedical
- mechatronics
- Services, Finance, Logistic
- ICT
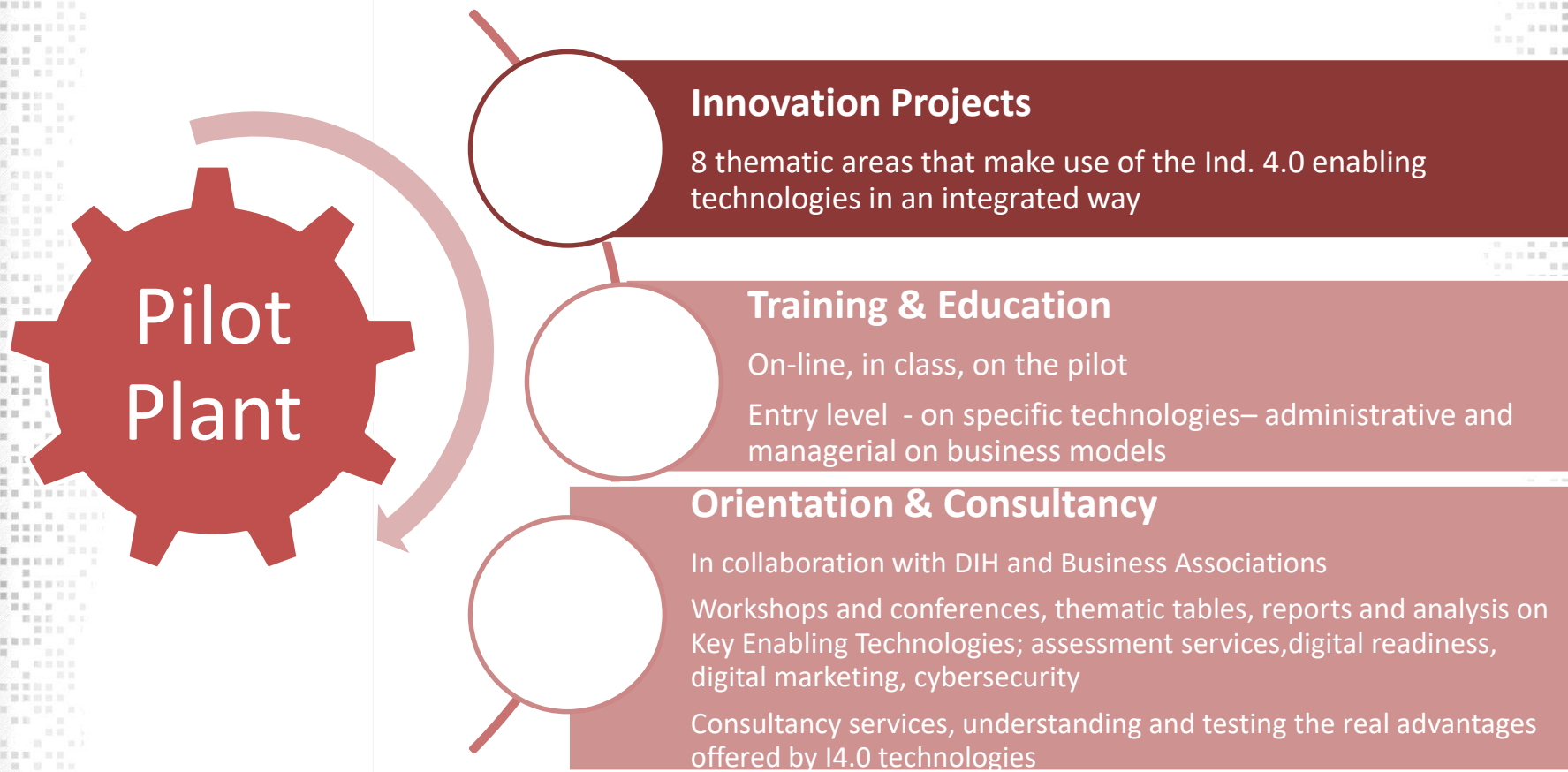- AgriFood
- Automotive & Aerospace

The 45 companies:
- **250k FTEs**
- **Sale of 80 Bn€**
- **10,400 patents**
- **190 Technology Transfer projects**

The 12 "institutions":
- Nearly 1,000 TT projects; 4,700 publications; 31 departments; 1,500 research fellows; 1,100 PhD students; 250 projects funded by competitive calls for a total of about € 15M
- Cineca + INFN → 90% of national computing capability; global leadership in calculation speed BIG DATA

Services & Activities

Pilot Plant

Innovation Projects

8 thematic areas that make use of the Ind. 4.0 enabling technologies in an integrated way

Training & Education

On-line, in class, on the pilot

Entry level - on specific technologies– administrative and managerial on business models

Orientation & Consultancy

In collaboration with DIH and Business Associations

Workshops and conferences, thematic tables, reports and analysis on Key Enabling Technologies; assessment services, digital readiness, digital marketing, cybersecurity

Consultancy services, understanding and testing the real advantages offered by I4.0 technologies

Innovation Projects

8 Thematic Areas

1. Big Data for Sustainability	2. Big Data for Manufacturing
3. ICT for machines and production lines	4 Advanced Systems to manage production processes
5. Security & Blockchain	6. Additive & Advanced manufacturing
7. Collaborative Robotics, Warehousing and Automated Guided Vehicle -AGV	8. Sustainability & Social Responsibility

First 16 Innovation Projects

Industrial innovation projects, collaborative public-private industrial research projects to support SMEs & other companies in the implementation of I.4.0 enabling technologies

Big Data for sustainability

- Smart City Services for Circular Economy and Sustainable Applications
- Big Data for Prevention Models Development to support precision medicine in the oncology sector
- Integrated IoT-Cloud platforms for Facility Management Services

Big Data for Manufacturing

- Big Data for Optimization and Reconfiguration of Production Lines
- Productive Processes Management through Edge Computing
- Integration Technologies Connected IoT
- Integration Solutions with Low Latency and High Availability Industrial Cloud

Advanced Systems for management of production processes

- Traceability of Products and Processes in Real Time

Security & Blockchain

- IoT Connected Security Platforms in Distributed Production Lines

ICT for machine and production lines

- Platforms for the production process optimal mantainance
- Predictive Diagnostics based on Data Analytics and Machine Learning Techniques

Additive & Advanced Manufacturing

- Design for AM Metal components
- Development of AM Technologies for Metal material
- Tailor made Prosthesis Design and implementation for Surgical Replacement

Collaborative Robotics, Warehousing and AGV

- Collaborative Robotics for Productive Processes
- Flexible Automatic Transport Systems (AGV / LGV / Collaborative Vehicles) and Advanced Storage Systems

H2020 – IoTwins

The IoTwins project won 16.4 M€ financing from the European Program H2020

EUROPEAN FUNDING

20 M€ costs

TOT 16.4 M€ funding

12 TEST-BEDS

- Predictive maintenance
- Production optimization
- Facility management
- New business models

European Commission

IoTwins

"Distributed Digital Twins for industrial SMEs: a big data platform" (IoTwins)

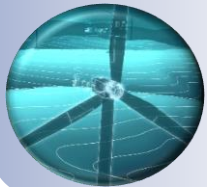**architecture** for development and deployment of Digital Twins of production plants & processes:
- IoT Twins
- Edge Twins
- Cloud Twins

BIG DATA PLATFORM

Big private companies

Public Institutions & Research Centers

Non-profit Organizations

23 PARTNERS

IoTwins Consortium: the synergy of 23 Partners in 8 Countries
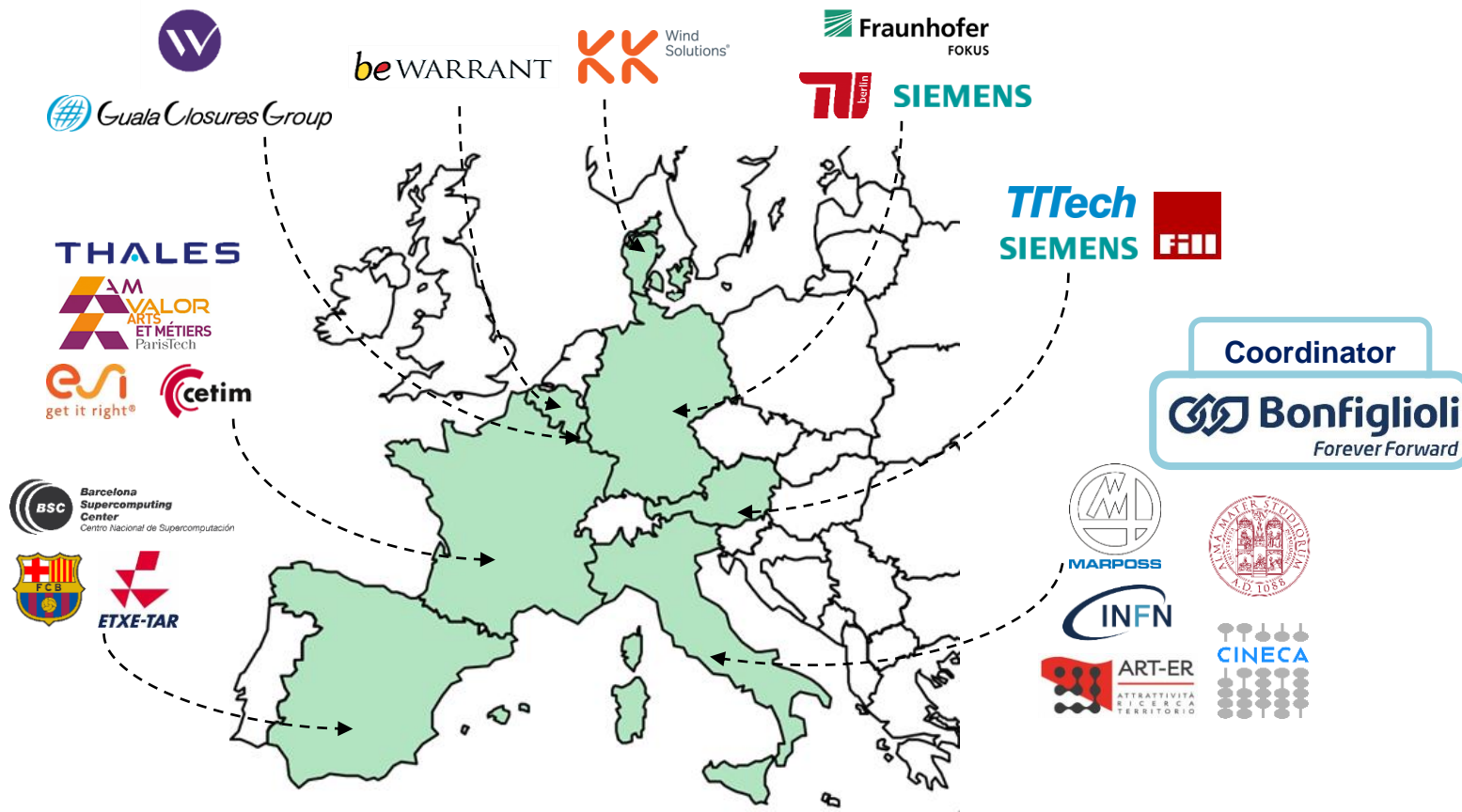
The project: a technological platform to feed 12 pilots

Techonological Platform

- Iot-edge-cloud infrastructure and Big Data services for SMEs
- AI services for Digital Twins

7 Pilots

- Manufacturing Test-Beds
- Facility management Test-beds

5 replicability pilots

- Platform for Replicability, Scalability and Business Model
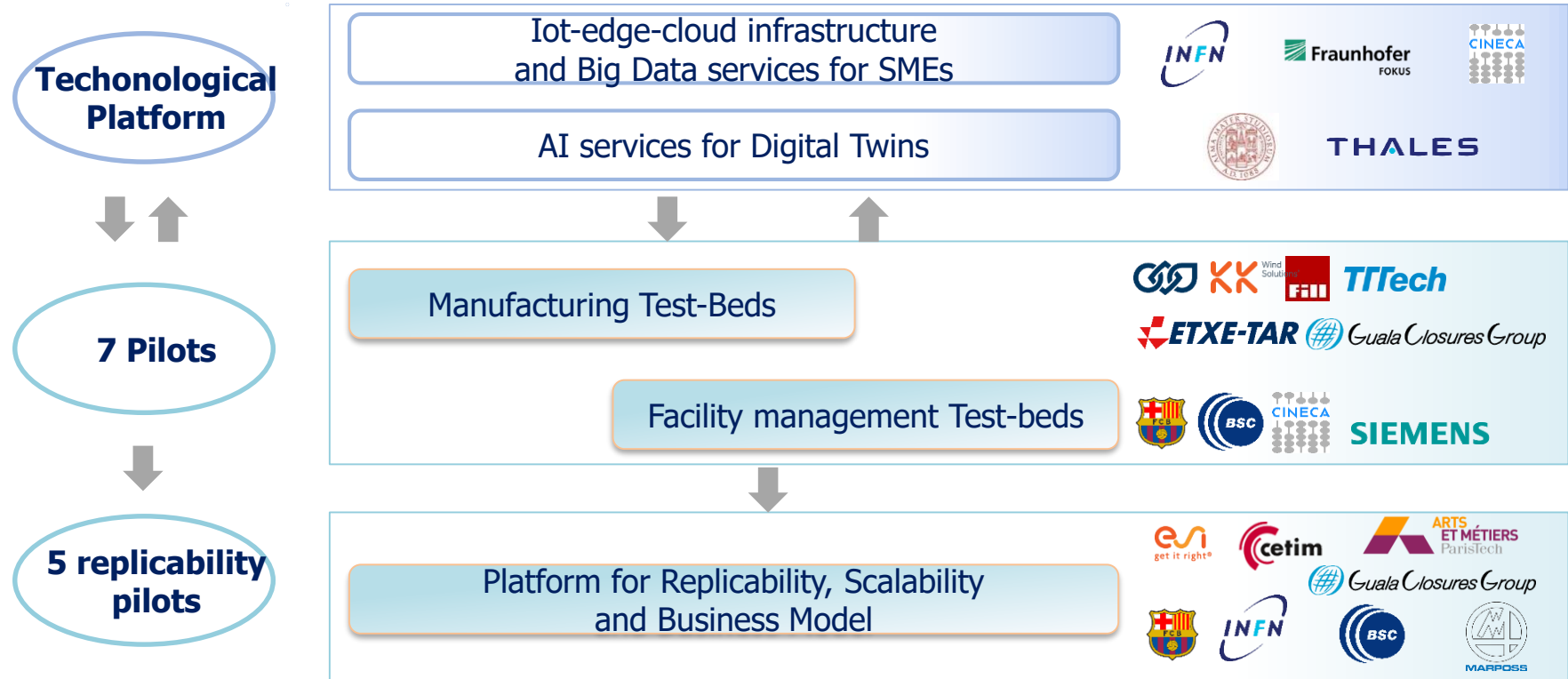
The Project will develop 8 Workpackages (WPs) in 36 months

WP1: MANAGEMENT

WP7: EXPLOITATION AND KNOWLEDGE MANAGEMENT

WP6: PLATFORM REPLICABILITY, SCALABILITY AND BUSINESS MODELS

Digital-twin methodology

PILOTS

WP4: MANUFACTURING TEST-BEDS

WP5: FACILITY MANAGEMENT TEST-BEDS

Requirements

Components for Digital twins

feedback

PLATFORM

WP3: AI SERVICES FOR DIGITAL TWINS

Big Data services

AI Components

WP2: IoT-EDGE-CLOUD INFRASTRUCTURE AND BIG DATA SERVICES FOR SMEs

WP8: OUTREACH ACTIVITIES

R&D activities: the IoT Platform will be implemented in 12 pilots

WP N°	Title	Participants	Short Description	Activity
2	IoT-Edge-Cloud infrastructure and big data services for SMEs	INFN, Fraunhofer FOKUS, CINECA	Definition of the technology and user requirements to design the IoTwins platform	**Platform**
3	AI services for distributed Digital Twins	THALES	Development of AI services (Machine learning, simulation…) and methodologies for the application on the Test-beds	**Platform**
4	Manufacturing test-beds	KK Wind Solutions, Fill, TTTech, ETXE-TAR, Guala Closures Group	1. Predictive maintenance of **wind turbines** 2. Monitoring the behaviour of **machines for automotive** 3. Optimization of **crankshaft manufacturing systems** 4. Predictive maintenance of **closure systems**	**4 Pilots**
5	Facility management test-beds	BSC, CINECA, SIEMENS	5. Management of crowd flows in the **Camp Nou** facility 6. Improving the environmental footprint of **Data Centers** 7. Management of a wide-scale **Smart Grid** in a living lab	**3 Pilots**
6	Platform replicability, scalability and business models	cetim, ARTS ET MÉTIERS ParisTech, Guala Closures Group, BSC, INFN, MARPOSS	8. Identifying **patterns for reuse** for manufacturing SMEs 9. **Performance homogenization** over different plants 10. Testing Test-bed 6 on other **IT facilities** (BSC and INFN) 11. Testing Test-bed 5 on **smaller stadiums** 12. Testing an innovative **business model** to exploit the Platform	**5 Pilots**

Source: IoTwins Consortium

WP 1, 7 and 8 will deal with the Coordination of the Consortium, the Exploitation and the Dissemination of the results generated by IoTwins

WP N°	Title	Participants	Short Description	Activity
1	Project Management	**Bonfiglioli** beWARRANT	Coordinating and monitoring the activities of Partners, administrating European funds	**Coordination**
7	Exploitation of the project developments and knowledge management	W	Defining business models to adopt the IoTwins platform/methodology, managing IPR and exploitable results	**Exploitation**
8	Outreach activities – dissemination and communication	ART-ER ATTRATTIVITÀ RICERCA TERRITORIO	Communicating and disseminating project Results: - Events, international conferences, workshops, open days, exhibitions…	**Dissemination**