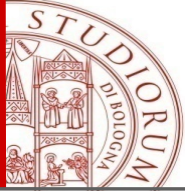


PANEL on INDUSTRY 4.0

A PERSPECTIVE ON AI PLATFORMS

Michela Milano

**ALMA MATER RESEARCH INSTITUTE FOR
HUMAN-CENTERED ARTIFICIAL INTELLIGENCE
UNIVERSITY of BOLOGNA**



Outline

- IoTwins project
- AI-on-demand platform
- Take-home message

November 2020

IoTwinS Project

**Distributed Digital Twins for industrial SMEs:
a big-data platform**

Concept and approach.

- IoTwin is a European project that will work to **lower the barriers for the uptake of Industry 4.0 technologies**, particularly for SMEs, to optimize processes and increase productivity, safety, resiliency, and environmental impact.
- IoTwin approach is based on a **technological platform** allowing a simple and low-cost access to big data analytics functionality, AI services and edge cloud infrastructure for the **delivery of digital twins in manufacturing and facility management sectors**.
- The approach is demonstrated through the development of **12 large scale testbeds**, organized in three application areas: **manufacturing, facility management and replicability/scale up** of such solutions.

20

M€ total value

16

M€ EU
Funding

23

Partners

1

Platform

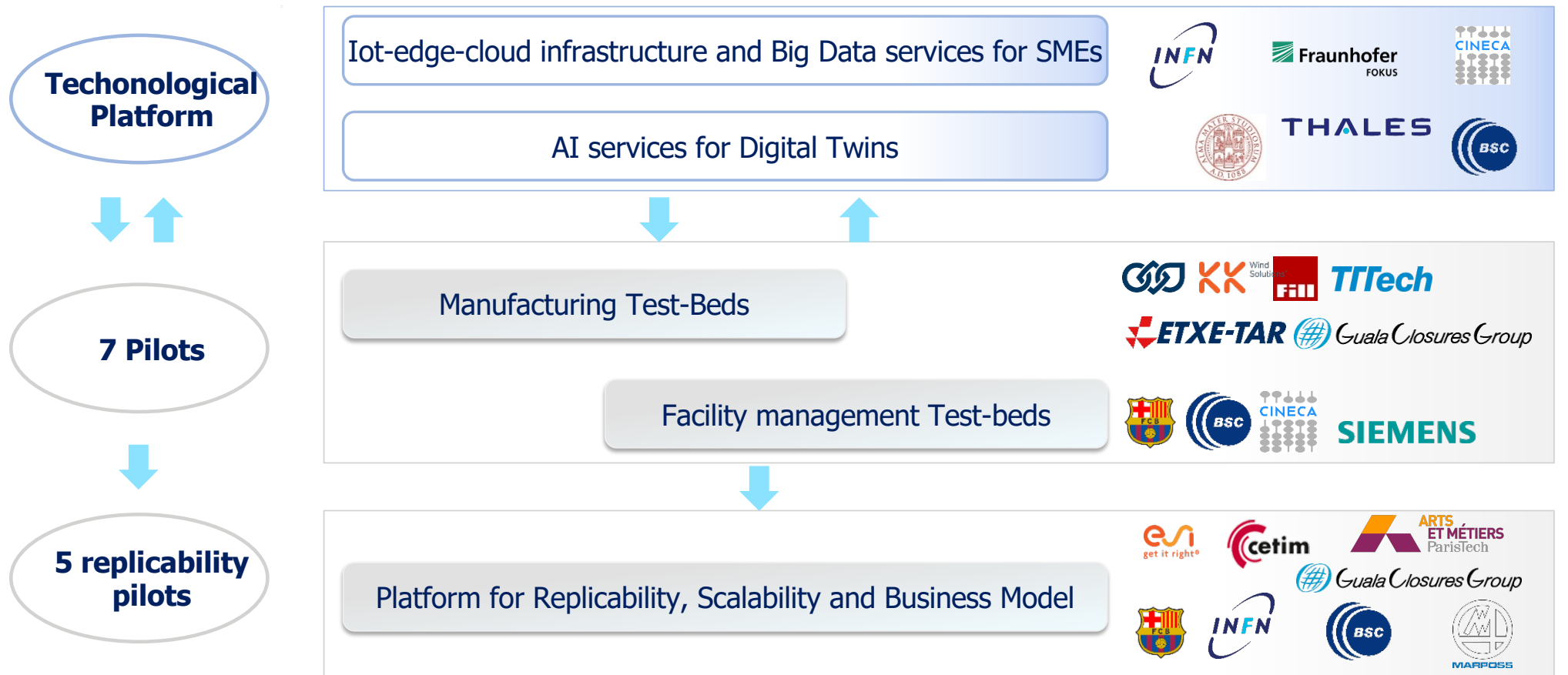
12

Testbeds

3

Application
areas

The project: a technological platform to feed 12 pilots





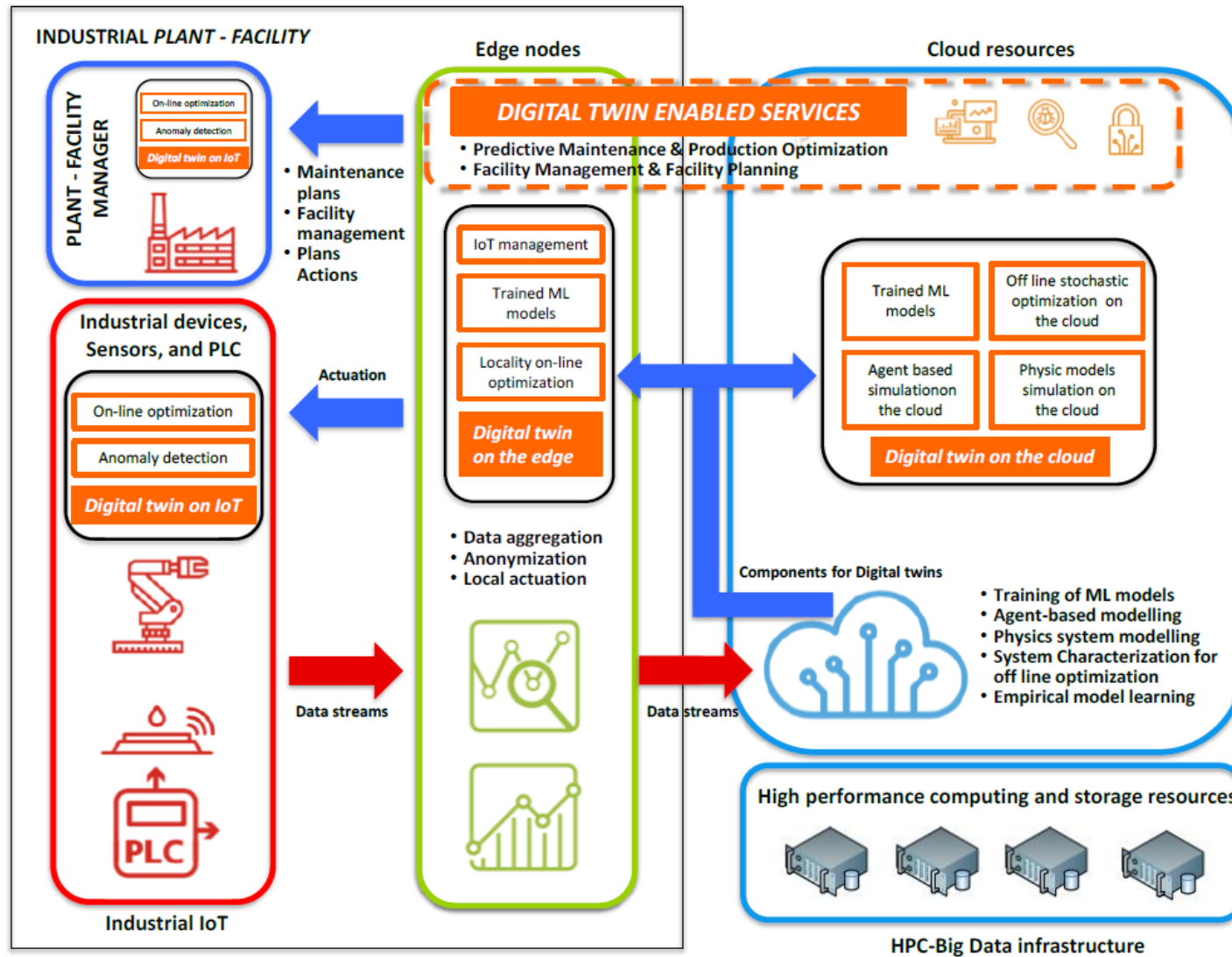
Platform and services.

All the IoTwins testbeds share the same methodology, grounded on the concept of **distributed IoT-/edge-/cloud-enabled hybrid twins, to replicate complex systems**, with the ambition of predicting their dynamics and temporal evolution

Key elements:

- A **full-fledged platform** enabling easy and rapid access to heterogeneous cloud HPC-based resources for advanced big data services.
- **Intelligent services** to simplify and accelerate the integration of advanced Machine Learning algorithms, physical simulation, on-line and off-line optimization into distributed digital twins
- Advanced edge-oriented mechanisms, tools, and orchestration to support **Quality of Service** in the runtime execution of the distributed digital twins

Digital Twins concept in IoTwins





Testbeds.



manufacturing

4 industrial testbeds providing predictive maintenance services that exploit sensors data to forecast the time to failure and produce maintenance plans to optimize maintenance costs

- Wind turbine predictive maintenance | Bonfiglioli Riduttori, KK Wind Solutions
- Machine tool spindle predictive behaviour | FILL
- Predictive maintenance for a crankshaft manufacturing system | ETXE-TAR
- Predictive maintenance and production optimization for closure manufacturing | GCL International



Testbeds.



facility management

3 testbeds for identification of criticalities, optimization techniques to provide efficient facility management plans, operation optimal schedules, and renovation/maintenance plans

- NOU CAMP - Sport facility management and maintenance | Futbol Club Barcelona
- EXAMON - Holistic supercomputer facility management | CINECA
- Smart Grid facility management for power quality monitoring | SIEMENS



Testbeds.



replicability

5 testbeds to demonstrate the replicability and the scalability of the IoTwins platform and of the former manufacturing and facility management testbeds

- Patterns for smart manufacturing for SMEs | **Centre Technique des Industries Mécaniques**
- EXAMON replication to other datacentres facilities | **Istituto Nazionale di Fisica Nucleare, Barcelona Supercomputing Center**
- Standardization/homogenization of manufacturing performance | **GCL International**
- NOU CAMP replicability towards smaller scale sport facilities | **Futbol Club Barcelona**
- Innovative business models for IoTwins PaaS in manufacturing | **Marposs**



BUILDING THE EUROPEAN AI ON-DEMAND PLATFORM

A glimpse on European AI Initiatives

EBDVF 4/11/2020

**Michela Milano
University of Bologna**

www.ai4eu.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825619

AI-on-demand platform

- **AI-on-demand platform: European platform collecting AI assets**
 - Tools, experts, papers, courses, data-sets
 - Three components: the infrastructure, the content and the ecosystem
 - How to design and develop to make it a real asset for Europe
 - Sustainability plan beyond the project time frame
- **Future development shaped by the SRIA**
 - **Engagement of the consortium members** on the definition of the content of the first version of the SRIA.
 - For the second version, we will extend the engagement outside the AI4EU consortium boundaries: relevant projects (ICT-48, ICT-49), relevant initiatives (ELG, AI data and robotic PPP, Bonseye....)

AI4EU in a nutshell



Strategic objectives

Ensure platform sustainability

Boost platform functionalities

Enrich platform high-quality content

Engage a wider community

Ensure a trustworthy AI approach

Impacts

Enhancing development, experimentation, comparison and use of EU AI solutions

Supporting EU research excellence reducing fragmentation

Boosting the industrial ecosystem and fostering AI-based innovation

Fostering social innovation and AI-based public services

Boosting a trustworthy AI approach

Stakeholders

Technology providers

Researchers

Industries: large, SMEs, start-ups

Public bodies



AI4EU in a nutshell

Infrastructure

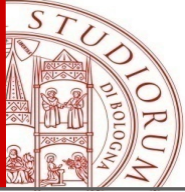
- Ease of use
- User feedback/reputation
- Multi-lingual support
- Security and trust
- Interoperability
- Personalisation of access
- Availability of computing resources
- Experimentation

Content

- Tools/algorithms
- Manuals
- Education material
- Experts
- Papers
- Data-sets

Ecosystem

- Hub for European AI
- Ethical observatory
- Connection with current and future EU initiatives
- Connection with related fields (HPC, cybersec)
- Matchmaking
- Integration with regional and national initiatives



Take home message

- AI Platforms must-have:
 - Foster the AI uptake in industry
 - Ease of use: interaction in natural language
 - Matchmaking capabilities
 - Requiements toward AI assets
 - Algorithms toward hardware
 - Replicability of techniques
 - StairwAI project will start in January 2021 to enrich the AI on demand platform with these capabilities