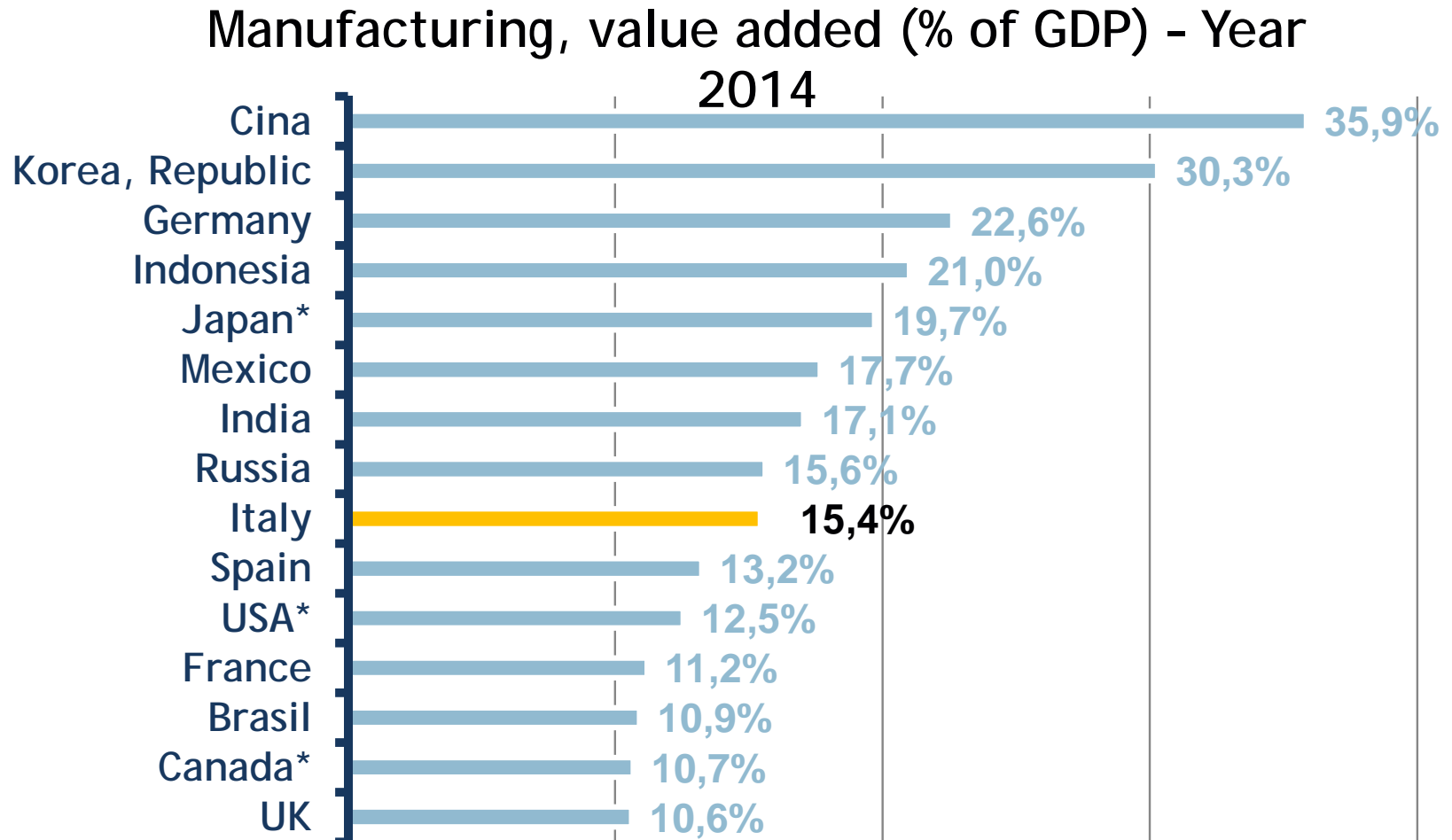# BE in CPPS

IoT and the fourth Industrial Revolution

IOT WEEK Industrial Session: the viewpoint of Manufacturing Industry through public-funded Research/Innovation projects

Sergio Gusmeroli
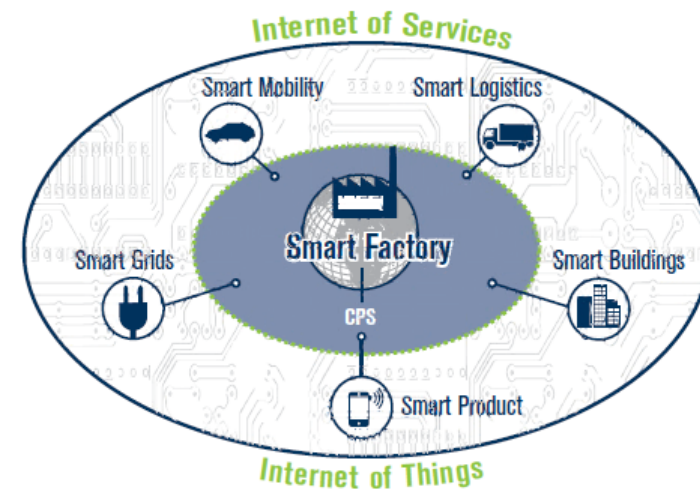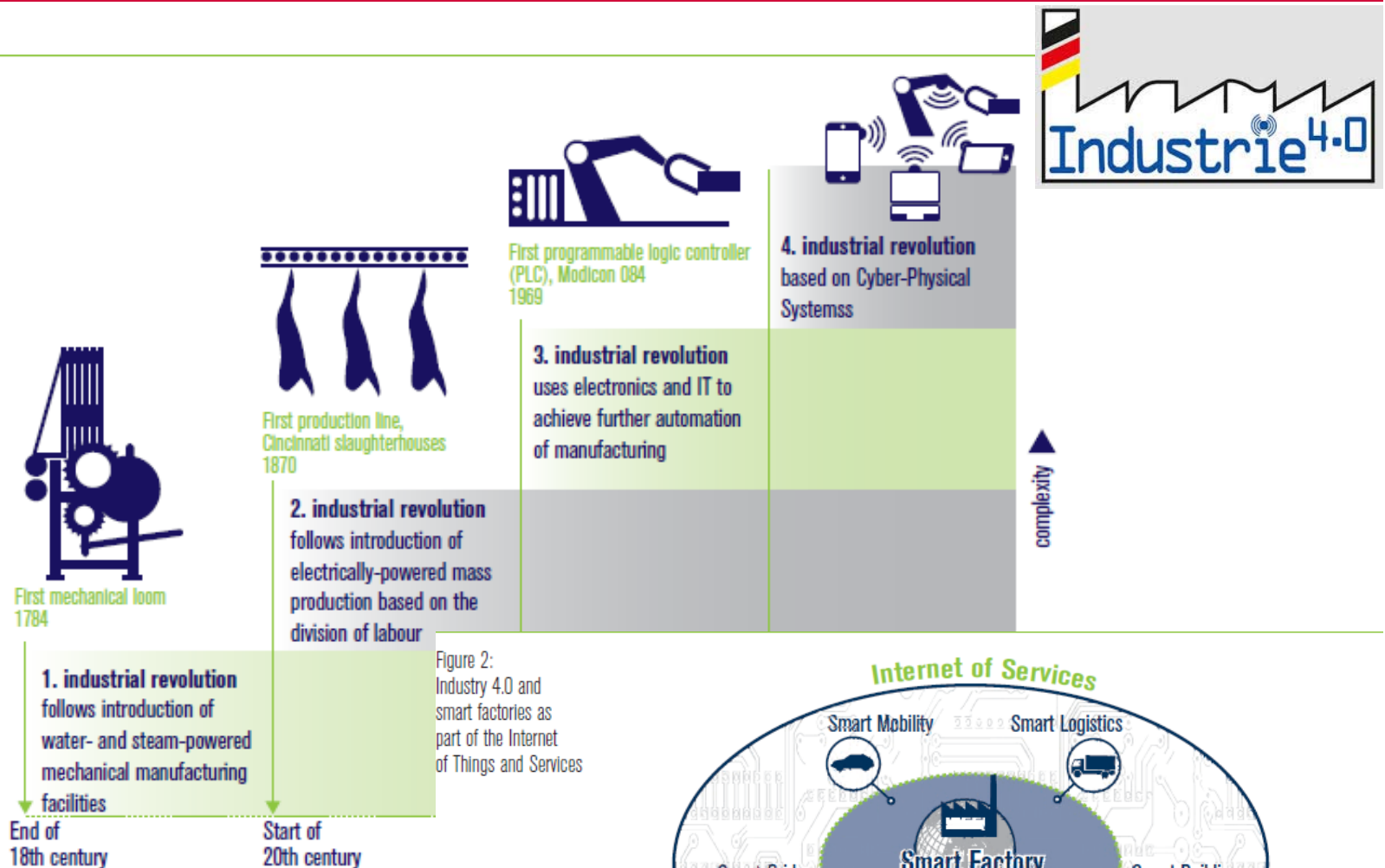sergio.gusmeroli@polimi.it

June, 1st 2016

Manufacturing leading role in the World

Manufacturing, value added (% of GDP) – Year 2014

Country	%
Cina	35,9%
Korea, Republic	30,3%
Germany	22,6%
Indonesia	21,0%
Japan*	19,7%
Mexico	17,7%
India	17,1%
Russia	15,6%
Italy	15,4%
Spain	13,2%
USA*	12,5%
France	11,2%
Brasil	10,9%
Canada*	10,7%
UK	10,6%

Source: The World Bank

Industrie 4.0: the German CPPS way

Figure 1:
The four stages of
the Industrial Revolution

Industrie 4.0

First programmable logic controller
(PLC), Modicon 084
1969

4. industrial revolution
based on Cyber-Physical
Systemss

3. industrial revolution
uses electronics and IT to
achieve further automation
of manufacturing

First production line,
Cincinnati slaughterhouses
1870

2. industrial revolution
follows introduction of
electrically-powered mass
production based on the
division of labour

First mechanical loom
1784

1. industrial revolution
follows introduction of
water- and steam-powered
mechanical manufacturing
facilities

complexity

End of
18th century

Start of
20th century

Figure 2:
Industry 4.0 and
smart factories as
part of the Internet
of Things and Services

Internet of Services

Smart Mobility   Smart Logistics

Smart Grids   Smart Factory   Smart Buildings

CPS

Smart Product

Internet of Things

POLITECNICO
MILANO 1863

BE in CPPS
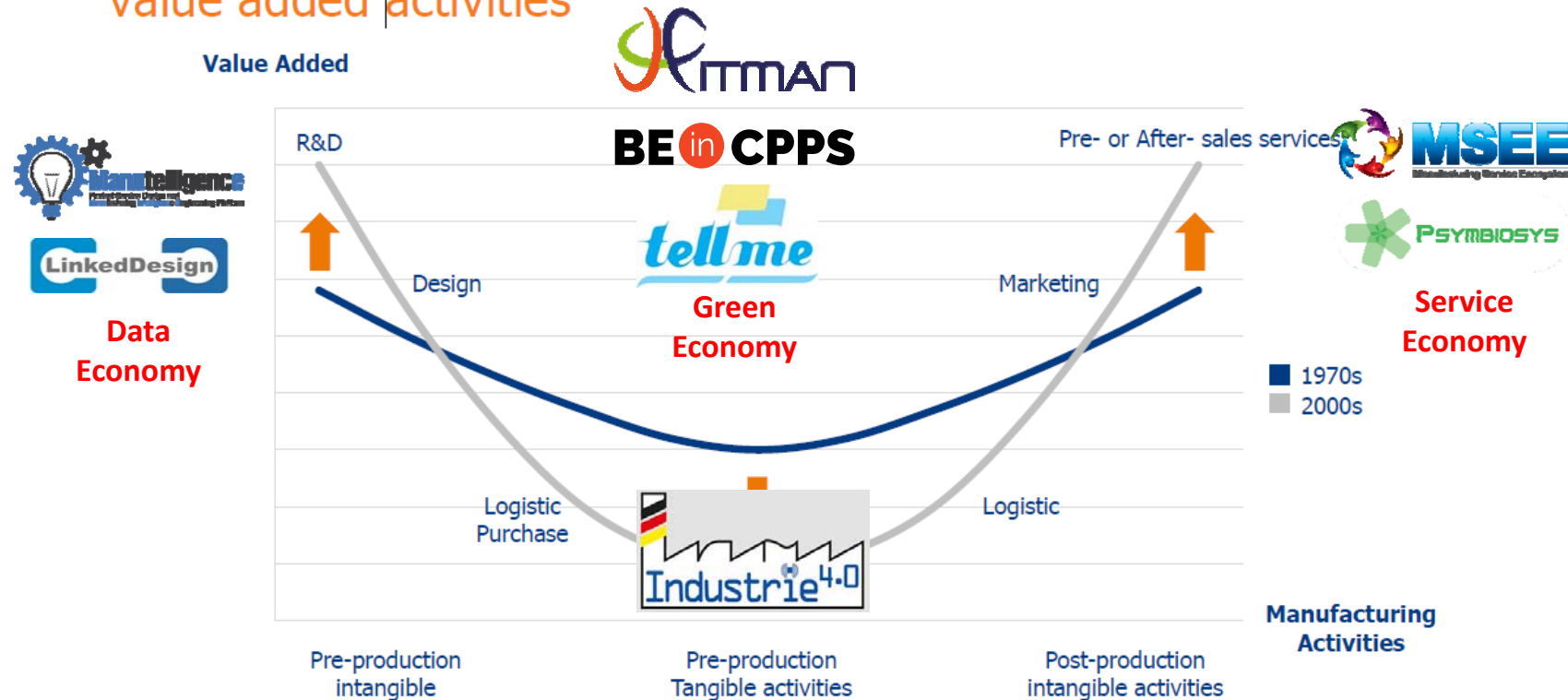
Digitising European Industry April 19th

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.**

Facilitated by a dynamic framework for coordination experience sharing between public and private initiatives at **EU, national and regional level**, the proposed actions are expected to mobilise close to **50 B€** of public and private investment in the next **5 years**, explore and adapt when needed the **legislative framework** and reinforce coordination of efforts on **skills and quality jobs** in the digital age.

POLITECNICO
MILANO 1863

"Software, itself, does nothing, it does not build anything, it does not save lives. The objective should be to **adapt it to industrial technologies**. Unify the software with the tools already available".

The fundamental challenge is to start a business process digitalisation in sectors so far not digitised, which opens a world of opportunities for enterprises".

July 2014

Rosa García
Presidenta de Siemens en España

Digitising Industry (the voice of politics)

Speech of Commissioner Oettinger

at Hannover Fair 14 April 2015

*Objective: Making sure that any industry in Europe, wherever it is located, can make the best use of **digital technologies** while adapting our workforce to the change*

1. Wide-spread adoption: access to technology and knowledge
2. Leadership in digital platforms for industry
3. Closing the digital skills gap
4. Smart regulation for smart industry

COMMISSION PRIORITY

Digital Single Market

Bringing down barriers to unlock online opportunities

European Digital Single Market Announcement by President Juncker

01:11/01:32   English

Digital Single Market: making the EU's single market freedoms "go digital"

An EU wide strategy for digitisation can ensure "scale", mobilise actors with value chains spreading across Europe and support interoperability and standardisation.

http://europa.eu/rapid/press-release_SPEECH-15-4772_en.htm

DG CNECT: two complementary actions
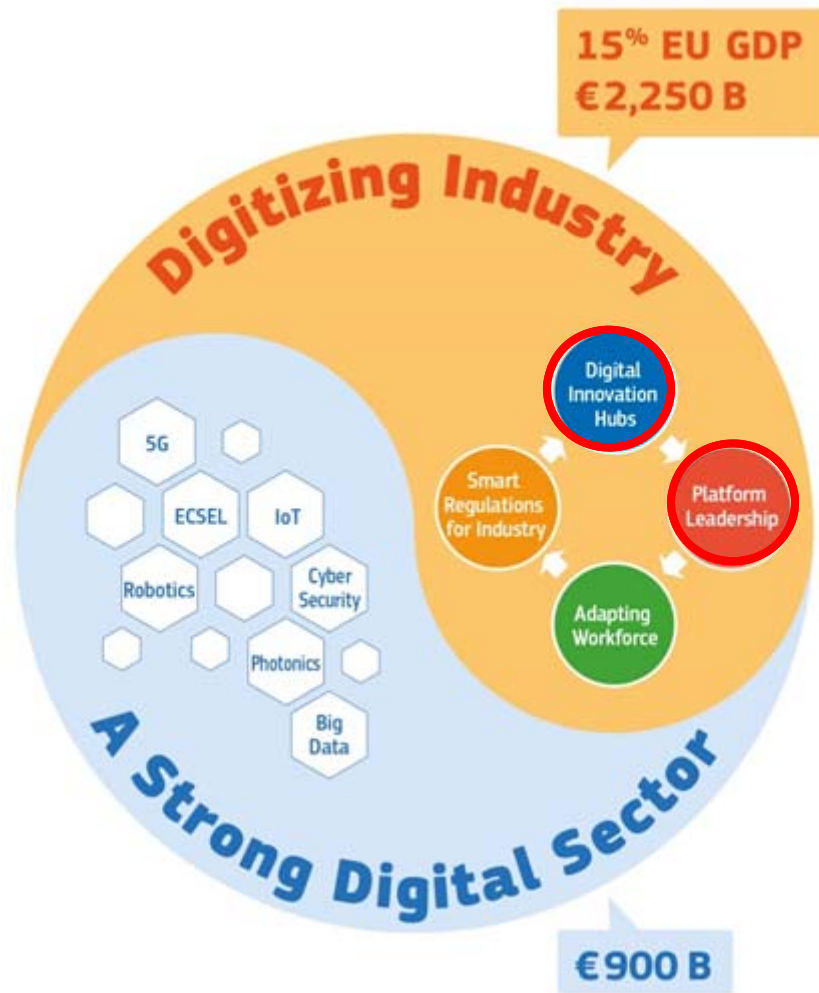
Two distinct but complementary pillars for Digital technology, incl. FI, adoption in Manufacturing:

- the development of a European **Digital Platform** (several initiatives to be considered and harmonized in a reference architecture)

- the creation of an **EU-wide Ecosystem** for digital industrial innovation (implemented by the I4MS initiative and its three Phases)
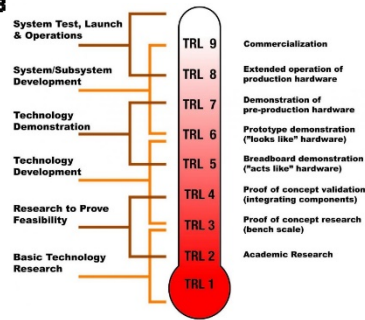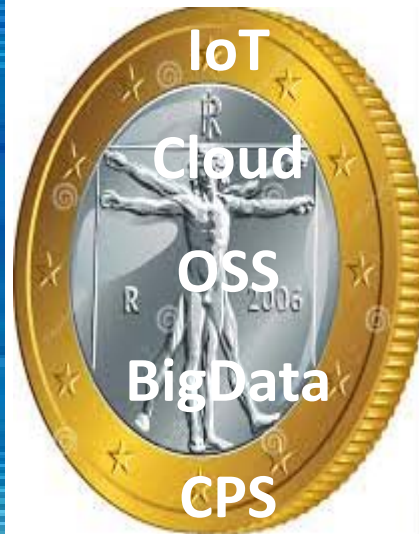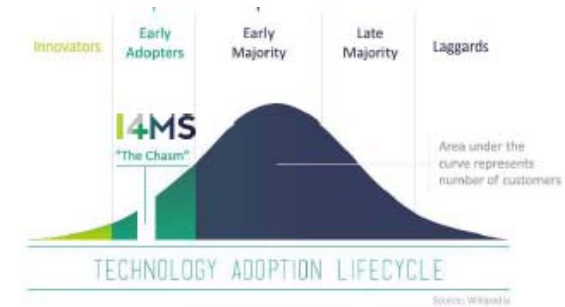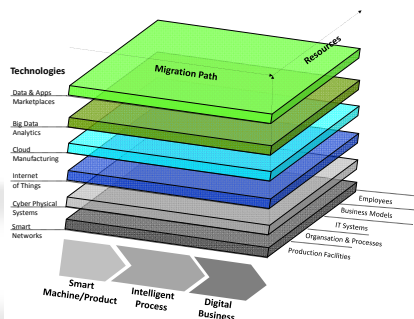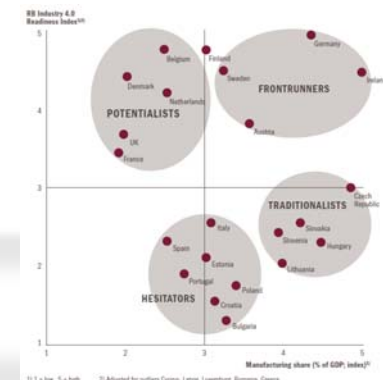

http://i4ms.eu

http://www.beincpps.eu

Digitising Industry + Industrie 4.0

Digitising Industry

INFORMATION TECHNOLOGY

IoT
Cloud
OSS
BigData
CPS

MIGRATION FRAMEWORK

Industry 4.0

Agenda of the Session

14:30 -16:00 IoT and the Fourth Industrial Revolution.
Chair Sergio Gusmeroli (POLITECNICO di MILANO, BEinCPPS coordinator) 5' intro
Panellists (6*10' position slides and then 25' audience / panel discussion)

- **Carl Gisleskog** "IoT in Factories of the Future cPPP: Achievements and Future Perspective", *EFFRA European Factories of the Future Research Association*;

- **Andreas Nettsträter** "Democratic Industry 4.0: Ideas, Maker and IoT", *Fraunhofer IML Dortmund*

- **Mauro Isaja** "Business Experiments for EU-wide adoption of Cyber Physical Production Systems: the BEinCPPS I4MS Innovation Action", *Engineering Ingegneria Informatica SPA*

- **Jacopo Cassina** "CPS for Manufacturing Industry: the sCorPiuS Roadmapping Exercise", *HOLONIX spinoff of Politecnico di Milano*

- **Nuria De Lama** "Road2CPS – Roadmap of CPS systems adoption in European strategic sectors" *Atos Spain*

- **Unai Martinez** "IoT for innovative Product-Service Systems Design: the ICP4Life FoF project", *Tecnalia Association*

Digitising EU Industry 4.0:
the role of IoT in the Factories of the Future

- The EC communication **"Digitising EU Industry"**. What is the role of IoT in this digitalisation journey? How to make IoT penetrate products-processes-business of the Manufacturing Industry? **IT Industry viewpoint**.

- **Industrie 4.0**, its reference model, its smart service world, its readiness levels. How could EU Manufacturing Industry implement a digital innovation migration path to maximise the benefits of both IoT and Industrie 4.0? **Manufacturing Industry viewpoint**

BEinCPPS Open Calls: wave I

BEinCPPS I4MS Phase II project aims at spreading the presence of **CPPS-based industrial experiments** to all the Regions of Europe, starting from 5 champion experiments located in **advanced Vanguard** EU regions.

BEinCPPS provides a **CPS/IOT Open Platform** on top of which application developers could base innovative services e.g. in the field of production planning, resources management, logistics optimisation.

BEinCPPS **Open Call 1** targets the development, testing and experimentation of **innovative IT applications experiments**, which, based on CPPS technology, could significantly enhance the impact of CPPS into the Manufacturing Industry and SMEs / Mid Caps in particular.

Open APIs and datasets coming from the project's 5 experimental facilities will form an IT infrastructure for a realistic testing and experimentation of the new applications.
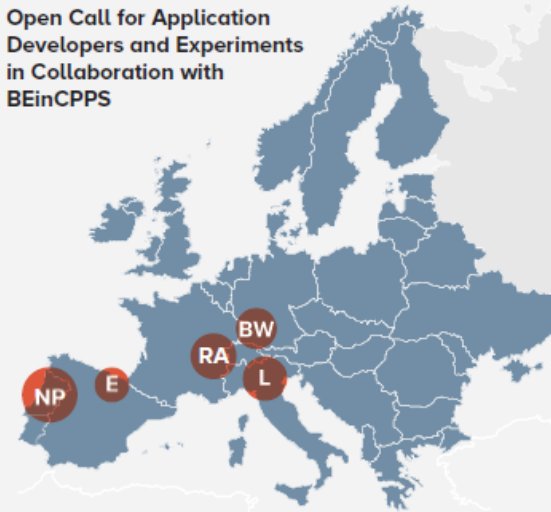

BE in CPPS
Business Experiment in Cyber Physical Production Systems

I4MS

www.beincpps.eu
www.i4ms.eu

OPEN CALL: MAY 2016

Open Call for Application Developers and Experiments in Collaboration with BEinCPPS

DIGITAL INNOVATION HUBS

- **Lombardy (L):** Zero Defect Quality Control System.
  Domain: White Goods
  Reference Industry: **WHIRPOOL**

- **Euskadi (E):** Manufacturing Processes for Plastic Components.
  Domain: Automotive
  Reference Industry: **MAIER Coop**

- **Baden Wuttenberg (WB):** Highly personalized cabin manufacturing.
  Domain: Agriculture Technologies
  Reference Industry: **JOHN DEERE**

- **Norte Portugal (NP):** High Speed Shoe Factory automation and control.
  Domain: Footwear Manufacturing.
  Reference Industry: **KYAIA**

- **Rhône Alpes (RA):** High Precision Moulding.
  Domain: Moulds Manufacturer
  Reference Industry: **PERNOUD**

Open Call for Application Developers and Experiments in Collaboration

More Information

BE in CPPS

OPEN CALL ON GOING

Register for the webinar
19th of May
at 11:00 CET