



Europe PPP: manufacturing

Riikka Virkkunen, VTT
Co-chair of Made In Europe



Watch the Video

<https://www.effra.eu/news/future-manufacturing-made-europe>



Synergies with the EU Policies

- **MiE Objective 1:**
Ensuring European
Leadership &
manufacturing
excellence

the new
industrial
strategy
for Europe

- **MiE Objective 2:**
Achieving Circular and
climate-neutral
manufacturing

the
European
Green
Deal

- **MiE Objective 3:**
Mastering the Digital
transformation of
manufacturing
industry

a Europe
fit for the
digital age

an
Economy
that works
for people

- MiE Objective 4:**
Creating Attractive
added-value
manufacturing jobs



Vision for 2030

Europe's manufacturing industries' vision for 2030 is to reinforce its global position in terms of competitiveness, productivity and technology leadership.

Europe will be the leading “**solution provider**” in **production technology, digitalization, resource efficiency and circular economy** implementation.

Needs addressed by the partnership

Pool resources from scattered manufacturing initiatives to support European manufacturing in the global competition

Boost digital transformation and data-based business in manufacturing industries

Speed up the transition to green and resource-efficient manufacturing value chains

Roll out the developed technologies to companies, especially SMEs, in all regions of Europe

Support the workforce in continuous learning and technology adoption

FP7

FoF 2020

Factories 4.0 and Beyond

Horizon Europe

Building on the vision of the FoF 2020 roadmap and public consultation in 2016

Key priorities for FoF 18-19-20

*Vision of the factories of the future:
the challenge perspective*



*Vision of the factories of the future:
the technology perspective*

- Agile value networks:** Lot-size one - distributed manufacturing
- Excellence in manufacturing:** Advanced manufacturing processes and services for zero-defect processes and products
- The human factor:** Human competences in synergy with technological assets
- Sustainable value networks:** Manufacturing in a circular economy
- Interoperable digital manufacturing platforms:** connecting manufacturing services



**EFFRA VISION FOR
A MANUFACTURING
PARTNERSHIP IN
HORIZON EUROPE**

2021-2027



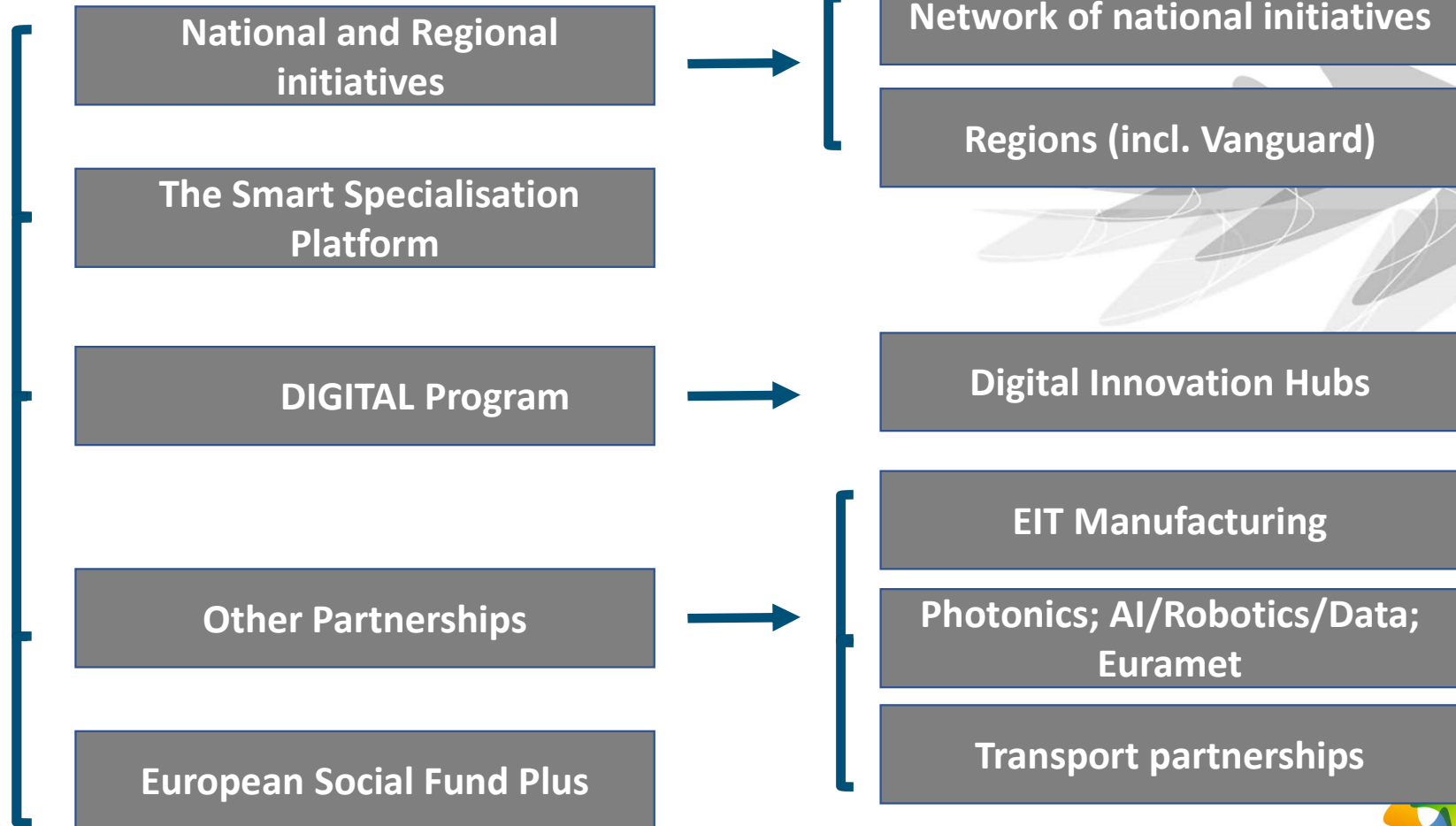
https://www.effra.eu/sites/default/files/made_in_europe-sria.pdf

2009/2010

2013/2014

2016

Cooperation with others



Policy objectives

Manufacturing competitiveness:

Leadership & manu-facturing excellence, generating new products and new markets

European Green Deal:

Circular and climate-neutral manufacturing

An Economy that Works for People and SMEs:

Attractive value added manufacturing jobs

A Europe Fit for the Digital Age:

Digital transformation of manufacturing industry, trusted and robust

Specific Objectives

- Excellent, responsive and smart factories & supply chains
- Circular products & Climate-neutral manufacturing
- New integrated business, product-service and production approaches; new use models
- Human-centered and -driven manufacturing innovation

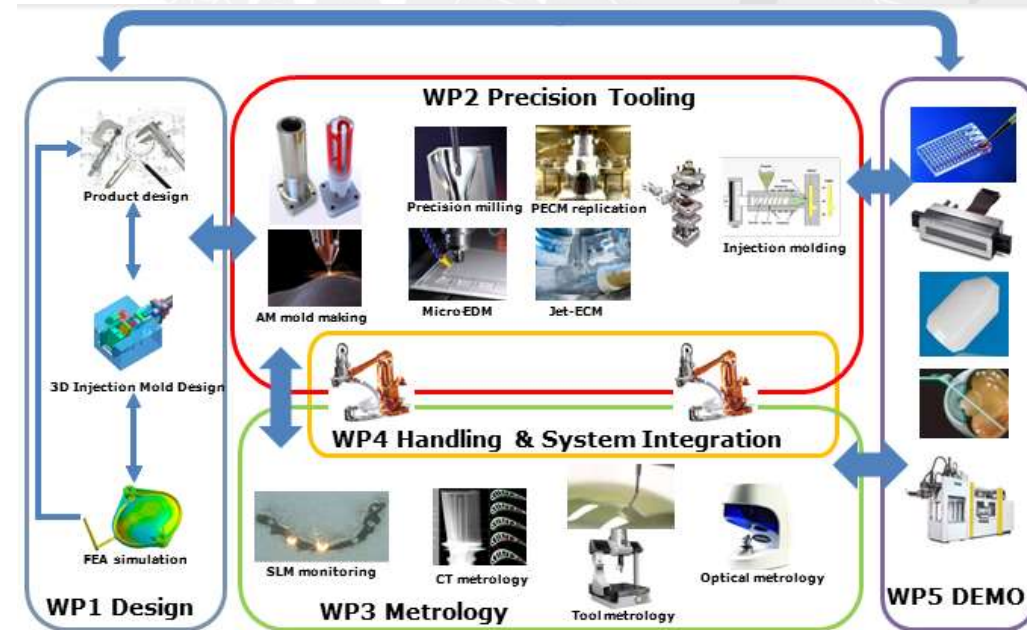


Key Technologies and Enablers

- Advanced and smart material processing technologies and process chains, including recycling and remanufacturing
- Smart mechatronics, robotics and logistic technologies
- Data analytics and (cognitive) artificial intelligence; Simulation, modelling, digital twins
- Digital platforms and data sharing solutions, robust and secure industrial communication technologies
- New business models, manufacturing organisation approaches and human-centred science and innovation
- Standards

Example: high precision manufacturing

- Quality control methods
- Computer tomography (CT) metrology and digital holography.
- a new CT **metrology** machine for micro-parts
- Patent applications about non-destructive **metrology**



<https://www.hi-micro.eu/about.html>



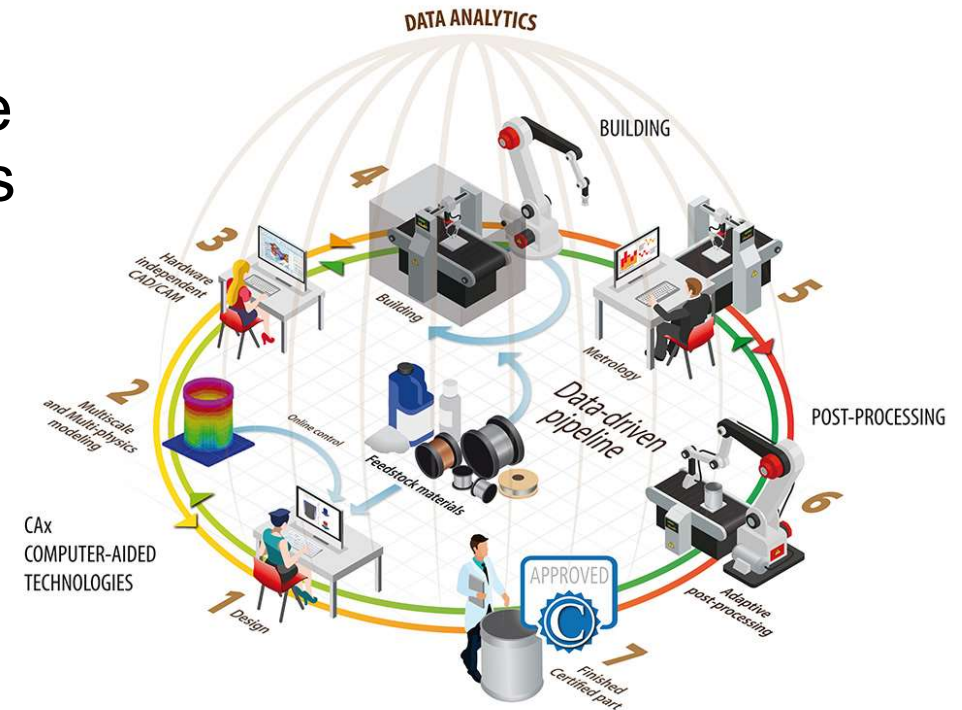
Example: high-performance manufacturing

- Flexible and automated platform for high accuracy manufacturing operations in medium and large complex components using multifunctional robot and laser tracker on overhead crane
- Onsite **metrology** integration



Example: data-driven manufacturing

- Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition processes
- Quality by design based on real time control and inline quality control
- Early detection of defects
- Cognitive systems



Integradde Digital thread for AM



Example: Reboot IoT Factory

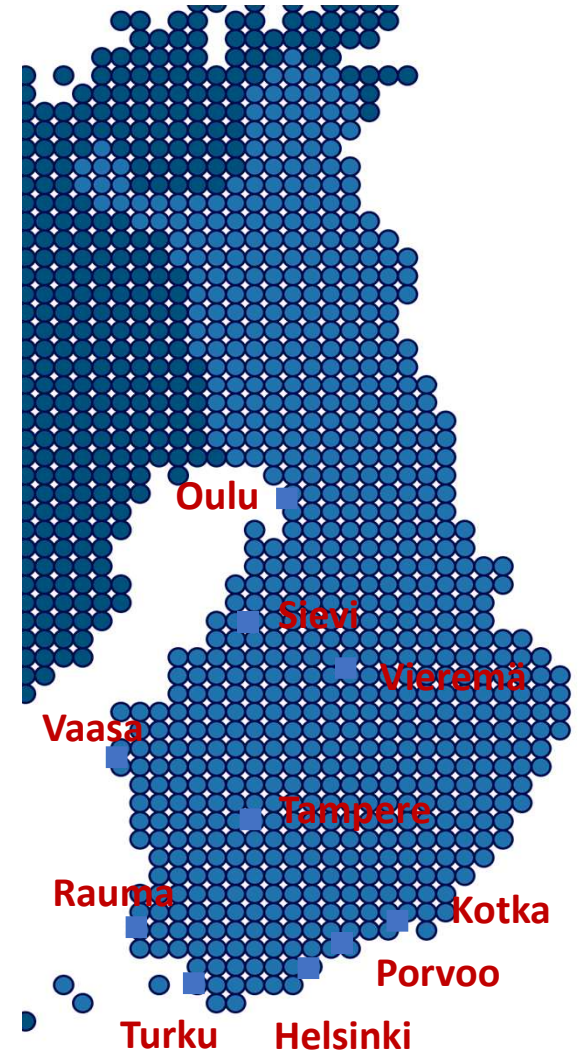
- Cognitive Supply Chain
- Robotics Fusion
- Labout at digital envionmnet
- Digital Production

<https://rebootiotfactory.fi/>

NOKIA
ABB



PONSSE
SULZER
SCANFIL



Example: Reboot IoT Factory 100+ use cases such as

- Machine vision for cobots
 - Self-Correcting Systems for Quality Control
 - Visual Inspection for soldering & gluing
 - Digital production: Putting Data to Work
- **Quality**
- **Real time control**
- **Cognitive systems**

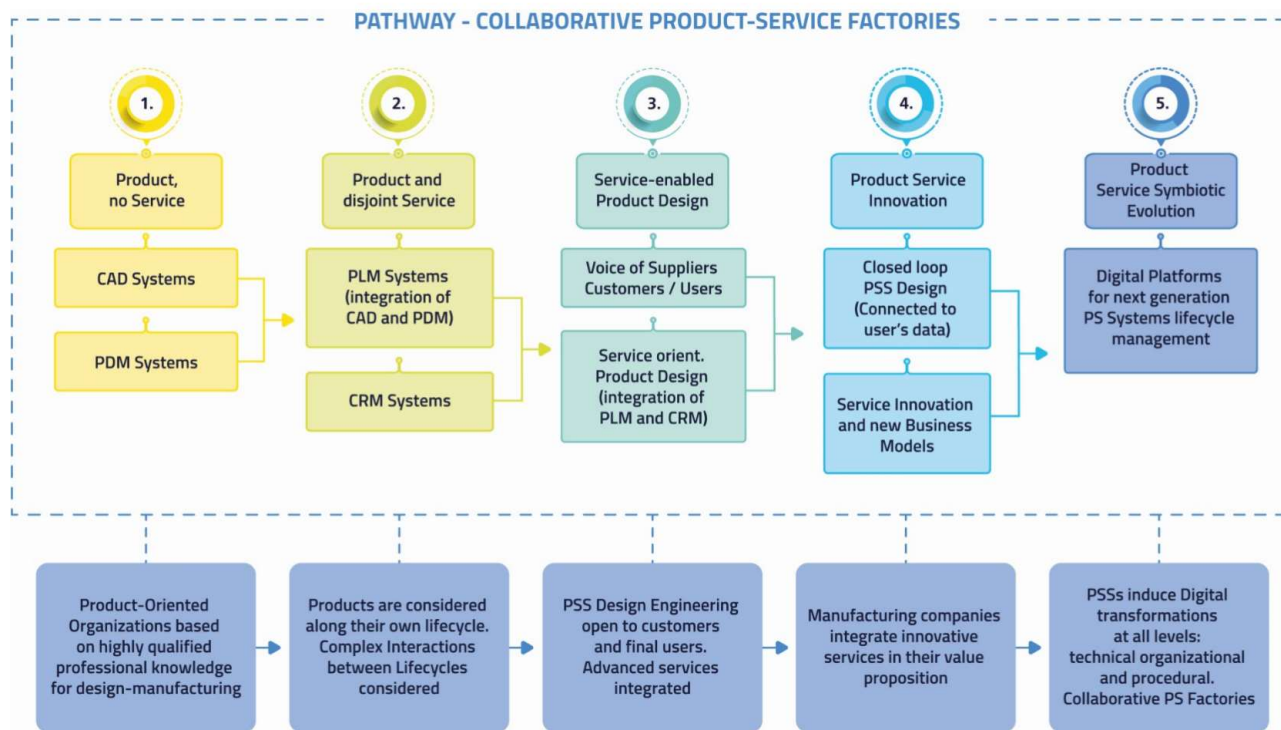
<https://rebootiotfactory.fi/>

<https://portal.effra.eu>



Example: ConnectedFactories 2 CSA

Pathways for manufacturing digitalisation and circularity



- Autonomous Smart Factories
- Hyperconnected Factories
- Collaborative Product-Service Factories
- Security
- Circular Economy
- Data spaces

Supported by the European Commission through the Factories of the Future PPP (Grant Agreement Number 873086)



Example: ConnectedFactories 2 CSA

Pathway to data

Digital Transformation - Industry 4.0					
Dimensions / Levels	Level I No Data Control	Level II Data Silos	Level III Data Bridges	Level IV Data Interoperability	Level V Data Valorization
Data Management					
Data Protection			Data Engineering & Security Privacy	Data Sovereignty and GDPR	Data-driven Business Models
Data Processing	Data are generated, processed and visualized by CPPS and I4.0 systems	Enterprise Applications (ERP, SCM, PLM, CRM) collect, store and visualize Data			
Data Analytics			Complex applications require data from different sources	AI-driven applications; Digital Assistants; VR/AR	Data Economy and Industrial Data Platforms
Data Visualization					
Data Sharing			Data Spaces Interoperability	Data Sharing Spaces	Flexible Data Marketplaces

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Example: ConnectedFactories 2 CSA

Stimulate visibility and impact

In particular, ConnectedFactories 2 supports the digital platform IA projects

- **ZDMP** - Zero Defect Manufacturing Platform
- **QU4LITY** - Digital Reality in Zero Defect Manufacturing
- **eFactory** - European Connected Factory Platform for Agile Manufacturing
- **SHOP4CF** - Smart Human Oriented Platform for Connected Factories
- **DigiPrime** - Digital Platform for Circular Economy in Cross-sectorial Sustainable Value Networks
- **KYKLOS 4.0** - An Advanced Circular and Agile Manufacturing Ecosystem based on rapid reconfigurable manufacturing process and individualized consumer preferences

ConnectedFactories maps projects, results and demonstrators on pathways and cross-cutting factors

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Metrology needs in manufacturing

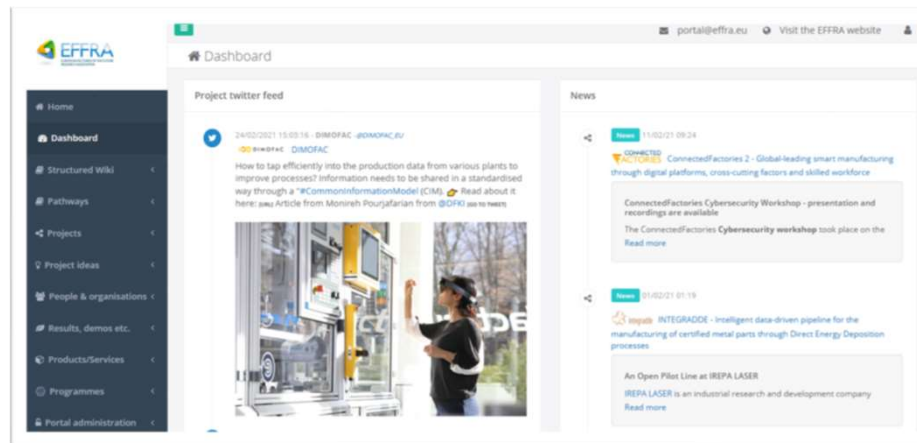
- Sensors, sensor fusion, optical methods, vision systems, NDT...
- Software, data platforms, algorithms
- Speed
- Non-contact
- Accuracy
- Integrated, end-to-end
- Affordable
- Standardised
- Robust,(cyber)secure

Metrology enabling

- Situation awareness
 - Quality
 - Life-time prediction, maintenance
 - Automation, robotisation, safety and new manufacturing methods
 - Digital manufacturing and circularity
-
- Systemic challenge
 - Need for manufacturing data platforms

Information and collaboration opportunities

- EFFRA (effra.eu)
 - Inspiring cases in the **EFFRA innovation portal** <https://portal.effra.eu/home>
- Pathways to digital and circular
 - <https://www.connectedfactories.eu/connectedfactories-information-sharing-and-analysis>
 - <https://www.connectedfactories.eu/follow-connectedfactories-effra-innovation-portal-weekly-digest>
- Made In Europe calls



Made In Europe 2023-24 planning ongoing

- Excellent, responsive and smart factories & supply chains
 - High-precision, quality
 - Sensorisation, advanced mechatronics
 - Decentralised Technical Intelligence, decision making
 - Real-time connected factories
- Circular products & Climate-neutral manufacturing
 - Life-cycle, sorting, identification, measuring, tracking, tracing
 - Digital platforms and data management
- New integrated business, product-service and production approaches; new use models
- Human-centered and human-driven manufacturing innovation

Many metrology opportunities

Summary

- Metrology is a key enabler for manufacturing
- Partnerships facilitate collaboration
- EFFRA portal for information sharing and
- Other important initiatives exist (I4.0, EIT Manufacturing, IDS, GAIA-X, DE program...)
- Data is important but also the enabling measuring technology
- Transition to digital and green manufacturing relies on measured data



VTT

Thank you!

Riikka Virkkunen,
Professor of Practice, VTT
co-chair of Made In Europe

VTT – beyond the obvious

