



#InvestEUresearch



Horizon 2020 Work Programme for Research & Innovation 2018-2020

Industrial Innovation Information Days
Brussels 3-4 October 2017

NMBP Programme
2018 TOPICS FACTORIES OF THE FUTURE (FOF)

DG RTD & DG CNECT

Research and
Innovation



**DT-FOF-05-2019:
Open Innovation for collaborative production
engineering (IA) – Arnaud Petein**



FOF-05-2019: Open Innovation for collaborative production engineering

Specific Objective:

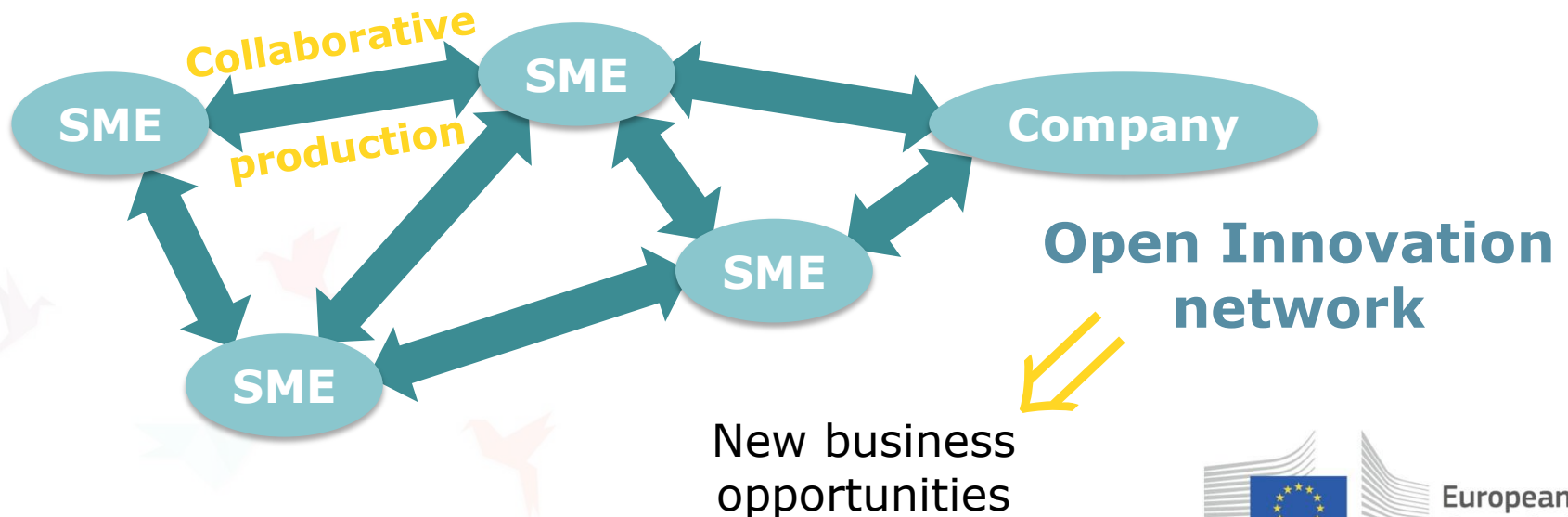
Micro-factories
Fab-labs
Do-It-Yourself
Makers



Industry



New products & processes
New functionalities
Shorter time to market



FOF-05-2019: Open Innovation for collaborative production engineering

Scope: consumer-goods sector + cover at least 3 areas amongst:

- Design and engineering from different actors
- Creative and agile analysis methodologies
- Ways [to share and analyse users data / demands
for collaborative engineering in the production network
- Open source product data exchange] → compatibility with
Standard representations IT systems
- Manufacturing Demonstration Facilities (MDFs):
 - test new technologies (fab-labs & makers)
 - develop industrial products
 - offer training

TRL
4 - 6

IA
70%

FOF-05-2019: Open Innovation for collaborative production engineering

Expected impact:

- Europe-wide Open-Innovation manufacturing networks
- Customer-driven production
- Increased product variety & customization
- Improved co-design and co-development capabilities
→ lower development costs
- Specific business models
 - Customized solutions
 - Rapid demand changes
 - Short time to market

**EUR 4 - 6
million(s)**

SMEs

SSH

Collaboration

Data

Important: social sciences & humanities (*creativity*)
inter-project collaboration
accessible & reusable data



DT-FOF-06-2019:

Refurbishment and re-manufacturing of large industrial equipment (IA) – Barry Robertson



Topic Code: DT-FOF-06-2019

Refurbishment and re-manufacturing of large industrial equipment (IA)

Specific Objective:

Lifetime extension of large industrial equipment through refurbishment, re-manufacturing, re-use, upgrading, in-situ repair, improved maintenance and more conservative utilisation.

These actions can limit high replacement costs, significantly extend the useful life of heavy machinery, and improve the return on investment from major capital items.

As such, this topic contributes to Circular Economy as well as FoF policies.

Topic Code: DT-FOF-06-2019

Refurbishment and re-manufacturing of large industrial equipment (IA)

Scope:

Demonstration of **at least two** industrial demonstrators in real industrial settings **in different sectors**.

Establish the feasibility of lifetime extension of large electrical &/or mechanical machinery in plants.

Proposals should cover **one or more** of the following areas:

- refurbishment and/or upgrading of large industrial equipment;
- re-manufacturing and re-use of equipment;
- inspection, functional diagnosis and in-situ repair of damage;
- maintenance and optimised utilisation of large industrial equipment.

Start project at TRL 5 with technology already validated in industrially relevant environment

Reach TRL 7 by the end of the project: system prototype demonstration in operational environments

*TRL
From 5
to 7*

IA
70%

Topic Code: DT-FOF-06-2019

Refurbishment and re-manufacturing of large industrial equipment (IA)

Expected impact:

Material and resource efficiency increased by at least 10%

Life time extension of the targeted large machinery and plants by at least 20%

Increased return on investment from major capital items

EUR from 12 to 15 million

Innovation Action

May include limited research and development activities.

Funding rate: 70% (or 100% for non-profit legal entities)

SMEs

Welcome to participate as technology developers or users

DT-FOF-08-2019:

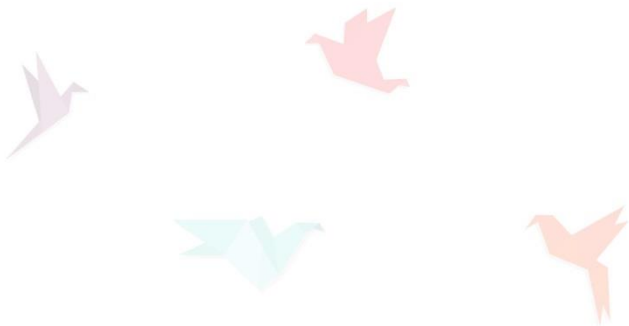
**Pilot lines for modular factories (IA 50%) –
Ivan Scannapiecoro**



Topic DT-FOF-08-2019: Pilot lines for modular factories (IA50%)

Specific Challenge:

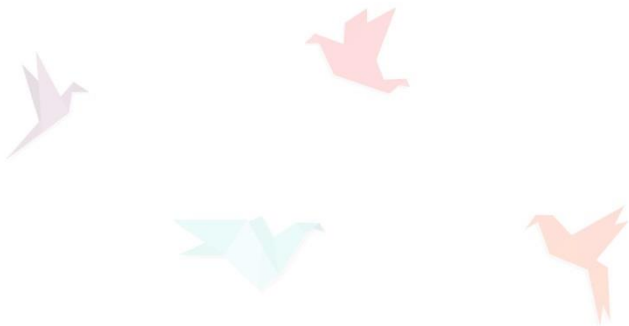
- High need of flexibility in production;
- Enable efficient production of small customised series;
- Two levels of modularity (from previous research)
 - i. Machine with interface and material handling system;
 - ii. Interchangeable tool heads;
- Advantage of modularity demonstrated by the ease of use and plug-and-produce features;



Topic DT-FOF-08-2019: Pilot lines for modular factories (IA50%)

Specific Challenge:

- The modules **should**:
 - i. Enable the production of the widest variety of complex products;
 - ii. Allow rapid physical rearrangements (automated processes or manual intervention);
 - iii. Have accessible, secure interfaces in order to be connected to a common data system for production control.
- The interfacing with the existing hardware and legacy software is another aspect that needs to be covered.



Topic DT-FOF-08-2019: Pilot lines for modular factories (IA50%)

TRL
5-7

IA
50%

Scope:

- Proposals from existing test beds allowing for the introduction of modular process units.
- Proposals should cover **all** the following areas:
 - I. Development of a range of production modules covering different disciplines (such as: mechanical cutting tools, thermal processes, laser treatments and additive manufacturing technologies, taking into account safety aspects);
 - II. Integration of comprehensive production management systems and real-time process control in a reconfigurable line and considerations for data interoperability between modules and process line;
 - III. Pilot production of different products covering processing technologies and features such as multi-functionality (mechanical, electrical, thermal, optical, etc.), multi materials, and complex shapes.

Topic DT-FOF-08-2019: Pilot lines for modular factories (IA50%)

Expected impact:

- At least 15% reduction of time to reconfigure the production line (alternatively 15% reduction in downtime);
- 10% higher resource efficiency due to more suitable processing equipment for customised products;
- Reduction of at least 15% of the overall cost of production;
- Measurable yield improvement from run-to-run for small lot sizes.

***EUR 12-15
millions***

DT-FOF-12-2019: Handling systems for flexible materials (RIA) – Jan Ramboer



DT-FOF-12-2019: Handling systems for flexible materials (RIA)

Specific Objective:

- Handling of soft materials
- Handling devices not pre-programmed for one specific task
 - Intelligent
 - Universally dexterous
- Control level of deformation in case of multiple contact points
- Low-cost systems -> SMEs
- E.g. textile, paper, food processing

DT-FOF-12-2019: Handling systems for flexible materials (RIA)

Scope:

- handling of the soft and flexible materials
 - gripping, moving, positioning, sorting, joining
- included in larger production processes
 - product and material related data
- Low-cost and universal dexterity

TRL
4 to 6

RIA-100%

DT-FOF-12-2019: Handling systems for flexible materials (RIA)

Expected impact:

- Bring back production to Europe;
- 15% increase in Job Quality
- 20% increase in productivity

EUR 6-8 millions



ICT Programme

Topic DT-ICT-07-2018-2019:

**Digital Manufacturing Platforms for Connected
Smart Factories – Arian Zwegers**



DT-ICT-07-2018-2019: Digital Manufacturing Platforms for Connected Smart Factories

Specific Challenge:

- Increasing role digital manufacturing platforms
- Advances needed in integration different technologies, making data accessible, and allowing complementary applications
- Challenge to exploit new concepts and technologies

NB:

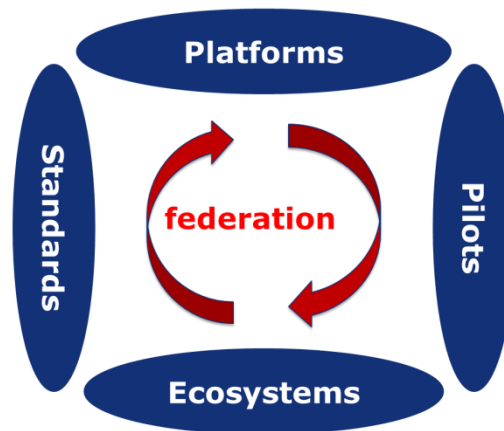
- Part of Focus Area "Digitising and transforming European industry and services: digital innovation hubs and platforms"
- Introductory texts "Platforms and Pilots" are applicable, in addition to specific topic texts
- See also Digitising European Industry WG2,
- <https://ec.europa.eu/futurium/en/dei-implementation>

DT-ICT-07-2018-2019: Digital Manufacturing Platforms for Connected Smart Factories

Scope Innovation Actions:

- **Develop platforms for connected smart production facilities**
 - Driven by EU actors and safeguarding European interest
 - Two industrial sectors
- **Target at least one 'grand challenge' *:**
 - Agile Value Networks: lot-size one (2018 call)
 - Excellence in manufacturing: zero-defect processes, products (2018)
 - Human factor: human competences and technological progress (2019 call)
 - Sustainable Value Networks: manufacturing in circular economy (2019)
- **Reference implementations preferably in open-source**
- **Max 20% financial support to third parties (typically 50-150 k€)**

TRL
±4-7



IA

* See document "Factories 4.0 and Beyond" on <http://www.effra.eu/>

DT-ICT-07-2018-2019: Digital Manufacturing Platforms for Connected Smart Factories

Scope Coordination and Support Actions:

- Cross-fertilise Industrial Platform communities, allowing for easier take-up of digital technologies, supporting transfer skills and know-how between academia and industry
- 2019 call



CSA

DT-ICT-07-2018-2019: Digital Manufacturing Platforms for Connected Smart Factories

Expected impact:

- Significant increase options SMEs/mid-caps to integrate technologies, unlock value data, deploy complementary applications, and become responsive link in supply and value networks
- Strengthened competitive position European platform providers
- Increased cooperation industrial and academic communities

From introductory texts:

- Increased prospects future digital industrial platforms
- Strengthened links with other programmes and initiatives
- Increased number of services/applications by European companies
- Significant, measureable contribution to standards
- Increased number of platforms, applications, business processes and innovative business models validated via large-scale piloting
- Emergence sustainable ecosystems around digital platforms

IA: 48 M€ (2018), 45 M€ (2019), up to 16 M€ would be appropriate, at least one per 'grand challenge'

CSA: 2 M€ (2019), one CSA

**ICT Programme:
Topic ICT-08-2019
Security and resilience for collaborative
manufacturing environments – Arian Zwegers**



ICT-08-2019: Security and resilience for collaborative manufacturing environments

Specific Challenge:

- Reliability and security requirements of physically-entangled systems in manufacturing environments versus digital connections with external partners in value chains
- Data exchange leads to data security challenges
- Solutions needed that guarantee adequate security without limiting capability to exchange data
- Link to multi-annual roadmap of the FoF cPPP
 - See document "Factories 4.0 and Beyond" on <http://www.effra.eu/>

ICT-08-2019: Security and resilience for collaborative manufacturing environments

Scope:

- Develop tools and services guaranteeing adequate level of data security for collaboration
- Practically usable solutions in real manufacturing facilities
- Address threat detection and countermeasures, evolution and real-time response
- Semi-autonomous or fully autonomous solutions
- At least one use case

TRL
5-7

RIA

ICT-08-2019: Security and resilience for collaborative manufacturing environments

Expected impact:

- **Take-up by industry of practically usable solutions which guarantee significantly increased cyber-security levels in daily operations for manufacturing facilities and other actors in the value chains**

*Open: 16 Oct 2018
Close: 28 Mar 2019*

*RIA: total budget 11 M€ (2019),
between 4-6 M€ would be appropriate per proposal*

DT-NMBP-18-2019:

**Materials, manufacturing processes and devices
for organic and large area electronics (IA) –
Martyn Chamberlyn**



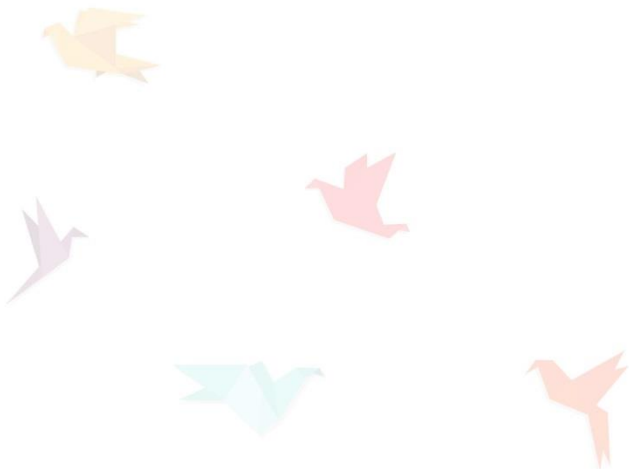
DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

*TRL
from 3 to 5*

Specific Challenge:

Europe is a leader in development of materials for organic and large area electronics (OLAE) but materials still need improvement to maintain this position.

There have been attempts to combine dissimilar manufacturing technologies to achieve seamless integration of the new technology into traditional products at constant/lower production cost and in a new generation of smart devices.



DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

Scope (1):

Activities include material development & improvement (electrical performance, processibility, stability and lifetime during device operation), as well as prototyping of advanced OLAE based electronic products. New materials & process development should cover all of the following:

- Combine materials with high uniformity & with high mobility in industrial quantities with high reproducible quality;
- Improved environmental stability to enable operation in more robust environments and to reduce barrier requirements;
- Seamless integration of the new technology into traditional and new products;
- Advance the TRL of OLAE and enhance its manufacturability including high speed processes for the integration of flexible OLAE components onto flexible substrates;

*TRL
from 3 to 5*

DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

Scope (2):

- **Cost reduction for the structuring and processing of organic electronic materials into device structures;**
- **Demonstration of OLAE-enabled prototypes in selected applications of flexible and wearable electronics.**



IA
70-100%

DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

Expected impact:

- New products based on the combination of printed & OLAE processed electronics in flexible and wearable electronics;
- Improvement in cost competitiveness, lifetime & processibility as well as manufacturing capability for OLAE materials and electronics;
- Improved environmental stability, water vapour transmission rates $< 10^{-6} \text{ gm}^{-2} \text{ d}^{-1}$ at $20^{\circ}\text{C}/50\% \text{ RH}$ and oxygen transmission rates $< 10^{-6} \text{ cm}^3 \text{ m}^{-2} \text{ d}^{-1} \text{ bar}^{-1}$, of organic electronic materials for products. Improved printable commercial material charge carrier mobility $> 5 - 10 \text{ cm}^2/\text{Vs}$;
- Improved business opportunities & value creation in Europe by strengthening cooperation along the value chain as demonstrated by prototypes at TRL 5 that are taken to early-concept market trials with market introduction of new products in 2-4 years after project completion.

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal!



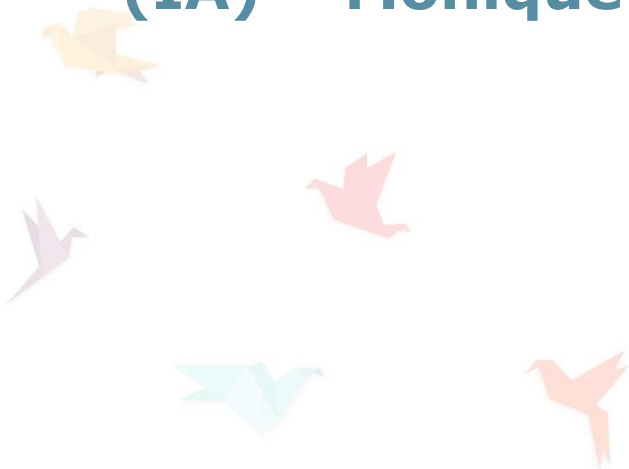
DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics

- Activities should start at TRL 3 and achieve TRL 5 at the end of the project.
- The Commission considers that proposals requesting a contribution from the EU of between EUR 4 and 5 million would allow this specific challenge to be addressed appropriately.
- This topic will be co-funded by LEIT-NMBP and LEIT-ICT, for a total budget of EUR 20 million.
- Proposals for Innovation Actions submitted under this call should include a business case and exploitation strategy



*EUR from 4 to 5
million*

DT-NMBP-19-2019: Advanced Materials for Additive Manufacturing (IA) – Monique IDIRI



DT-NMBP-19-2019:

Advanced materials for additive manufacturing

Specific Challenge:

- Additive manufacturing (AM) is applied in processing of most industrial metals, ceramics, polymers and composites, at quite different levels of industrial readiness.
- Challenge is to **develop equipment** that allows the **additive layer manufacturing of multi-materials** items and **multi-functional materials** (for research, transport including aeronautics, consumer customised goods, communications, biomaterials and energy).
- Development of novel materials is a primary challenge in development of AM. Also need **to use nanotechnologies to aggregate multiple materials within a single process**, while **improving or expanding their functionality**, and **enhancing their performance**.



DT-NMBP-19-2019:

Advanced materials for additive manufacturing

Scope: By combining several materials, proposals should advance the state of the art through the **development of ready assembled multifunctional devices**. Proposals should demonstrate several simultaneous activities:

- Quantification of improved functionalities, properties, quality and lifespan of fabricated pieces;
- Evaluation of matching material properties to the production process to enable the joining of dissimilar materials for AM tools;
- Demonstration of a better understanding of the nanotechnology integrated materials properties and manufacturing;
- Integration and validation at early stage of the qualification and certification considerations of the materials;
- Joint development with material suppliers and end-users is required for a rapid uptake by industry;
- Modelling, standardisation and regulatory aspects (especially safety and nanosafety) and the process and materials qualification.

*TRL
from
4 to 6*

*IA
70%-100%*

DT-NMBP-19-2019:

Advanced materials for additive manufacturing

Expected impact:

- **Improvement of the** efficiency, quality and reliability of the product **by at least 40%**;
- **Better use of raw materials** and resources with **reduced environmental impact** and to **lower cost by 35%** as demonstrated by Life Cycle Assessment;
- **New opportunities and business for SMEs** across Europe (which are key players in advanced materials research for Additive Manufacturing).

Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.

*EUR from 6 to
8 millions*

SMEs

Thank you!

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