

EU Support to Nanotechnologies

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Outline

I. State of play

II. Nanosafety

III. Translation to products

IV. Horizon Europe

Nanotechnology – U.S. & EU

Richard Feynman (US) 1959: *“There’s plenty of room at the bottom”*

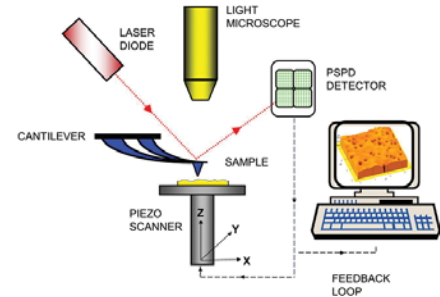
Gerd Binnig (D) and Heinrich Rohrer (CH) IBM Research Zurich, Switzerland

- 1981 - Scanning tunneling microscope



Gerd Binnig (D), Christoph Gerber (CH), Calvin F Quate (US)

- 1986 – Atomic Force Microscope



First EU support in nanotechnologies already in 1998 under FP4:

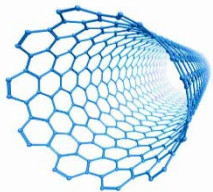
Transnational collaboration within the EU for research in high precision engineering, micro-engineering and nanotechnology - incorporating the formation of the European Society for Precision Engineering and Nanotechnology

EU investments so far

€ 1.8 billion in FP7

€ 1.4 billion in Horizon 2020 + **€0.5 billion until 2020**

Nanomaterials



Fields of application

- Health (medical devices)
- Pharmaceuticals
- Food (packaging)
- Textile (materials, antimicrobial)
- Catalysis (MOFs, ...)
- Energy conversion and storage
- Environment (water, soil)
- Transport (light, self-healing)
- Electronics
- Construction (coatings)
- Plastics



Cross-cutting issues

Societal acceptance

Risk governance

- Nanodefinition
- EU-OECD: Testing guidelines
- Standardisation
- EU Observatory
- Risk Governance Council

Safe by Design

- Nanosafety Cluster

Upscaling

- Pilot lines and test beds

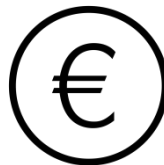
Current research routes

Safe by design: Risk assessment in early stage of product development

**Reduce time
required for R&D**



**More cost effective
innovation**



Faster to market



**Prepare for future
regulatory challenges**



Safer products



**Better consumer
acceptance**



Current open calls in Horizon 2020:

2019: from science to regulation: metrics and main sectors

2020: from science to regulation: behaviour of multi-component nanomaterials

2020: Regulatory science for medical technology products

EU legislation with provisions for nanomaterials

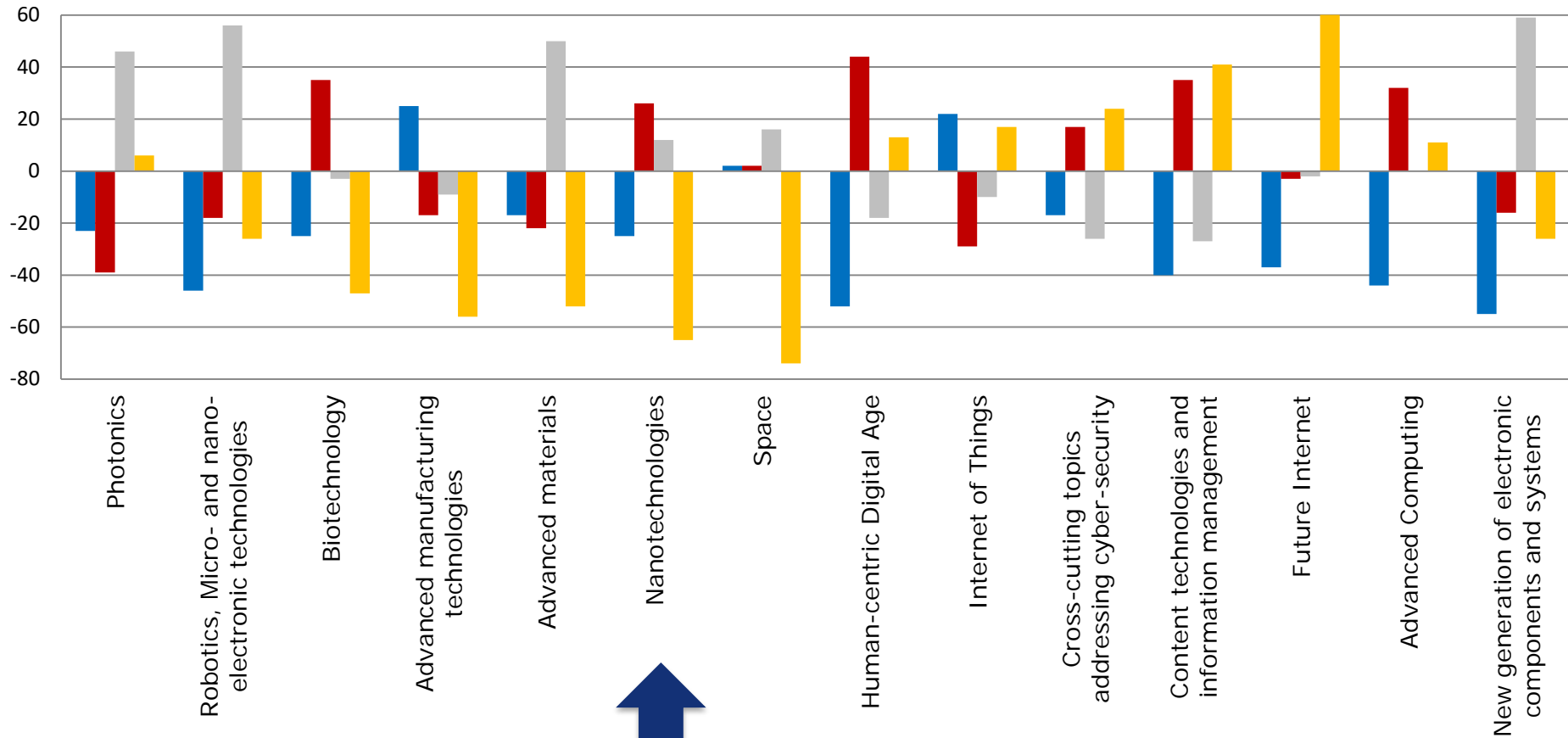
Regulatory framework	Definition	Approval procedure	Safety assessment	Labelling	Guidance
REACH (Chemicals) Regulation 1907/2006 Amended Annexes (EU 018/1881)	✓		✓		✓
Biocidal Products Regulation 528/2012	✓	✓	✓	✓	
Cosmetic Products Regulation 1223/2009	✓	✓	✓	✓	✓
Novel Food Regulation 2015/2283		✓	✓	✓ FIC Regulation 1169/2011	✓
Food Additives Regulation 1333/2008			✓	✓*	✓
Plastic Food Contact Materials Regulation 10/2011		✓	✓		
Active & Intelligent FCM Regulation 450/2009		✓	✓		
Food Information Provision to Consumers Regulation 1169/2011	✓			✓	
5 Medical Devices Regulation EU/2017/745	✓	✓ (Conformity certificate)	✓		 European Commission

World S&T power centres

Revealed technological advantage, 2009-2013

Source: RISE, Fraunhofer, 2016

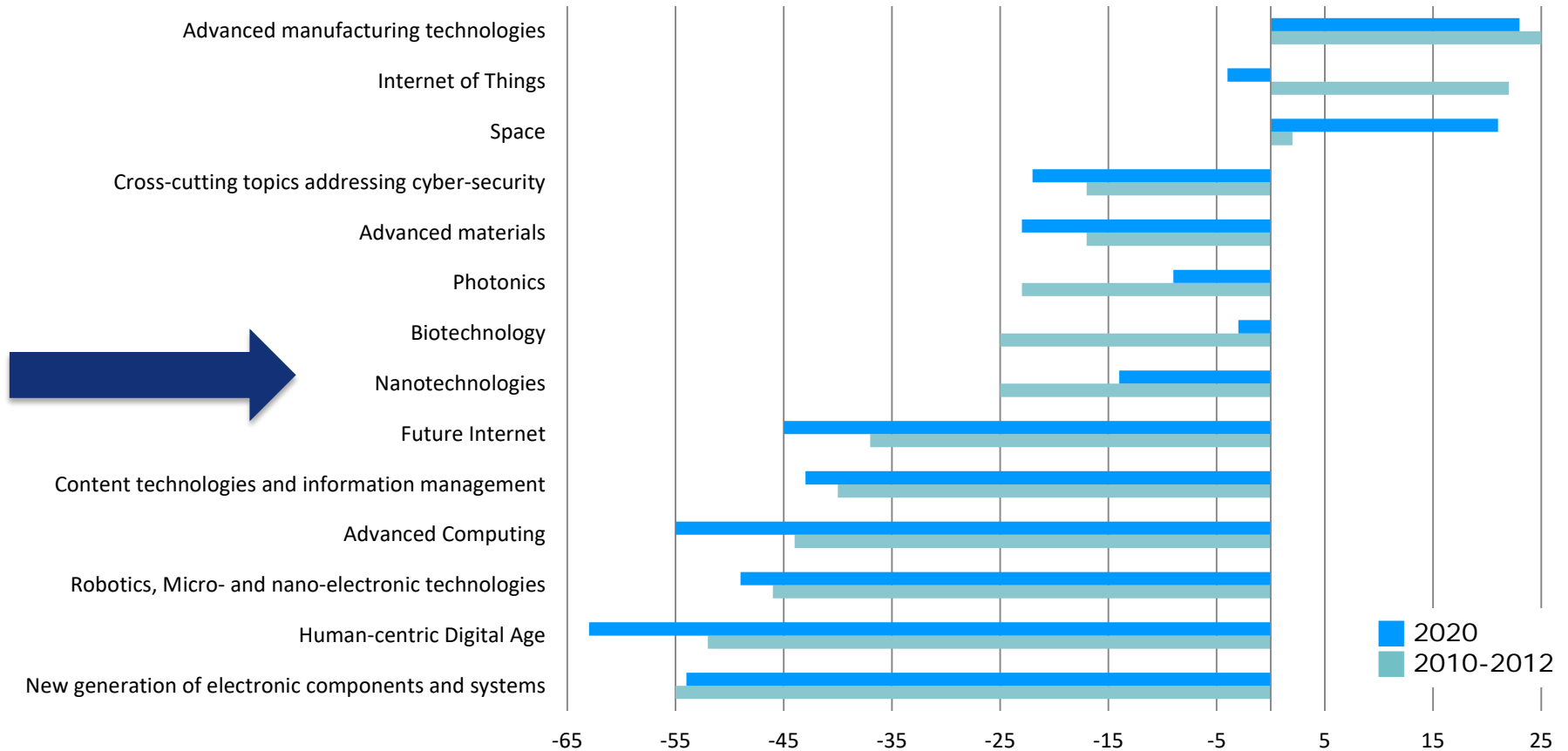
■ EU
■ US
■ East-Asia (JP, KR)
■ CN



EU comparative advantage

Revealed technological advantage - Extrapolation 2020

Source: RISE, Fraunhofer, 2016



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Project overview

Societal engagement

NANO2ALL
GONANO

Hardware
EU-TOXRISK
npSCOPE
HISENTS

Risk Governance
NANOCOMMONS
EC4SAFENANO
caLIBRAte
GOV4NANO
NANORIGO
RiskGONE

Methods
NANOREG2
ACENANO
EU-TOXRISK
npSCOPE

Software
caLIBRAte
NanoInformaTIX
NanoSolveIT
GRACIOUS

Testing Platform
caLIBRAte
NANOREG (2)
smartNANOtox
GRACIOUS
PATROLS

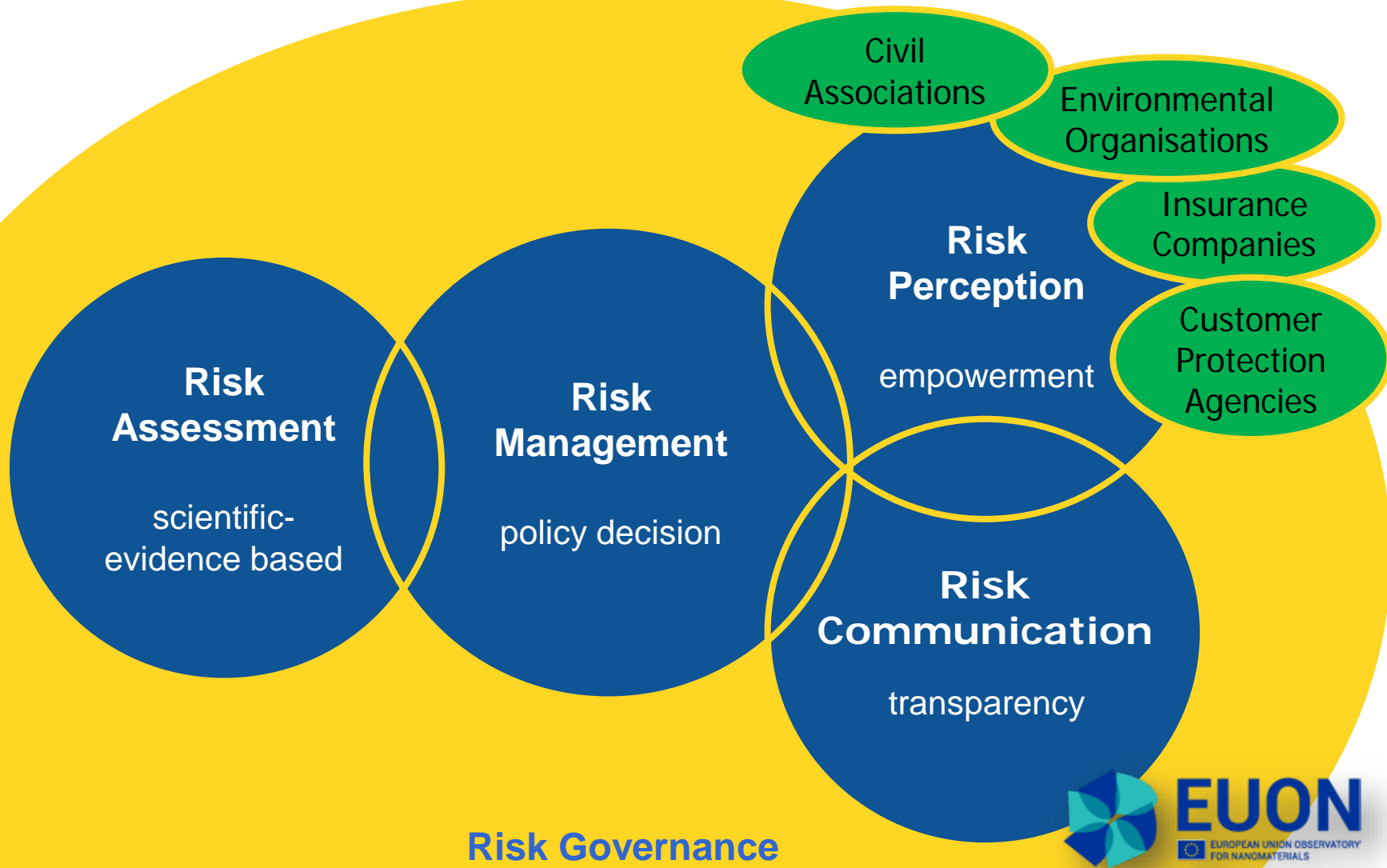
Integrated Testing

NANOFASE
EU-TOXRISK
ACENANO
smartNANOtox
HISENTS
GRACIOUS
PATROLS

Database
TOX21
HISENTS
NANOREG (2)
BIORIMA
MARINA
eNANOMAPPER

Safe by Design
NMBP 15 2019
NMBP 16 2020

Standardisation
NMBP 34 2019



EUON
EUROPEAN UNION OBSERVATORY
FOR NANOMATERIALS

RISK GOVERNANCE COUNCIL



Structured civil dialogue

Transparency to the Citizens

Access to quality data

Openness

Open communication

Ex: EUON, DaNa

Citizen Empowerment

Trusted environment

Platform to voice concerns

Risk Governance Council



VIDEO:

[Research on the safety of nanomaterials: beyond Horizon 2020](#)

Period	Number of users	Number of page views	Number of countries visiting
June 2017 - June 2019	71 393	177 430	156

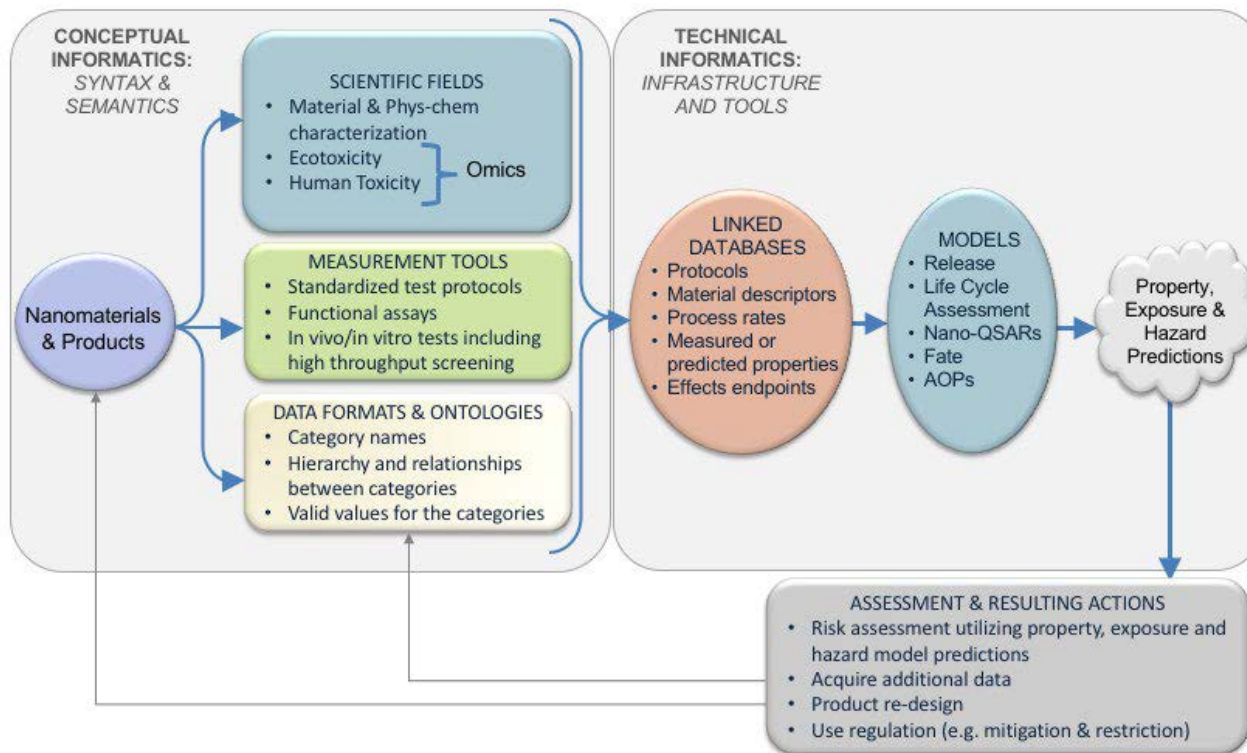
Key initiatives

- **Nanosafety cluster**
major source of expertise and knowledge, synergies among EU funded projects
- **'MALTA INITIATIVE'**
A joint route towards standardisation, testing guidelines and guidance documents for risk assessment of nanomaterials; contribution of all participants in OECD working party is needed (OECD Member Countries, Observers, inter/governmental organisation, NGOs, industry,...)
- **Significant international collaboration in nanosafety**
Israel, USA, Brazil, South Africa, South Korea, Iran, Mexico



EU-U.S. Roadmap Nanoinformatics 2030

- released in November 2018
- edited by Andrea Haase and Frederick Klaessig
- <https://zenodo.org/record/1486012#.XTIcCOgzaUn>



EU-U.S. Nano Communities of Research



October 15-16, 2019, Aix en Provence, workshop organised by EU and U.S. NNI.

<https://us-eu.org/save-the-date-october-15-16-2019/>

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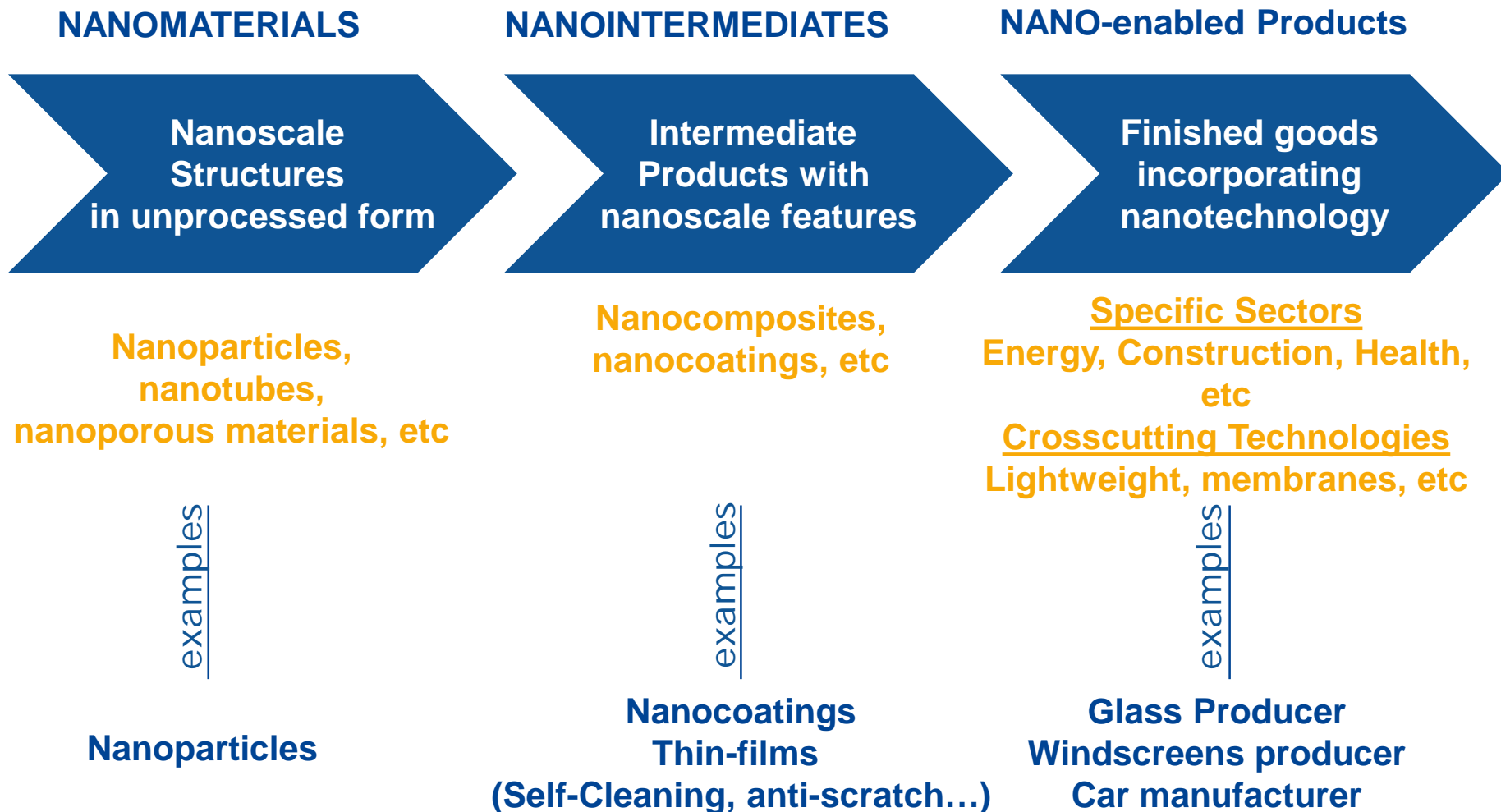
I. State of play

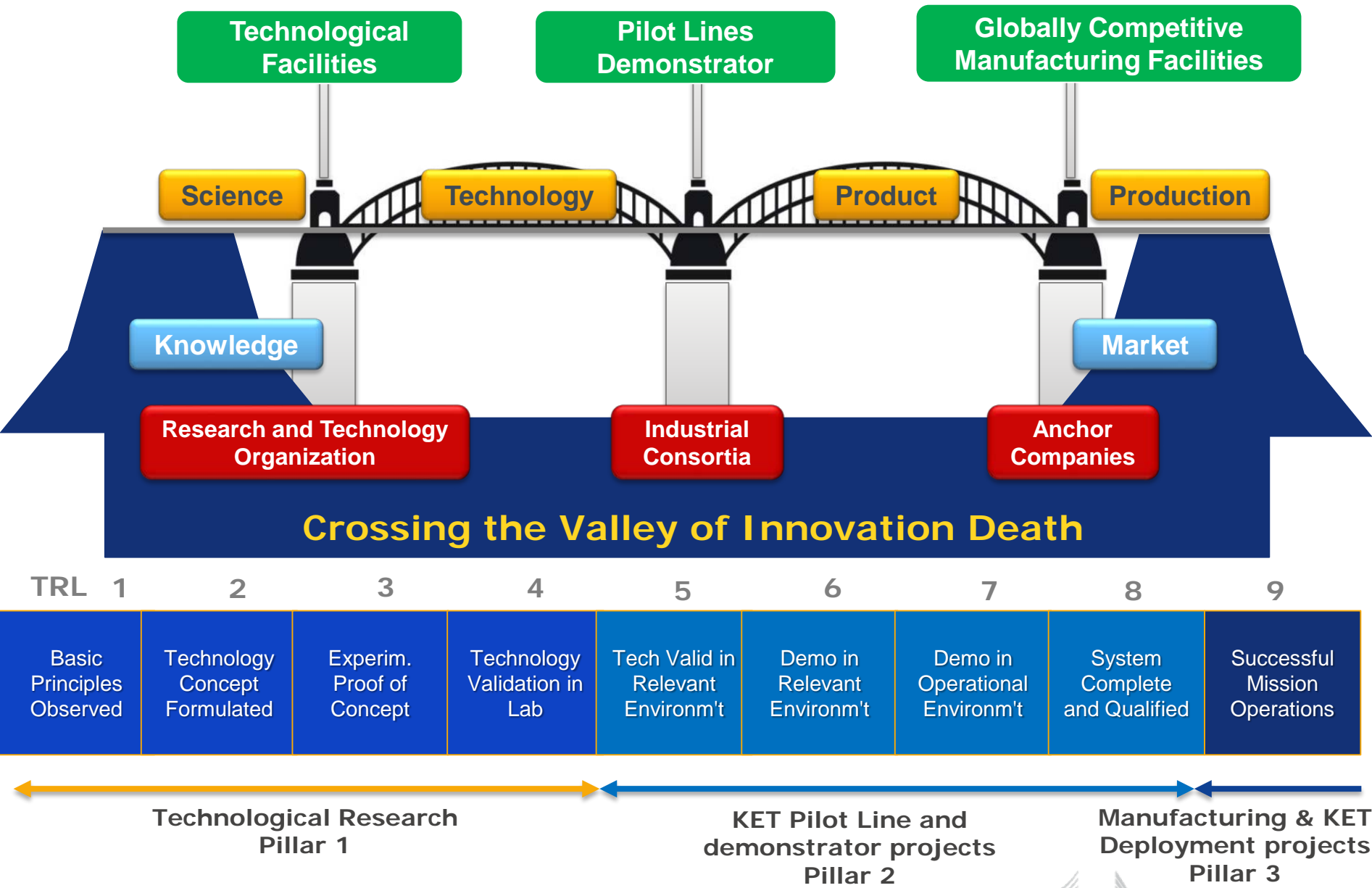
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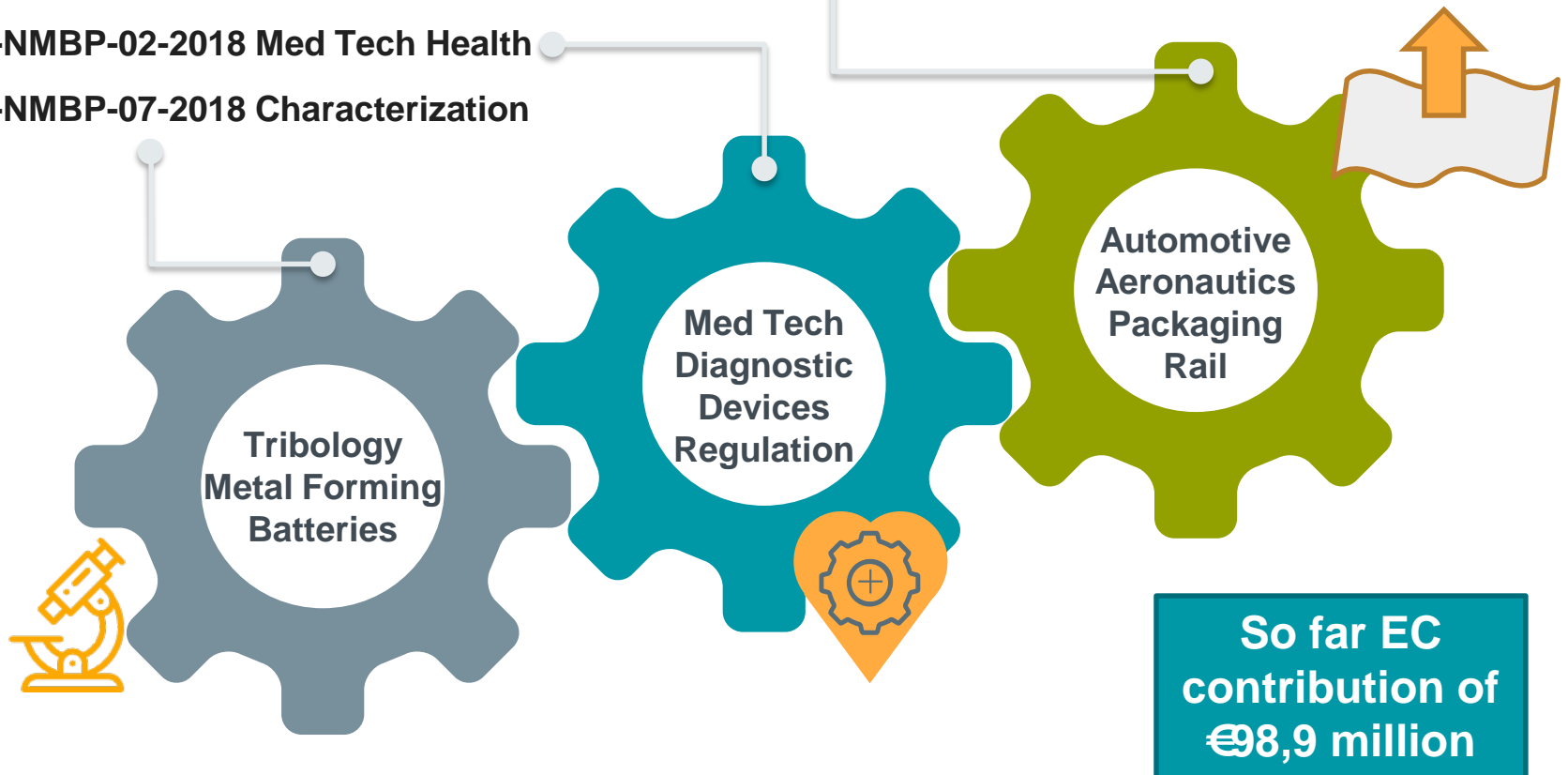
Translation to products





Open innovation test beds – 10 first projects (1)

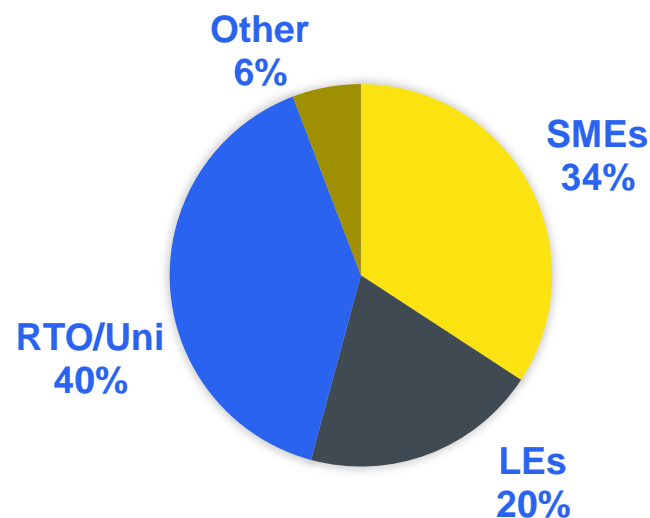
- DT-NMBP-01-2018 Lightweight
- DT-NMBP-02-2018 Med Tech Health
- DT-NMBP-07-2018 Characterization



Open innovation test beds – 10 first projects (2)

Current participation
reflects offers from
most of Europe...

...but services open
to all of Europe!

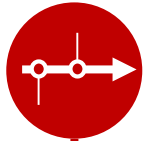


% of Participants by Type

Open innovation test beds – next projects



~ 250 M€ in Horizon 2020



Areas 2018–2020

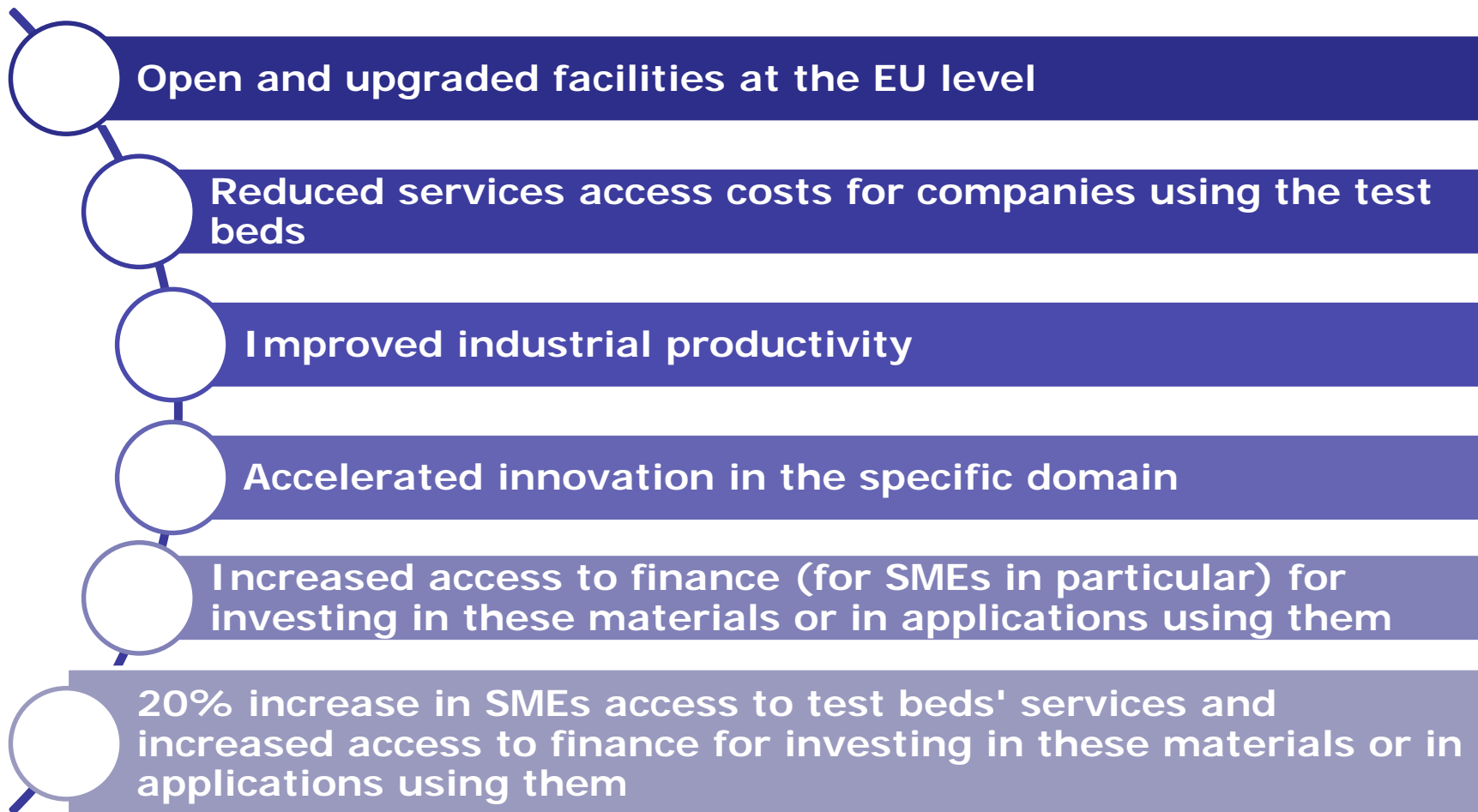
RUNNING PROJECTS:

- 2018 NMBP-01: Lightweight, nano-enabled multifunctional composite materials and components (IA)
- 2018 NMBP-02: Safety Testing of Medical Technologies for Health (IA)
- 2018 NMBP-07: Characterization (IA)

FORTHCOMING

- 2019 NMBP-03: Nano-enabled surfaces and membranes (IA)
- 2020 NMBP-04: Bio-based nano-materials and solutions (IA)
- 2020 NMBP-05: Functional materials for building envelopes (IA)
- 2020 NMBP-06: Nano-pharmaceuticals production (IA)

Open Innovation Test Beds – Expected Impact



Technology Infrastructures

Facilities, equipment, capabilities and support services required **to develop, test and upscale technology to higher TRLs** whilst ensuring feasibility and regulatory compliance.

Public, semi-public or private status.

Users are mainly industrial players, including SMEs, **seeking** to develop innovative technologies **towards commercialisation of new products**, processes and services.



Contribution to industrial policy



<https://publications.europa.eu/en/publication-detail/-/publication/0df85f8b-7b72-11e9-9f05-01aa75ed71a1/language-en>

Outline

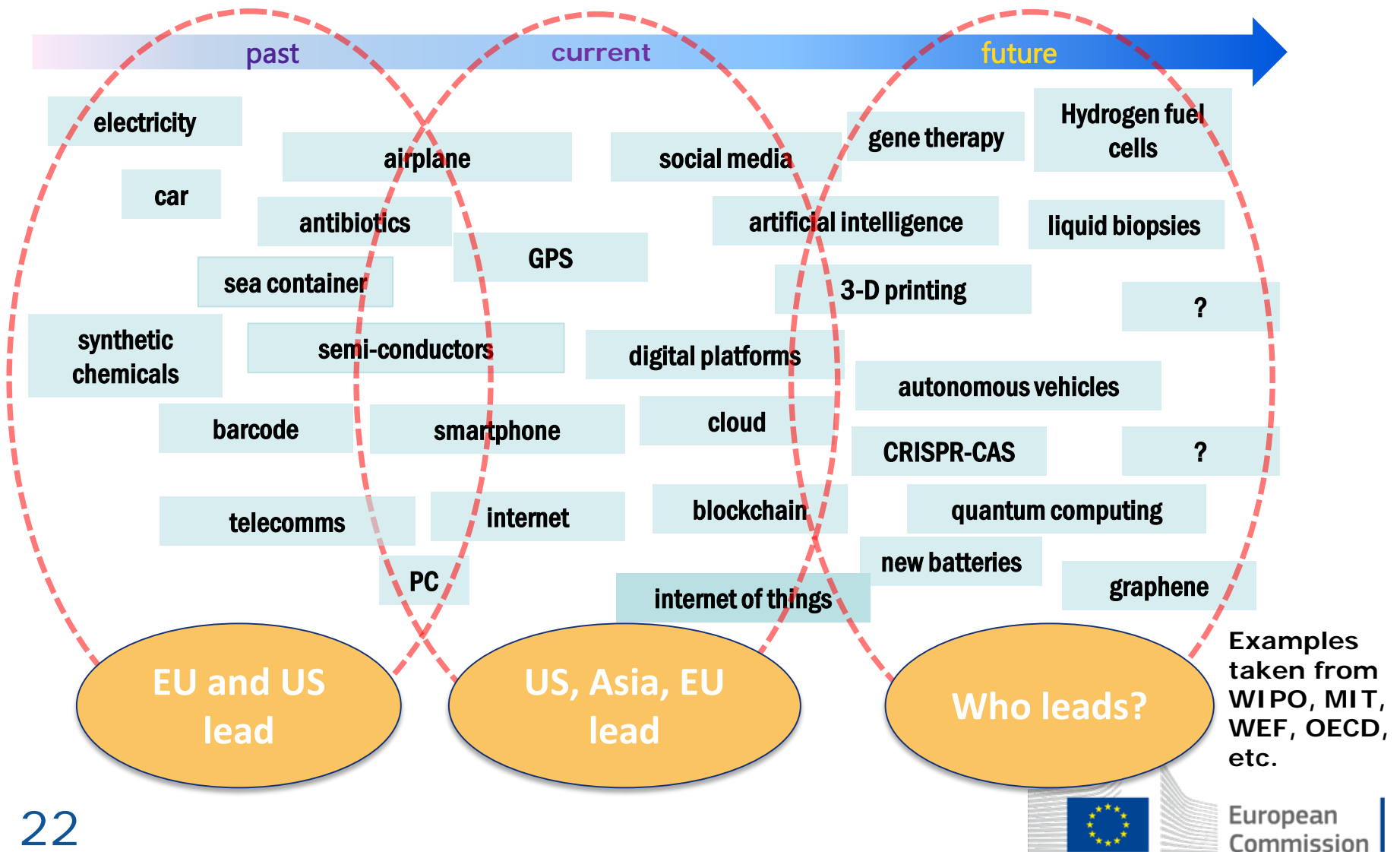
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Who will lead the next wave of breakthrough and disruptive innovation?



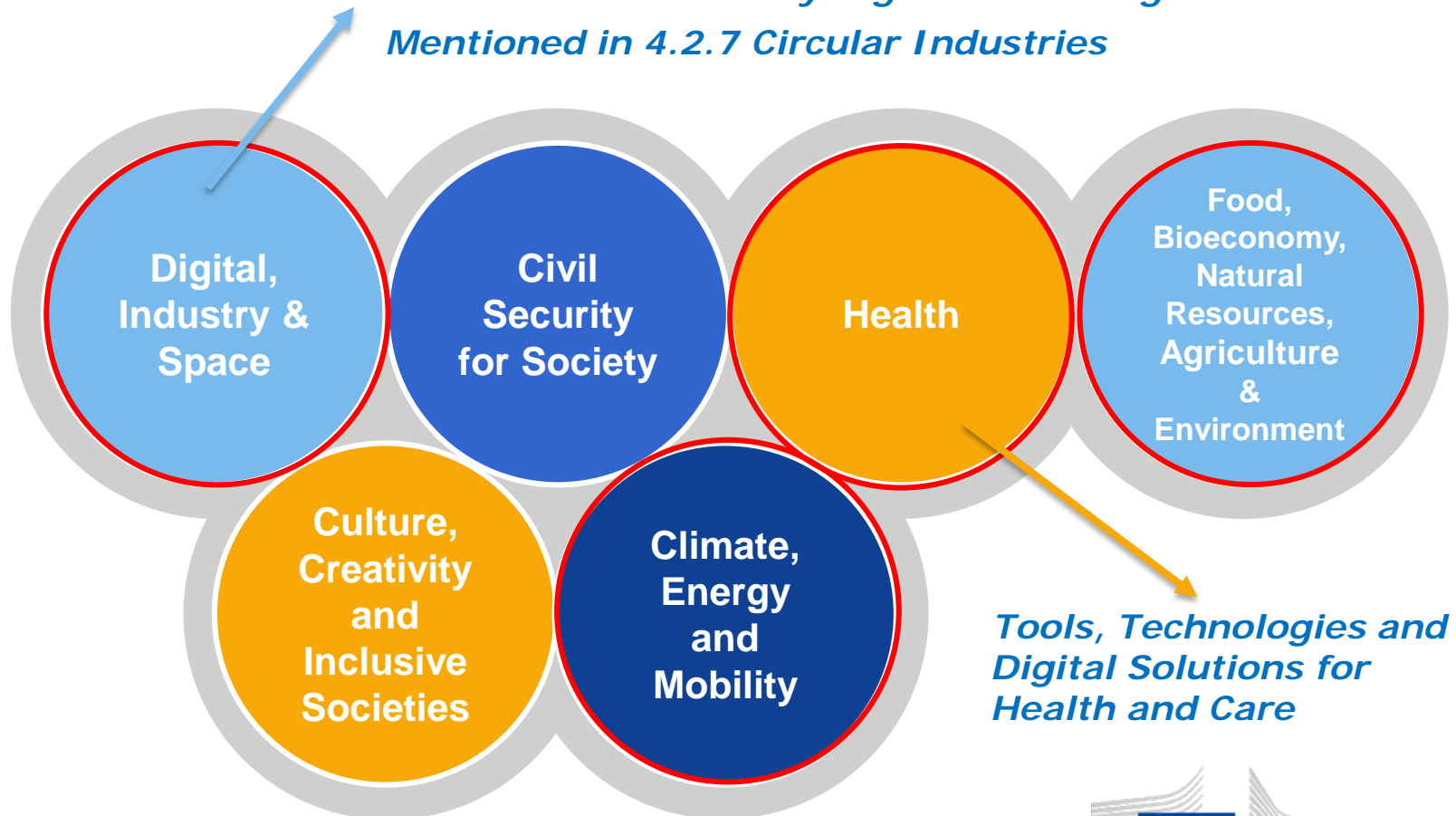
Nanotechnologies in HORIZON EUROPE:

Materials

Area of intervention 4.2.3. Advanced Materials

Mentioned in 4.2.2 Key Digital Technologies

Mentioned in 4.2.7 Circular Industries



Materials in HORIZON EUROPE

- ✓ Meeting citizens' needs for **sustainable, safe and advanced materials**.

An **EU innovation ecosystem of technology infrastructures** for technological transformation and uptake by EU industry (SMEs).

- ***New materials including plastic-, bio- and smart materials***
- ***Environmentally friendly, durable, reusable and recyclable***
- ***Regulatory, safety, risk, customer and ethical oriented (including pre-normative activities)***
- ***Adding value by design, architecture and general creativity***
- ***Boosting industrial innovation (test beds) supporting new applications in all industry sectors!***
- ***Observing future and emerging trends in KETs***

CO-CREATION

Public consultations and input for strategic programming for Horizon Europe

**EUROPEAN
RESEARCH &
INNOVATION
DAYS**

24 → 26
SEPTEMBER

KANAL ♡ CENTRE POMPIDOU
Brussels, BELGIUM

**20
19**

#RiDaysEU
@EUScienceInnov

© European Union, 2019



Latest information on consultation and next framework programme:

https://ec.europa.eu/info/designing-next-research-and-innovation-framework-programme/what-shapes-next-framework-programme_en#latest

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Horizon Europe dedicated website

<http://ec.europa.eu/horizon-europe>

European Innovation Council

<http://ec.europa.eu/research/eic>

EU budget for the future

http://ec.europa.eu/budget/mff/index_en.cfm

Latest call information Horizon 2020

https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/nmbp_h2020-leit-2018-2020_draft.pdf

