





#### What Money 4 Which Purpose?

Finland EU

**R&D&I** Business Finland Horizon 2020

Working Capital Finnvera EIB

**Investments** Finnvera EIB

**Transactions** Finnvera EIB

#### **Structure of €77B Horizon 2020**

#### I Excellent Science

#### Il Industrial Leadership

#### **III Societal Challenges**

- European Research Council
  (ERC): frontier research
- Future and Emerging Technologies (FET).
  - a) Open
  - b) Proactive
  - c) Flagships
- Marie Skłodowska-Curie (MSCA) – actions: training, career development and mobility for researchers
- Research Infrastructures

- Leadership in Enabling and Industrial Technologies
  - 1.1. ICT
  - 1.2. nanotechnology
  - 1.3. materials
  - 1.4. biotechnology
  - 1.5. manufacturing and processing
  - 1.6. space
- Risk finance: loans & equity funding
- 3. Innovation in SMEs

#### 20% of the budget or pillars II + III to SMEs

- SME Instrument(1/3)
- Collaborative projects (2/3)

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and forestry, marine, maritime and inland water research and bioeconomy
- 3. Secure, clean and efficient energy
- 4. Smart, green and integrtaed transport
- Climate action, resource efficiency and raw materials
- Europe in a changing world: inclusive, innovative and reflective societies
- Secure societies protecting freedom and security of Europe and its citizens

Also: European institute of innovation and technology, Science with and for society, Spreading excellence and widening participation

IV Joint Research Center JRC, excl. nuclear

Nuclear research: EURATOM







#### Technology Readiness Levels [Academic + Applied Research]

TRL 1 – Basic principles observed

TRL 2 – Technology concept formulated

TRL 3 – Experimental proof of concept

#### <!-- Companies' R&D starts from here -->

TRL 4 – Technology validated in lab

TRL 5 – Technology validated in relevant environment



#### Technology Readiness Levels [Applied + Industrial R&D&I]

TRL 6 – Technology demonstrated in relevant environment (~"MVP")

TRL 7 – System prototype demonstration in operational environment (~"Pilot")

TRL 8 – System complete and qualified

<!-- Companies' R&D ends here -->

TRL 9 – Actual system proven in operational environment

#### RIA/IA Call Types & Funding (=Where The Money Is)

- ➤ Top-down | Commercial Time Horizon ~3-5 yr
  - \* 70 % grant for profit (100 % for non-profit)
  - \* Innovation Action (IA): TRL ~6-8 (~BF Co-Innovation)
- ➤ Top-down | Commercial Time Horizon ~5-8 yr
  - \* 100 % grant for profit / non-profit
  - \* Research and Innovation Action (RIA): TRL ~4-6 (~AoF+VTT)





# ICT-46-2020: Robotics in Application Areas (1)

RIA | EUR 6-7M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: Robots face new technical and non-technical challenges. To address such issues in a modular and open way, and reduce the barriers that prevent a more widespread adoption of robots. 4 Priority Areas are targeted: healthcare, inspection and maintenance of infrastructure, agri-food and agile production. Scope: Autonomy in robotic systems is built on a combination of 4 Core Technologies: Al & Cognition (interaction, safety), Cognitive Mechatronics (e.g. learning), Socially cooperative human-robot interaction, Model-based design and configuration.



# ICT-46-2020: Robotics in Application Areas (2)

IA | EUR 6-7M | Opening 19 Nov 2019 | DL 22 Apr 2020

Specific Challenge: Robots face new technical and non-technical challenges. To address such issues in a modular and open way, and reduce the barriers that prevent a more widespread adoption of robots. 4 Priority Areas are targeted: healthcare, inspection and maintenance of infrastructure, agri-food and agile production. Scope: Through large-scale pilots, proposals are expected to make a significant step forward in platform development in one of the two application areas: In the Agri-Food sector from farming to processing and distribution OR Agile Production.



# ICT-47-2020: R&I boosting promising robotic apps

RIA | EUR 2-3M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: Robotics enables a significant part of the economic impact of AI by delivering physical intelligence. Scope: I. Development of autonomous robots at the micro- or millimetre scale; II. Integration and use of novel materials for service robotics; III. Beyond human speed, general purpose, dexterous manipulation of objects; IV. Application and integration of non-visual sensing for service robotics; V. Development of safe physical powerful robotic systems with proximity sensing capability; VI Variable autonomy systems for awareness.



#### ICT-48-2020: Towards network of Al excel. centres

RIA | EUR 12M | Opening 9 Jul 2019 | DL 13 Nov 2020

<u>Specific Challenge</u>: To ensure European strategic autonomy in such critical technology as AI.

Scope: The networks will aim at strengthening the Al-on-Demand-platform in enriching its capacity in terms of tools, competencies, services, to make it the reference and quality label for resource in Al. Being the one-stop-shop for Al resource in Europe, the tools, algorithms, resources developed in the networks of excellent centres will be made available to all via the Al-on-Demand platform.



### ICT-49-2020: Al on demand platform

#### IA | EUR 5M | Opening 19 Nov 2019 | DL 22 Apr 2020

<u>Specific Challenge</u>: The ambition is to bring AI technologies and resources to integrators and innovators in all sectors and actively engage with a wide user community, to foster adoption of AI, via use-cases experiments.

<u>Scope</u>: This topic builds on ICT26-2018-20, a reference access point gathering and providing access to Al-related knowledge, algorithms and tools and access to related infrastructures, equipment, and data resources, offering also experts support to potential users of Al in order to facilitate the integration of Al.



## ICT-38-2020: Al for manufacturing

RIA | EUR 4-6M | Opening 9 Jul 2019 | DL 16 Jan 2020 Specific Challenge: State-of-the-art AI technologies need to be integrated with advanced manufacturing technologies and systems in order to exploit their potential in manufacturing and process industry. Specific attention has to be given to standardisation, synchronising EU and Member States activities, and to international collaboration.

<u>Scope</u>: Al technologies in the manufacturing domain, for example in agile production processes and predictive quality, taking into account e.g. time criticality, safety and security.



# ICT-36-2020: Disruptive photonics technologies

RIA | EUR 3-6M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: Advanced photonics technologies. Scope: The focus is on the following themes (sub-topics): i. 3D light field and holographic displays (Mixed Reality); ii. Packaging and module integration for photonic integrated circuits (PIC); iii. Light to Fuel (direct and efficient (>5%) conversion of solar energy into chemical fuel); iv. Next generation biophotonics methods and devices as research tools to understand the cellular origin of diseases (photonics-based in-vivo/in-vitro imaging systems and techniques).



# ICT-37-2020: Photonics technologies (1)

RIA | EUR 3-5M | Opening 19 Nov 2019 | DL 22 Apr 2020

Specific Challenge: Distributed smart photonic sensor networks involving public participation through community-based monitoring could assist in creating inventories of emitted pollutants, identifying pollution hotspots, and alerting citizens in real time on potential health risks.

Scope: The focus is on the following themes (sub-topics):

i. Flexible Farm-to-Fork Sensing; ii. Novel Photonics Integrated Circuit (PIC) Technology building blocks.



# ICT-37-2020: Photonics technologies (2)

IA | EUR 4-7M | Opening 19 Nov 2019 | DL 22 Apr 2020

<u>Specific Challenge</u>: Distributed smart photonic sensor networks involving public participation through community-based monitoring could assist in creating inventories of emitted pollutants, identifying pollution hotspots, and alerting citizens in real time on potential health risks.

<u>Scope</u>: iii. Smart Photonic Sensing for Environmental Pollution Detection: Prototyping, demonstration and validation in real settings of an innovative, cost-effective, portable, smart hyperspectral sensing system, pollution detection.



## ICT-50-2020: Software Technologies

RIA | EUR 3-5M | Opening 9 Jul 2019 | DL 16 Jan 2020

<u>Specific Challenge</u>: The increased complexity of present and emerging ICT systems poses several challenges at software and hardware level including new requirements in terms of integration and cybersecurity.

<u>Scope</u>: Proposals will address at least one of the following two areas: 1. Development tools & methods for interoperable, adaptive, secure and trustworthy software; 2. Advanced Software systems and architectures (e.g. self-managed software, dynamic optimizations & resource pooling).



# ICT-51-2020: Big Data tech and extreme-scale analytics

RIA | EUR 3-6M | Opening 9 Jul 2019 | DL 16 Jan 2020 Specific Challenge: Novel methods, approaches and engineering paradigms in machine learning, analytics and data management. Scope: Proposals should cover at least one: ML/DL, architectures for collecting, managing and exploiting vast amounts of data; system engineering/tools to contribute to the co-design of federated/distributed systems; new methods for extreme-scale analytics, deep analysis, precise predictions and automated decision-making; novel visualization techniques; data fusion and data integration technologies; efficient sharing of data.



# ICT-40-2020: Towards a smart cloud computing

RIA | EUR 3-5M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: The challenge is to develop comprehensive cloud solutions and testbeds combining various execution platforms for ubiquitous and seamless computing environments. Scope: Proposals will address at least one of the following areas: i. Advanced cloud technologies and testbeds combining aspects of network, computing and data/information resources; ii. Advanced Cloud Data Privacy and Security techniques; iii. Novel programming models and semantically interoperable services.



# ICT-52-2020: Smart Connectivity beyond 5G

RIA | EUR 5-12M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: It also looks beyond 5G to prepare for the realisation of Smart Connectivity systems as a platform for a Next-Generation Internet.

<u>Scope</u>: E.g. it should enable novel interaction between human and digital systems based on new terminal types embedded in the daily environment, e.g. in cars, doors, mirrors, and new interfaces recognising gestures, facial expressions, sound and haptics.



#### ICT-41-2020: 5G innovations for verticals

IA | EUR 4-6M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: Software networks provide high flexibility through implementation of virtual network functions (VNFs). Scope: Experimentation facilities able to provide enhanced experimentation infrastructures on top of which third party experimenters e.g. SMEs or any service provider and target vertical users will have the opportunity to test their applications in an integrated, open, cooperative and fully featured network platform running across multiple domains where needed, and tailored to specific vertical use case.



## ICT-42-2020: 5G core technologies innovation

IA | EUR 4-6M | Opening 9 Jul 2019 | DL 16 Jan 2020

<u>Specific Challenge</u>: The challenge is to reap the fruits (new technologies, HW devices) of earlier R&D investments in these enabling technologies to support the emergence of new markets and new market actors in Europe.

<u>Scope</u>: The key 5G technological blocks under consideration are primarily hardware-based and include, but are not limited to, phase array antenna, array processors, millimetre wave devices and subsystems, photonics based devices, baseband processor platforms, low-cost access points, IoT etc.



# ICT-53-2020: 5G / Connected & Automated Mobility

IA | EUR 7-10M | Opening 9 Jul 2019 | DL 13 Nov 2020 Specific Challenge: To qualify and characterise the latest version of 5G (5G NR-V2X and beyond) in the context of advanced use cases deployment in Europe of CAM, may also benefit from AI. Scope: This is realised through cross-border trials along 5G corridors covering significant portions of roads or railways covering (V2V), vehicle-to-infrastructure (V2I), vehicle-to-pedestrian (V2P), and vehicle-to-network (V2N) technologies.



#### ICT-54-2020: Blockchain for the Next Generation Internet

RIA | EUR 8/6/6M | Opening 9 Jul 2019 | DL 16 Jan Apr 2020 Specific Challenge: Developing a more human-centric Internet supporting values of openness, decentralisation, inclusiveness and protection of privacy and giving the control back to the endusers, in particular of their data.

<u>Scope</u>: 3 sub-topics, proposals should address only one of these: i. Advancing research on Blockchain and Distributed Ledger Technologies; ii. Fostering trust in internet information exchange and content with blockchain; iii. Bringing forward the emergence of collective intelligence on the internet (social media).



## ICT-55-2020: Interactive Technologies

IA | EUR 1.5-2M | Opening 9 Jul 2019 | DL 13 Nov 2020 Specific Challenge: Interactive Technologies such as Augmented (AR) and Virtual Reality (VR) are set to transform the ways in which people communicate, interact and share information. Scope: 1/Support a pan-European coordination effort to strengthen the collaboration among the constituency (ICT-25-2018); 2/improve competiveness through research into future high-quality multi-sensorial interactive hardware and multi-user interaction systems (ICT-25-2018) and 3/ increase the innovation capacity through the development of new authoring tools.



#### ICT-56-2020: Next Generation IoT

RIA | EUR 5-8M | Opening 9 Jul 2019 | DL 16 Jan 2020 Specific Challenge: The challenge is to leverage EU technological strength to develop the next generation of IoT devices and systems which leverage progress in enabling technologies such as 5G, cyber-security, distributed computing, artificial intelligence (AI), Augmented Reality and tactile internet. Scope: Reference implementations should include proof-ofconcept, demonstrations and validation, driven by realistic use cases with advanced needs in areas such as wearables, transportation, agriculture homes, health and energy.



# ICT-57-2020: An empowering, inclusive NGI

RIA | EUR 2-4M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: Leveraging on multidisciplinary expertise drawing on knowledge from both the technological and human sciences, novel technologies, such as automatic translation as well as speech and sign recognition and synthesis.

Scope: Develop novel mobile applications translating between speech and sign languages to assist people with hearing impairments. The resulting applications should be open source, robust, cost-effective and validated across a wide spectrum of users.



#### ICT-44-2020: Next Generation Media

IA | EUR 5/2M | Opening 9 Jul 2019 | DL 16 Jan 2020 Specific Challenge: The challenge for the traditional media sectors is to compete in this extended ecosystem and to meet user expectations by rapidly embracing new technologies for creation, management, and distribution of content. Scope:i. Business Innovation Ecosystems (Develop new business innovation ecosystems by using approaches, such as a sandbox, for technology-driven innovation in media); ii. New User Driven and Enriched Experiences in Future Media.



#### ICT-58-2020: European - African innovation hubs

IA | EUR 1-2M | Opening 19 Nov 2019 | DL 22 Apr 2020

<u>Specific Challenge</u>: To reinforce cooperation and strategic partnership with selected countries in Africa.

<u>Scope</u>: 1.reinforcing the development and establishment of Pan-African networks of Digital Innovations/Tech Hubs through strengthening local digital innovation and startup ecosystems; 2.developing a mutually beneficial cooperation between African and European DIHs.



# DT-ICT-03-2020: Uptake of digital game changers

IA | EUR 8M | Opening 9 Jul 2019 | DL 13 Nov 2020 Specific Challenge: The challenge is to accelerate the design, development and uptake of advanced digital technologies by European industry – especially in SMEs and mid-caps. Scope: In one or more of the following areas: Smart modelling, simulation, and optimisation for digital twins; Laser based equipment in advanced and additive manufacturing; Innovative Al in manufacturing; Cognitive autonomous systems and humanrobot interaction; Widening Digital Innovation Hubs.



#### DT-ICT-04-2020: Photonics Innovation Hubs

IA | EUR 9.5-19M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: The challenge is to provide a sustainable ecosystem of research and innovation support for the benefit of SMEs facilitating a broad uptake and integration of photonics technologies.

<u>Scope</u>: Open access to Photonics Innovation Hubs: One-stopshop access, supported through a network of competence centres, to services and capabilities such as expertise, training, prototyping, design, engineering, business support, financing advice and pilot manufacturing for first users and early adopters.



#### DT-ICT-05-2020: Big Data Innovation Hubs

IA | EUR 8-12/5-7/5M | Opening 9 Jul 2019 | DL 13 Nov 2020 Specific Challenge: The challenge is to break "data silos" and stimulate sharing, re-using and trading of data assets by launching a second-generation data-driven innovation hub. Scope: Sub-topic 1: Federate and network the relevant actions and initiatives; Sub-topic 2: Select, launch and incubate innovation experiments in view of bringing to the market new solutions and services based on secure, trusted value chains; Sub-topic 3: Select, launch and incubate innovation experiments for data driven services and tools to reshape media value chain.



## DT-ICT-09-2020: Boost rural economies thru e-platforms

IA | EUR 15M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: One key challenge is to overcome the barrier of missing interoperability of smart object platforms and service platforms that share and exploit data between them. Scope: Proposals are expected to develop and demonstrate cost-efficient and flexible cross-domain applications through large-scale pilots. These should build on an open, API-based, interoperable and federated IoT architecture and include a reference implementation supporting flexible integration of heterogeneous services.



## DT-ICT-12-2020: Al for the smart hospital of the future

IA | EUR 7-10M | Opening 19 Nov 2019 | DL 22 Apr 2020 Specific Challenge: AI in this context has the potential to deliver integrated physical and digital services that address a wide range of healthcare applications, for example in patient care, diagnosis, treatment and in hospital based laboratory and support services. Scope: Devise in-facility pilot demonstrators that deliver innovative Al-based solutions in a health and care setting such as a hospital, primary or home care. Pilots should enable or support clinical, diagnosis and treatment, etc.

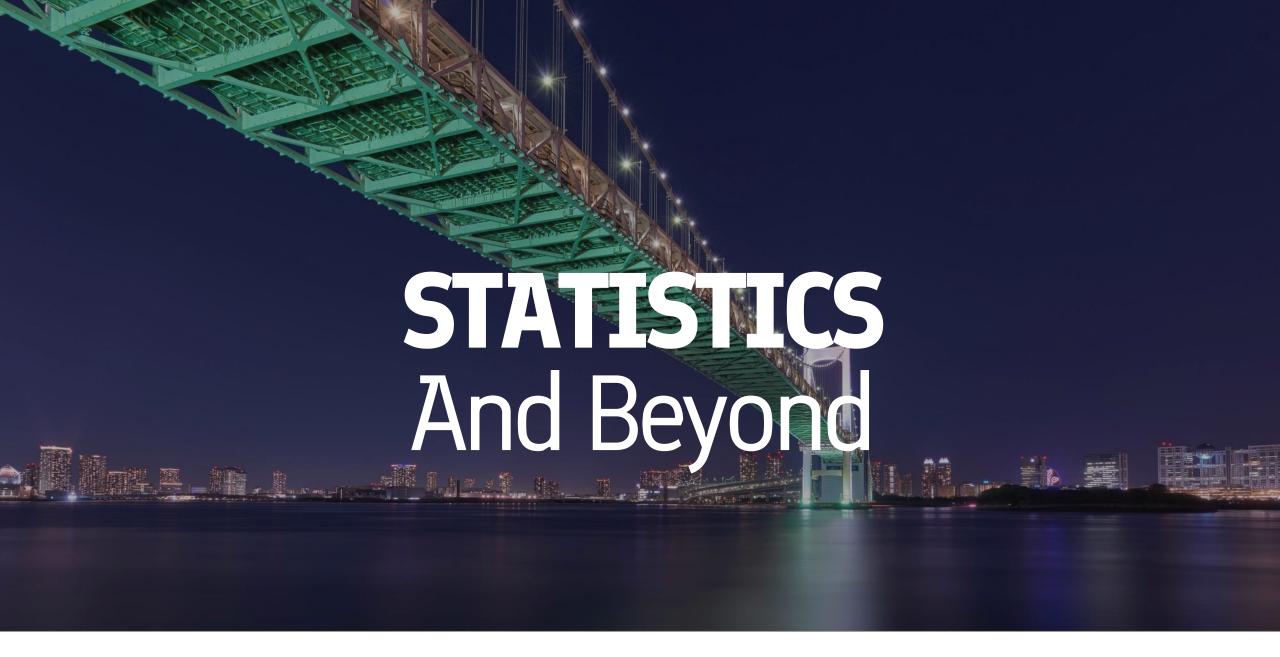


# SU-ICT-02-2020: Building blocks for resilience

RIA | EUR 4-5M | Opening 25 Jul 2019 | DL 19 Nov 2020

Specific Challenge: Algorithms, software and hardware systems must be designed having security, privacy, data protection, fault tolerance and accountability in mind from their design phase in a measurable manner.

<u>Scope</u>: Proposals are invited against at least one of the following three subtopics: a) Cybersecurity/privacy audit, certification and standardization, b) Trusted supply chains of ICT systems, c) Designing and developing privacy-friendly and secure software and hardware





### 1 Jan 2014 – 15 April 2019

- ✓ Total EC Contibution to Finland: <u>EUR 910M</u> from which Industrial Leadership in <u>ICT EUR 145M</u>.
- ✓EUR 145M: ~330 beneficiaries in total from which in RIA/IA actions ~190 beneficiaries.
- √ Finnish success rate for funding is typically ca 15 %.
- ✓ Success rates jump typically to 20-30 % when having existing networks with cPPPs and European technology platforms.



### **Key Platforms (cPPPs)**

- Factories of the Future (<a href="http://www.effra.eu">http://www.effra.eu</a>)
- ➤ Energy-efficient Buildings (<a href="http://e2b.ectp.org">http://e2b.ectp.org</a>)
- ➤ European Green Vehicles Initiative (<a href="http://www.egvi.eu">http://www.egvi.eu</a>)
- ➤ Sustainable Process Industry (<a href="https://www.spire2030.eu">https://www.spire2030.eu</a>)
- ➤ Photonics (<a href="http://www.photonics21.org">http://www.photonics21.org</a>)
- ➤ Robotics (<a href="https://eu-robotics.net">https://eu-robotics.net</a>)



### **Key Platforms (cPPPs)**

- ➤ High Performance Computing (<a href="http://www.etp4hpc.eu">http://www.etp4hpc.eu</a>)
- ➤Advanced 5G networks for the Future Internet (<a href="https://5g-ppp.eu">https://5g-ppp.eu</a>)
- ➤ Big Data (<a href="http://www.bdva.eu">http://www.bdva.eu</a>)
- >ECSO (<a href="https://www.ecs-org.eu">https://www.ecs-org.eu</a>) + FISC (<a href="http://www.fisc.fi">http://www.fisc.fi</a>)
- ➤ AIOTI Alliance Internet of Things Innovation (<a href="https://aioti.eu">https://aioti.eu</a>)





#### ICT Proposers' Day 2019 (19 – 20 Sep)

H2020 ICT Proposers' Day 19. – 20.9.2019 is a networking event gathering about 2.500 participants interested in European ICT Research & Innovation and Horizon 2020 Work Programme for 2019-20.

#### **MANUFUTURE 2019 (30 Sep – 1 Oct)**

MANUFUTURE 2019 is part of Sustainable Days 30.9. – 1.10. The event for 750 people is organized in collaboration with the Ministry of Environment, DIMECC and others.



#### **EUROPEAN BIG DATA VALUE FORUM 2019 (14 – 16 Oct)**

The European Big Data Value Forum is a key European event for industry professionals, business developers, researchers, and policy makers to discuss the challenges and opportunities of the European data economy and data-driven innovation in Europe. About 700 attendees expected, event is coordinated by VTT.



#### SECURITY RESEARCH EVENT 2019 (6 – 7 Nov)

SRE 2018 will gather 800 participants representing a wide range of security stakeholders: researchers, industry representatives, public security providers and practitioners (for example fire departments, police forces and border guard and law enforcement agencies), as well as policymakers.

#### **SET-Plan (14 – 15 Nov)**

SET Plan conference 14. – 15.11.2019 targets to energy sector for about 500 participants.



<u>EFECS - European Forum for Electronic Components and Systems (19 – 21 Nov)</u>

EFECS 19. – 21.11.2019 is the international forum with a focus on 'Our Digital Future' along the Electronic Components and Systems value chain in Europe. The organizers of the event include ECSEL Joint Undertaking and the European Commission, in association with EUREKA. Around 700 participants are expected.





### What a NCP Can Do 4 You in Practise? (1)

- ✓ To inform and to provide general and specific info about calls, conditions and offer Commission's annotated info behind calls.
- ✓ To assist, advise and train e.g. about project submission, budgeting and reporting. Offers project <u>proposal second opinion</u> & <u>pitching coaching</u>.
- ✓ All difficult questions are welcome and NCP has <u>direct contacts</u> to solve them from European Commission.
- ✓ Signposting and cooperation with other funding opportunities (national & international).



### What a NCP Can Do 4 You in Practise? (2)

- ✓ Finnish NCPs act as a co-delegate and expert members in different theme focused <u>committees</u> (e.g. ICT, Health, Security) in order to provide hints where EC R&D activities, funding instruments and conditions are going.
- ✓ Business Finland has close cooperation nationally between Academy of Finland, VTT, Sitra, different ministries and key stakeholders to affect e.g. Finnish proposal bilateral discussions with Commission and to join forces with other delegates/NCPs.



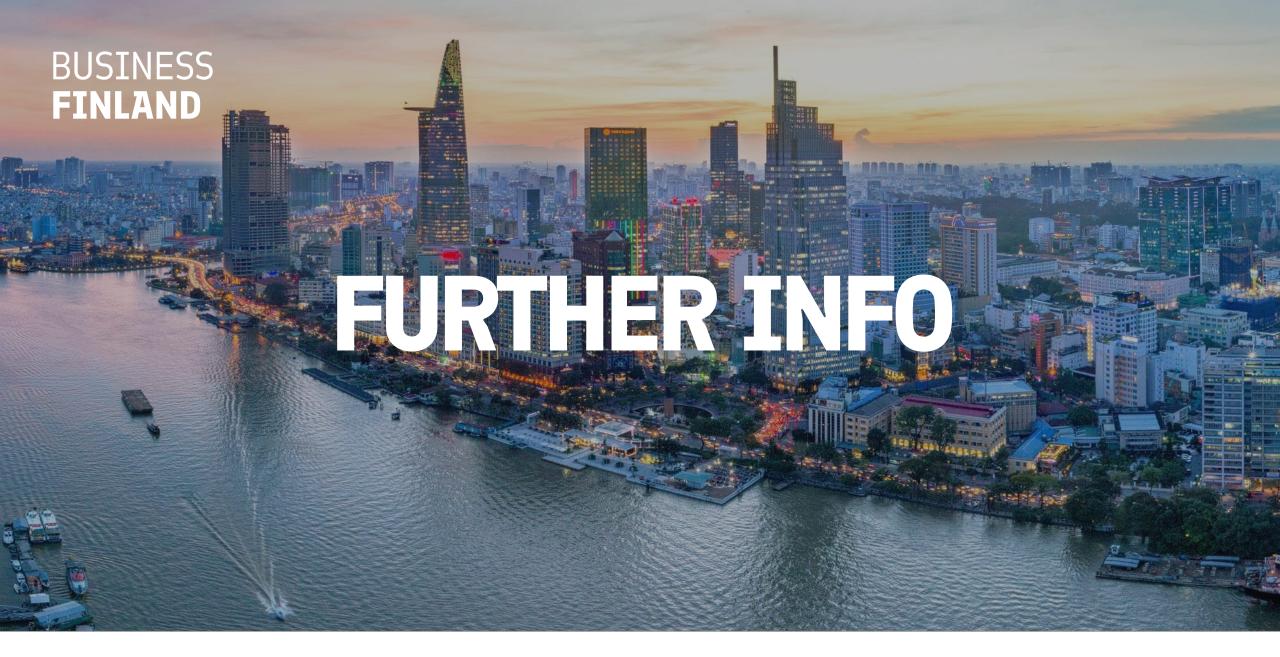
### What a NCP Can Do 4 You in Practise? (3)

- ✓ Also possibility to use <u>national voice</u> to foster Finnish research and innovation in the short term & in the long run (2021-2027).
- ✓NCP can provide call statistics, conclusions and reasons behind success rates. NCP has the access to all proposal Evaluation Summary Reports which provide valuable information about different consortia and lessons to learn.
- ✓ Business Finland NCPs have the access to Business Finland customer portfolio (research and corporate projects) which helps to build either domestic and international consortia.



### What a NCP Can Do 4 You in Practise? (4)

- ✓ Business Finland has close cooperation between e.g. Sweden, Norway and Japan which helps to organize other type of international R&D funding <u>beyond European Commission</u>.
- ✓NCPs have their <u>colleagues in every EU country</u> to help to find the relevant partner in different industry R&D domains.
- ✓ Knows about the <u>key technology platforms</u>, <u>PPPs and events</u> in EU in advance.
- ✓ Last but not least: no conflicts of interest.





### Who Knows What and Where?

- ✓ Finnish Horizon 2020 Contacts & Organizations <a href="https://bit.ly/2TYayVo">https://bit.ly/2TYayVo</a>
- ✓ Marie Skłodowska-Curie Actions <a href="https://ec.europa.eu/research/mariecurieactions/">https://ec.europa.eu/research/mariecurieactions/</a>
- ✓EIB | Blending & Lending http://www.eib.org/en/products/blending/index.htm http://www.eib.org/en/products/lending/index.htm
- ✓EIB | Finland | Loan/guarantee & equity/VC <a href="https://bit.ly/2WmAHtv">https://bit.ly/2WmAHtv</a>





### WORLD IDEAS

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