

Bringing European Science Closer to Market - ATTRACT

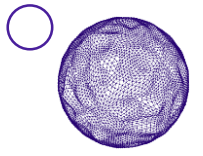
John Wood

Chair, ATTRACT Project Advisory Committee (PAC)

Foundation Future Leaders, CERN

September 20, 2022



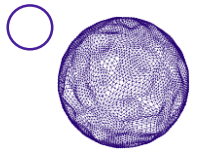


Why ATTRACT?

We believe that the potential of European Research Infrastructures as Innovation Engines is not yet fully exploited.

- The European Commission defines Research Infrastructures (RI) as facilities providing resources and services for research communities to conduct research **and foster innovation***.
- But is this really the case? Could pushing the limits of Fundamental Science, which is the mission of RIs, *in some new way* translate research faster and in a more streamlined fashion into industrial applications, new business and social wealth?
- The ATTRACT initiative was created in 2018 to address the above question, in a dialogue with the EC.
- It became apparent that this new approach would need to deviate from the traditional role of considering RI as access facilities for industry.
- Moreover, the communities behind RIs would also need to tap into industrial know-how in a better way (e.g. advanced and high scale manufacturing capacity) for pushing their own research-driven mission.

* https://ec.europa.eu/info/research-and-innovation/strategy/european-research-infrastructures_en



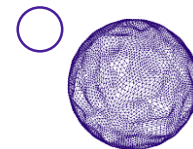
Basic Philosophy of ATTRACT:

To create a novel Ecosystem focusing on breakthrough detection and imaging (D&I) technologies in Europe.

The dialogue between the ATTRACT Consortium and the EC, as well with several influential thinkers, led to the following key insights*:

1. A new action framework beyond the existing RI-industry frameworks and practices was needed for enabling the opportunities identified in the paradigm of “Open Science, Open Innovation, Open to the World”, to harness *both* value creation and value capturing, and *share* it
 - see Henry W. Chesbrough and Melissa M. Appleyard, Open Innovation and Strategy, California Management Review Vol. 50, No. 1, 2007.
2. Focus on bottom-up, low TRL initiatives in D&I with industry (SME)-RI co-innovation potential innovation (but do not assume all scientists wish to turn into entrepreneurs themselves). But the (young) entrepreneurs should be on board!
3. Aim at a *sustainable* cycle, in phases (cascade funding approach). Try to engage private investors ...
4. Create a framework that can be dynamically tested by generating, gathering and analyzing related data. This is needed to validate the concept and see whether it can be significantly scaled-up, also outside D&I.

• Many of them have been reflected in the EC policy paper, *Sustainable Research Infrastructures*,
https://ec.europa.eu/info/sites/default/files/research_and_innovation/research_by_area/documents/swd-infrastructures_323-2017.pdf

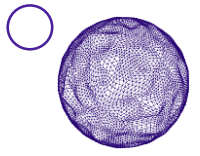


ATTRACT: Why Detection and Imaging (D&I)?

What in the picture has nothing to do with D&I?

- The scientific mission of European RIs as well as their R&D associated communities is strongly coupled with detection and imaging technology instrumentation (including computing).
- Detection and Imaging technologies are and will be at the core of future industrial developments applications and business (e.g. IoT, Smart Cities, Autonomous Transport, Sustainable Agriculture, etc).

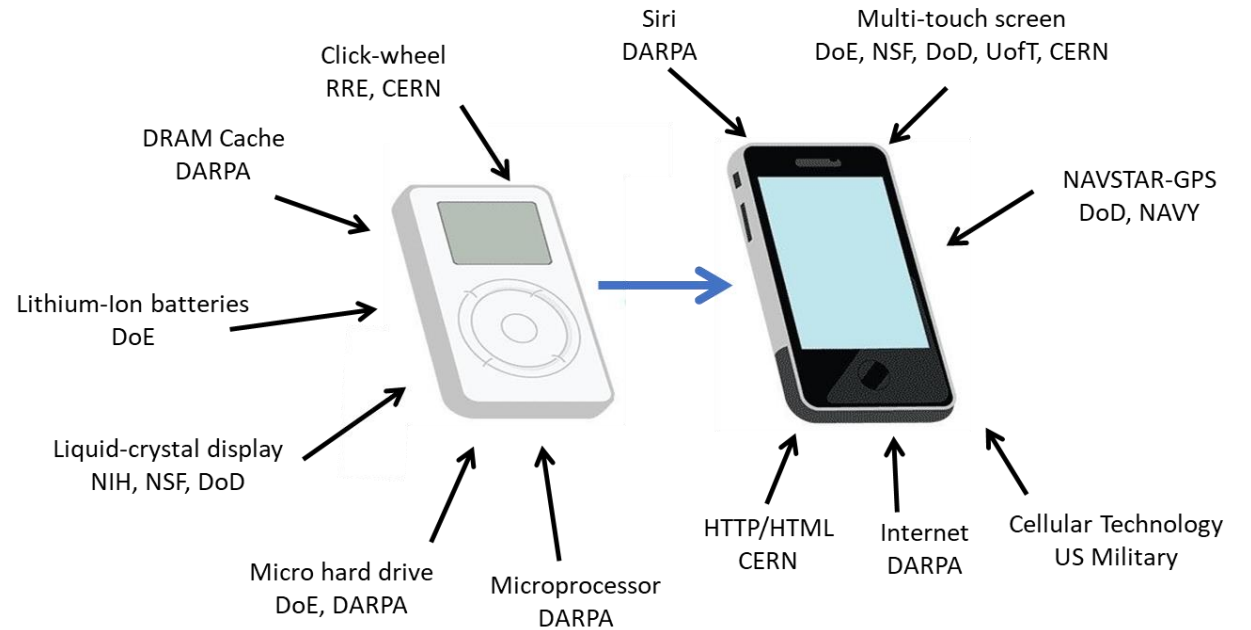




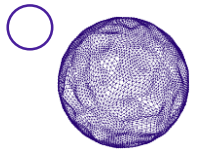
ATTRACT: Key pillars (1)

“So where does breakthrough Innovation come from?”

Public Funding: Key for helping nascent breakthrough technologies, many of them even at the conceptual level, mature for raising the interest of private capital .



DARPA: Defense Advance Research Project Agency
 RRE: Royal Radar Establishment
 CERN: European Organization for Nuclear Research
 DoE: Department of Energy
 NIH: National Institute of Health
 NSF: National Science Foundation
 DoD: Department of Defence
 UofT: University of Toronto



ATTRACT: Key pillars (2)

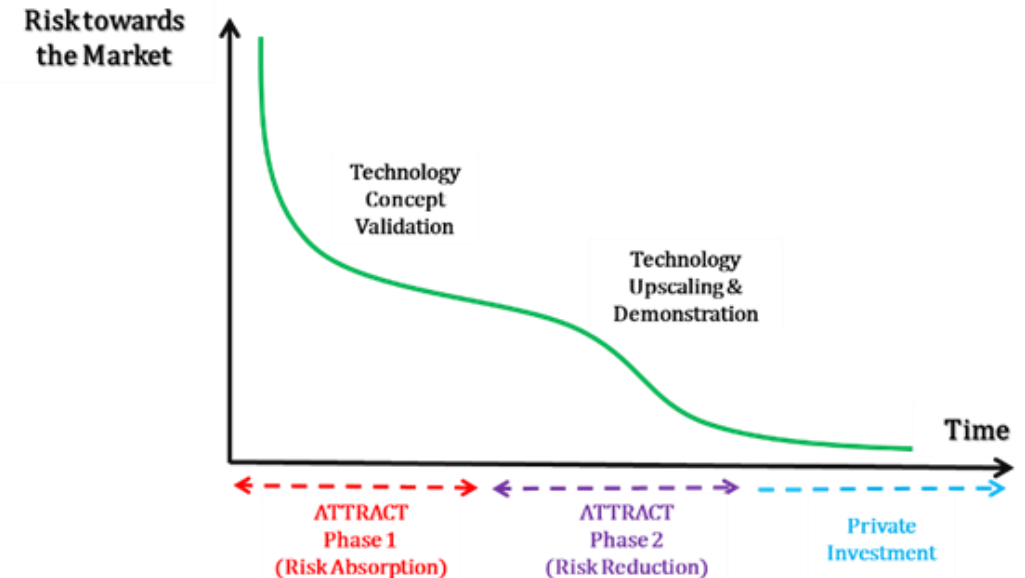
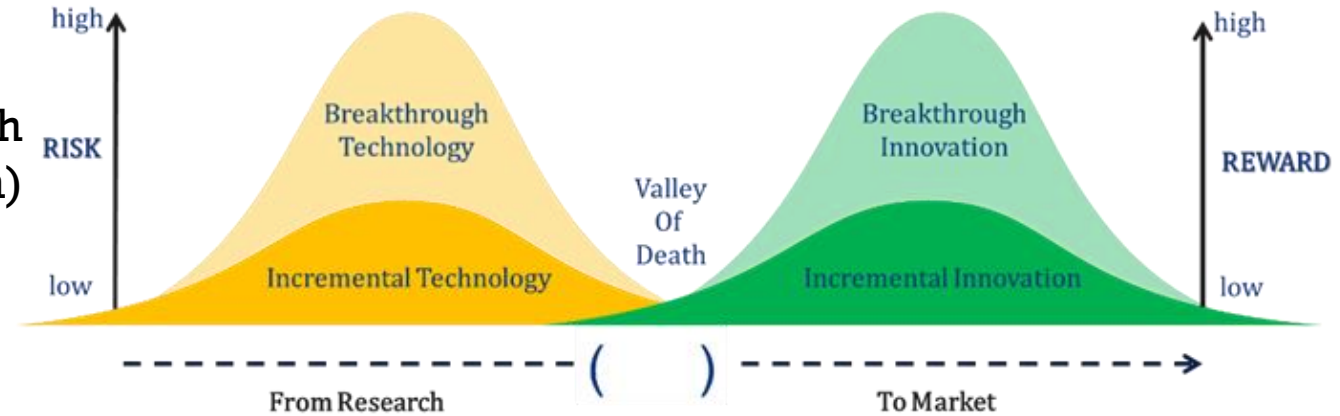
“Not two Valleys of Death look the same”

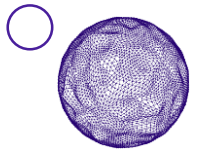
Phased approach to funding: Breakthrough Technologies (coming from Fundamental Research) are very risky for private capital.

De-risking them needs public funding:

First, a **risk-absorption stage**, where ideas and concepts could reach a prototype level and technology concept validation (Phase-1).

Second, a **risk-mitigation stage**, where the most promising concepts are further helped raising towards a pre-market product (Phase-2).



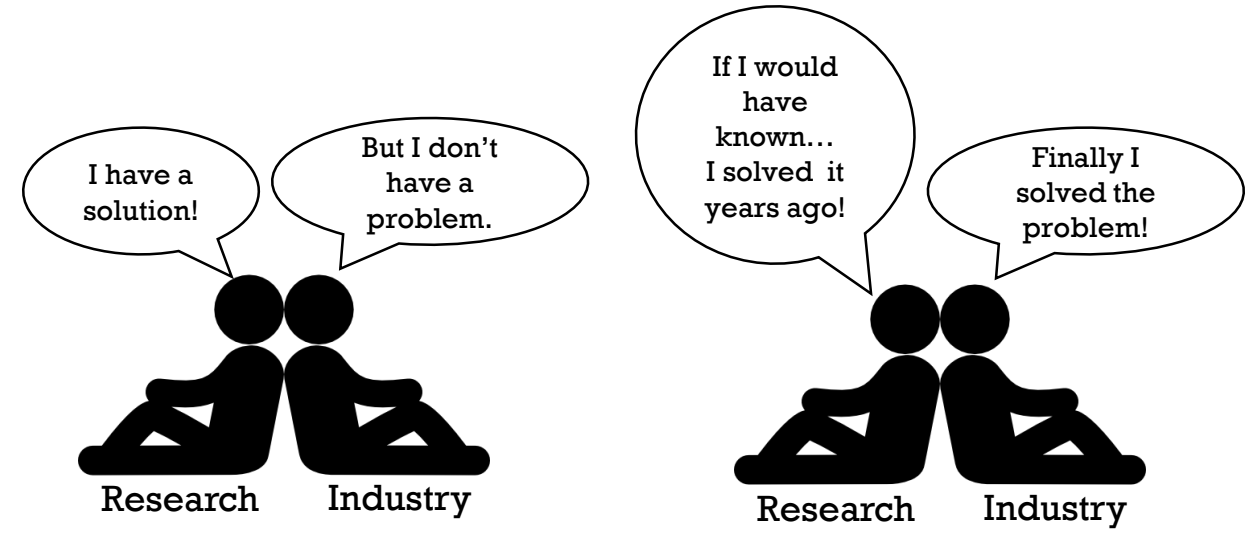


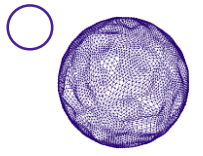
ATTRACT: Key pillars (3)

“Trust and shared know-how is not built in one day”

Co-Innovation:

- Bridge between two communities (research and industry) that in principle have different motivations and goals for undertaking R&D&I (capital and/or resource intensive) efforts .
- Entails the identification and collaboratively pursuing of win-win outcomes, starting already at the conceptual stages of a technology development and enduring them until the later stages of the innovation value chain (e.g. commercialization).
- This model differs from established research-industry customer-supplier relationships.





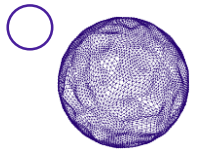
ATTRACT: Key pillars (4)

“Young people want to change the world”

Young Innovators Projects:

- ATTRACT is facilitating the integration of interdisciplinary MSc level students working side by side with professional researchers from academia and industry developing the R&D&I funded projects.
- These Young Innovators' goal is prototyping technology solutions specifically addressing the United Nations Sustainable Development Goals,
- They use a Design Thinking approach inspired by the technology developed by the projects.





Example of what we wish to see ...

Enabling potential projects where, for example...

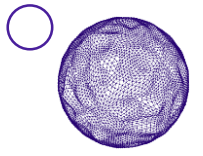
....a biologist realizes that her ideas for a new sensor,

....are solving the issues faced by an astrophysicist friend,

....and when both get in contact with a company developing solutions for plastic recycling,

....the three of them think it is worthwhile working together, and even more,

... relying on some young folks for prototyping their ideas and get inspired by new ones.



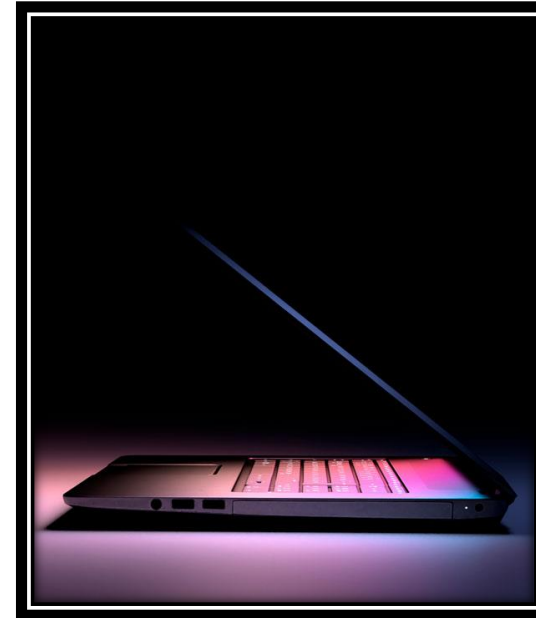
ATTRACT Phase-1: Technology Examples



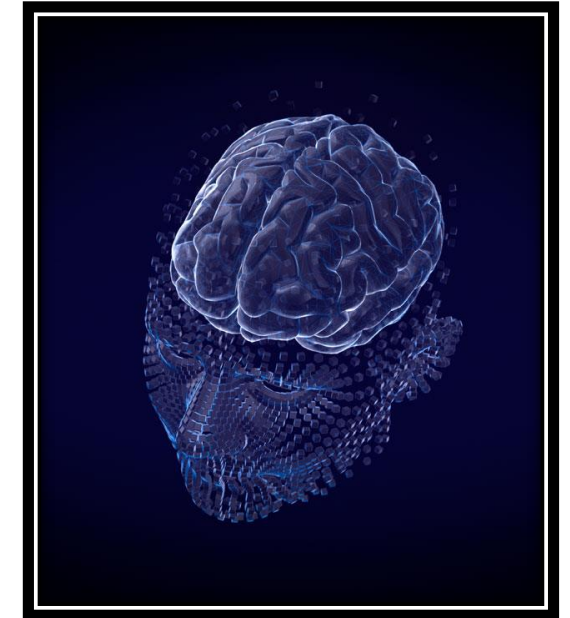
Portable Eco-Batteries



Pollution Detecting Drones



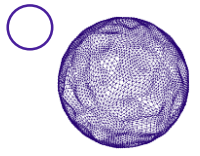
Advanced IoT Technologies



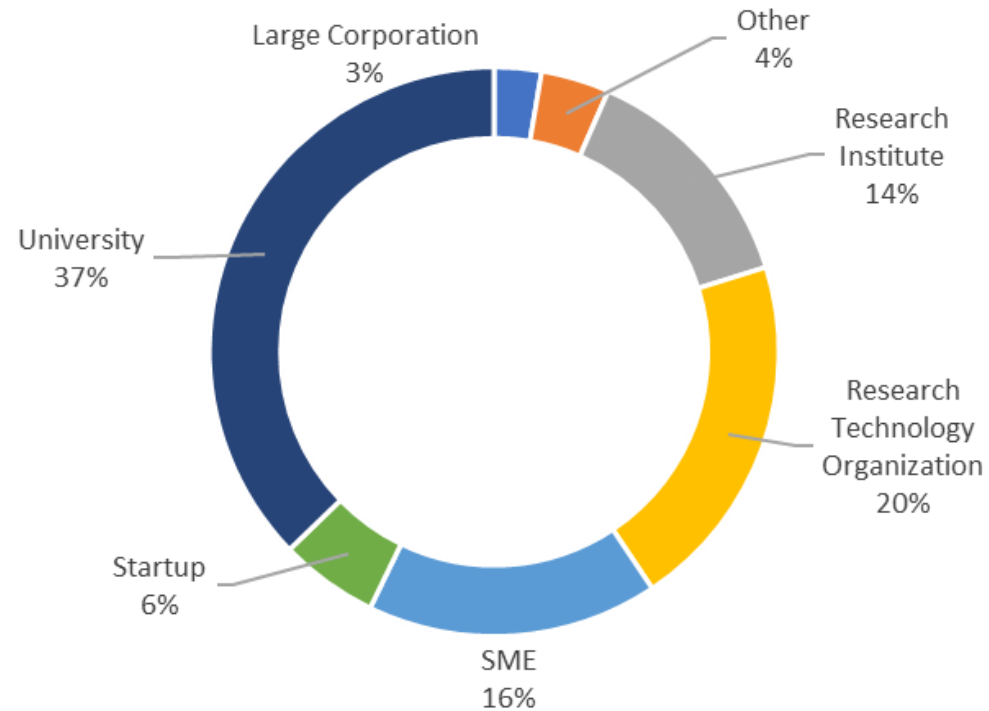
Virtual Reality for Healthcare

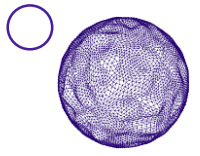
ATTRACT SHOWROOM: 170 examples of breakthrough technologies

<https://phase1.attract-eu.com/showroom/>



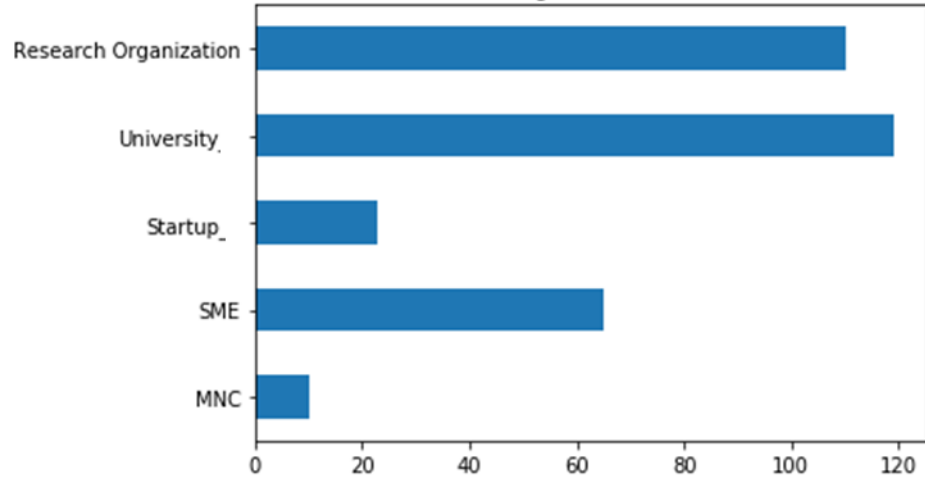
ATTRACT Phase-1: Type of Organizations Involved



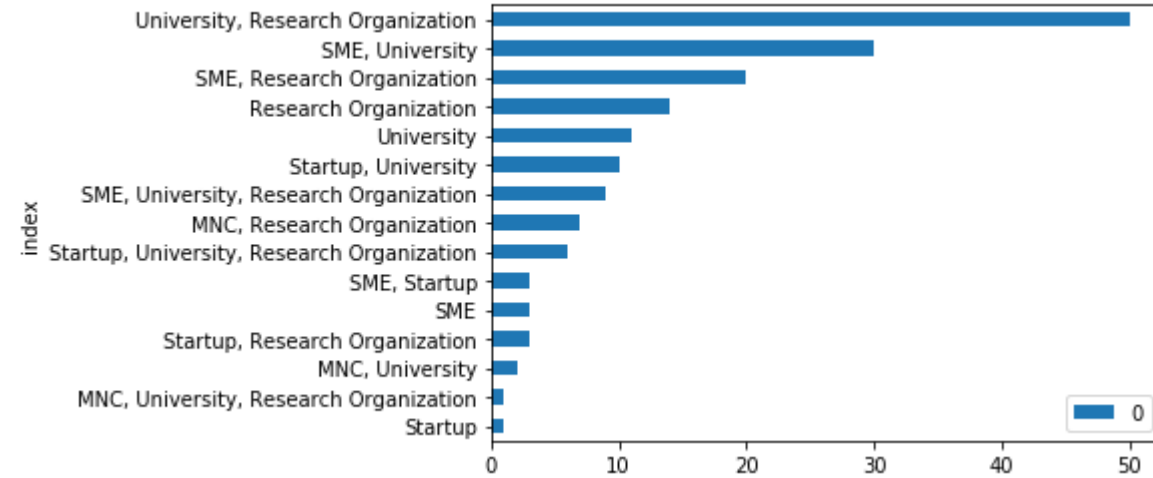


ATTRACT Phase-1: Summary Statistics

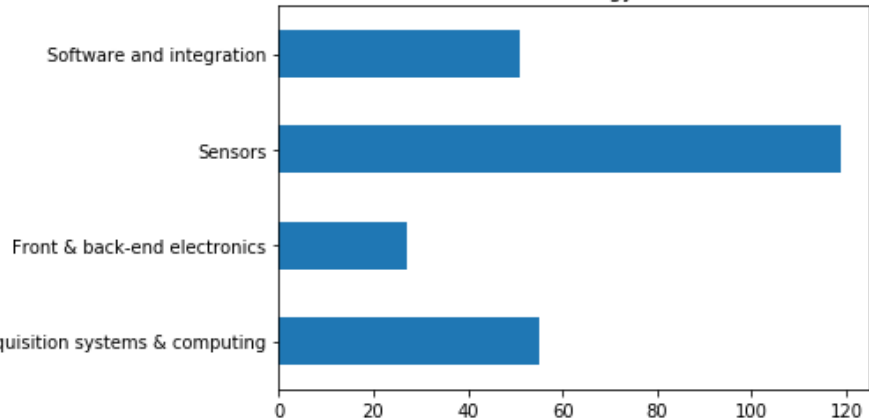
Organizations

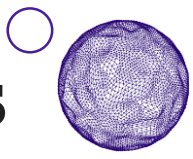


Collaborations



Technology





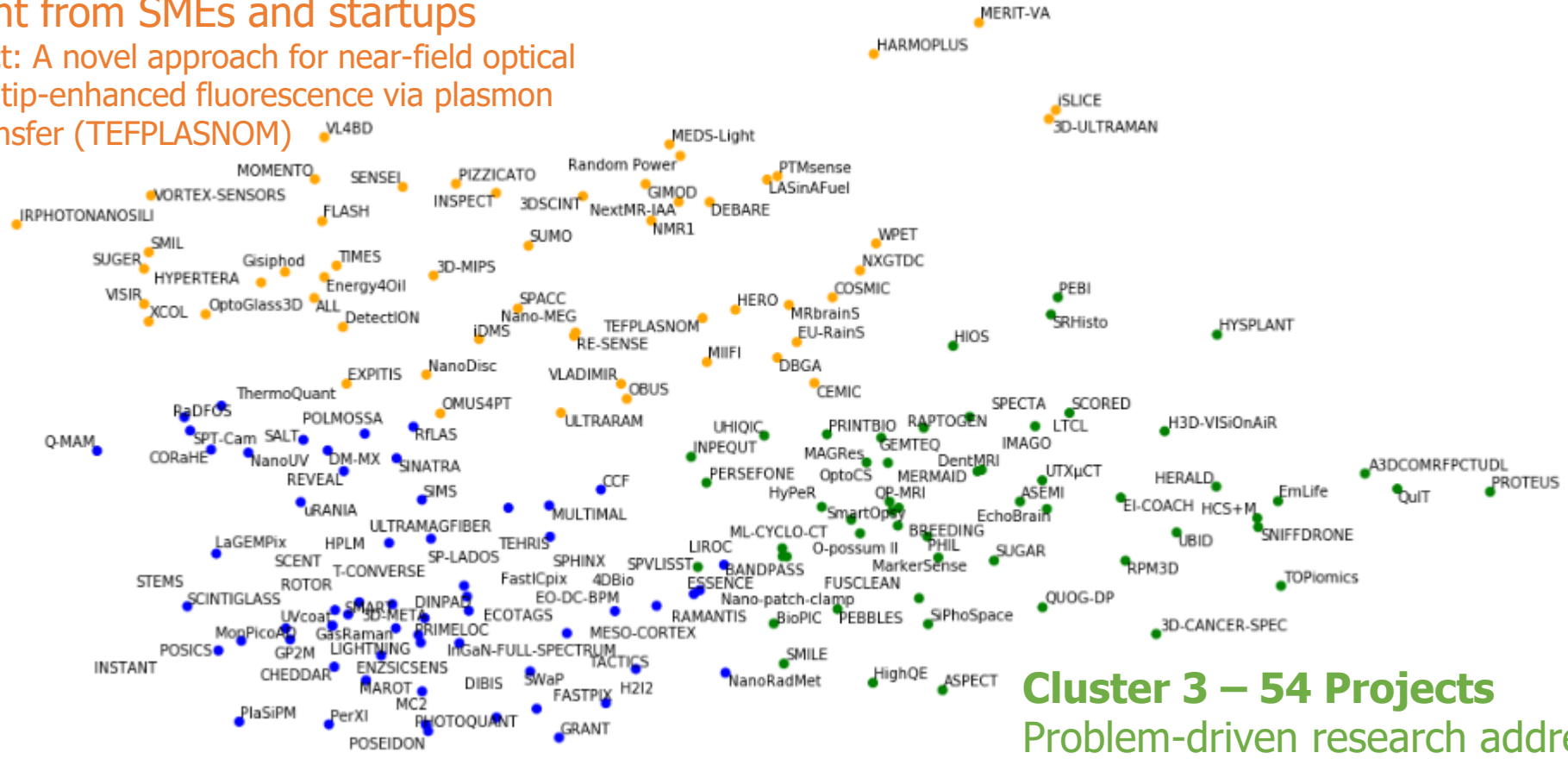
ATTRACT Phase-1: Clusters

Cluster 2 – 55 Projects

Aim is to create or improve product by applying a technology from one field to another

Large involvement from SMEs and startups

Representative project: A novel approach for near-field optical microscopy based on tip-enhanced fluorescence via plasmon resonance energy transfer (TEFPLASNOM)



Cluster 1 – 61 Projects

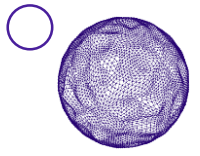
Continuous research or assembling existing technologies for new sensors / electronics

Representative project: A monolithic picosecond avalanche detector (MonPicoAD)

Cluster 3 – 54 Projects

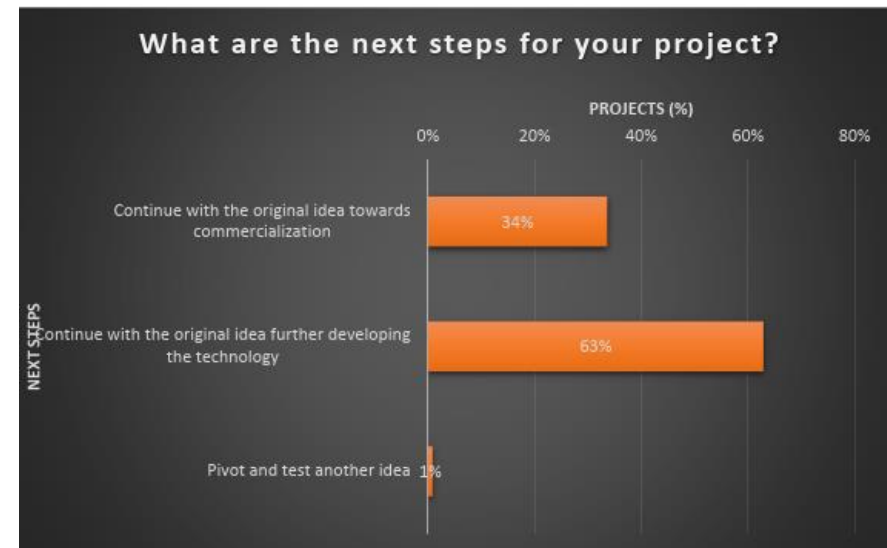
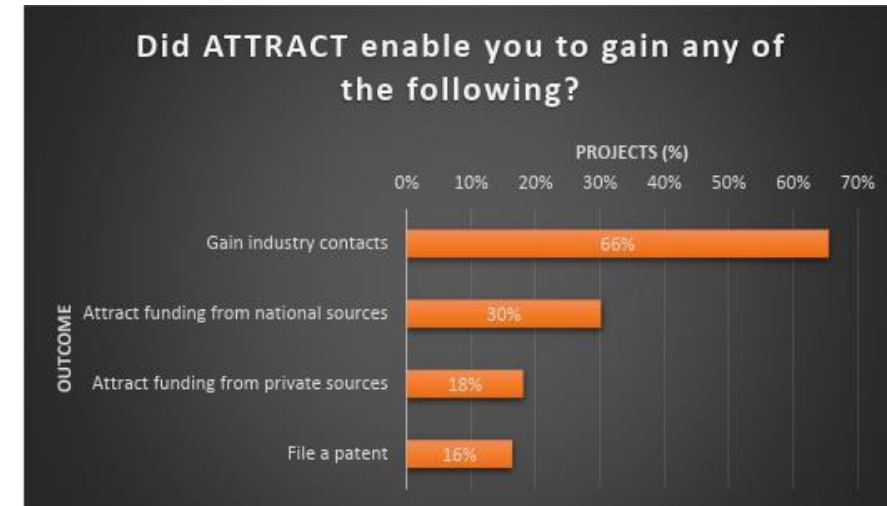
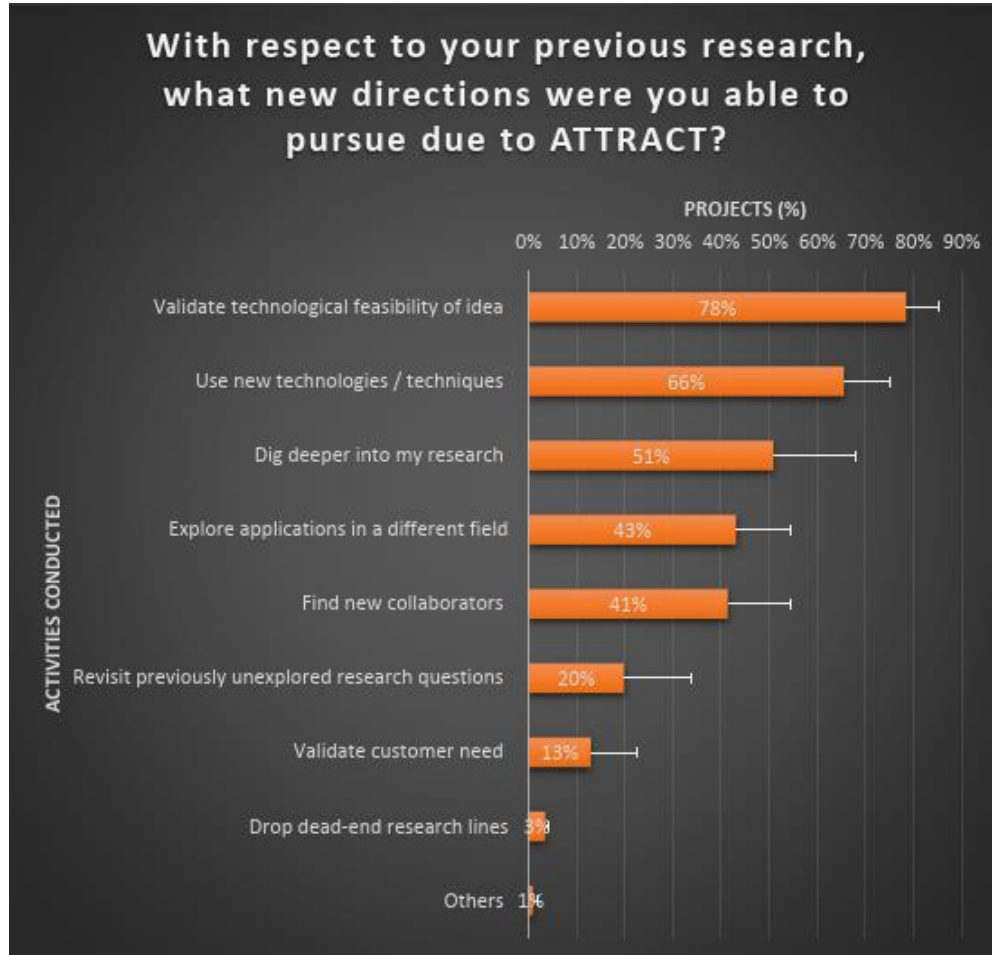
Problem-driven research addressing specific challenges in health and biology
Typically employs software and computational methods

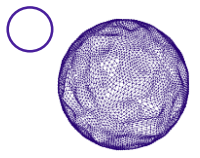
Representative project: Endoscopy by interferenceless coded aperture correlation holography device with annular optical aperture (EI-COACH)



ATTRACT Phase-1: Some figures of merit (1)

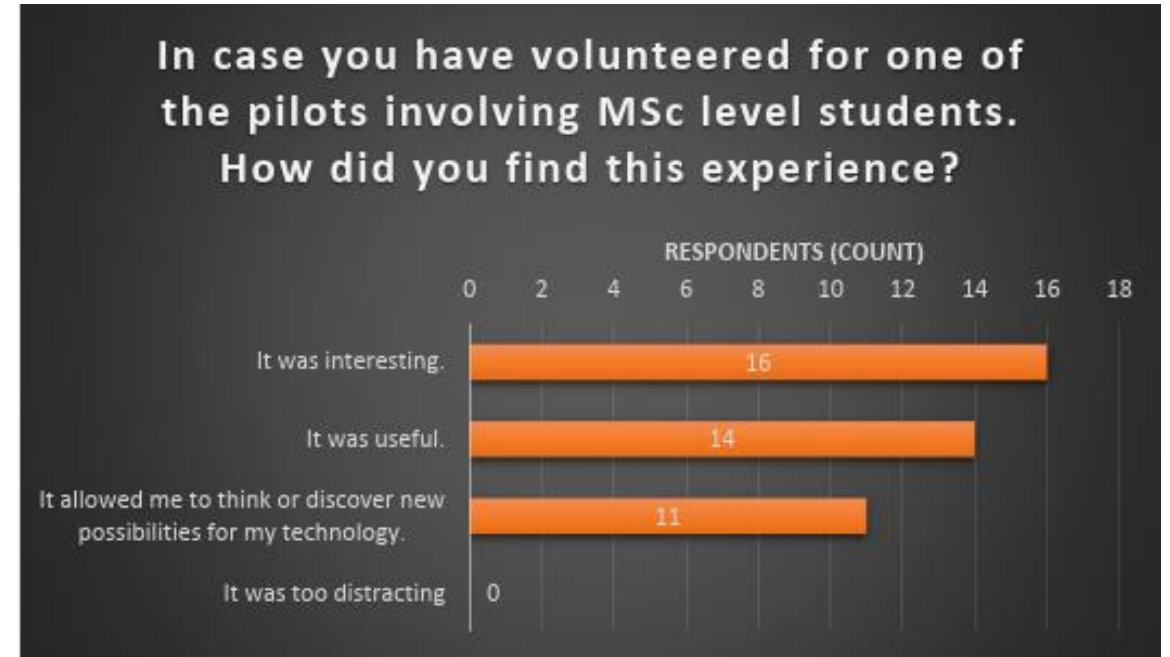
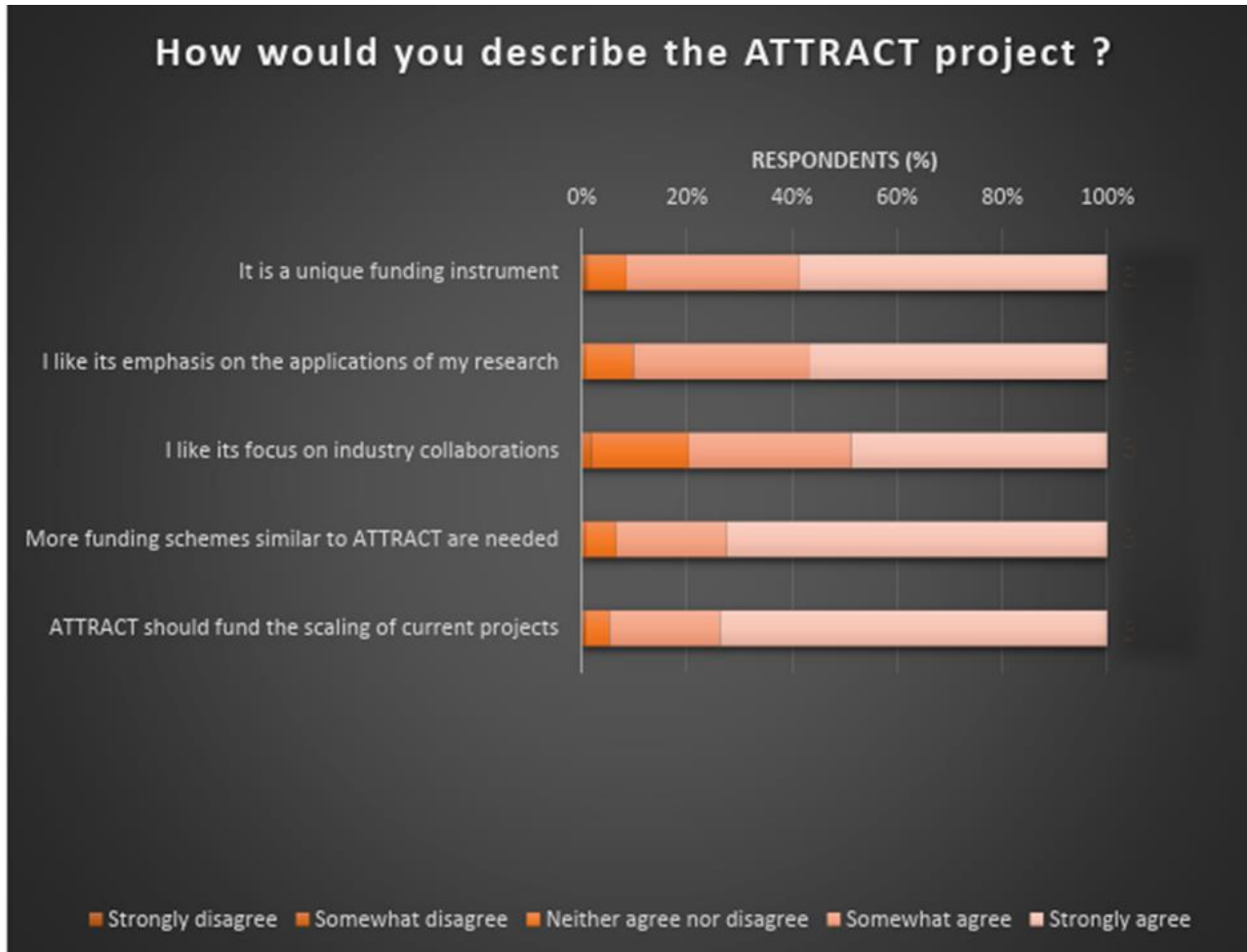
“How are we doing after Phase 1?”

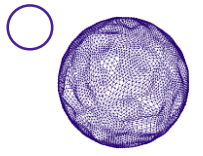




ATTRACT Phase-1: Some figures of merit (2)

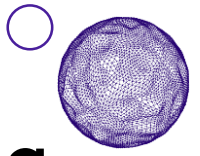
“How are we doing after Phase 1?”





Identified Challenges (so far...)

- Awareness among researchers of the different technologies being developed in the other funded projects
- Disruptive effects of COVID-19 (lack of access to labs, testing of new ideas ...)
- Projects to find and engage with the right (industrial) partners to scale up the TRL
- Provide the right type of (IP) help for the researchers interested in commercializing their ideas
- Engaging the right type of (C) VCs at the right moment (PAC is working on this!!)



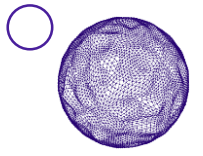
Side Note: ATTRACT Phase-1 and the COVID-19 Pandemic

Funded Project	How the developed technology found new applications to fight COVID-19
FUSCLEAN	Optical technology enabling a fast and contactless analysis of surfaces contaminated by SARS-CoV-2.
SMILE	Disposable device able to stabilise, preserve and prepare saliva samples for COVID-19 detection.
VL4BD and DetectION projects	Covid-19 outbreak tracking and epidemic simulation tools.
H3D-VisionAir	Smart-eye technology offering remote support for doctors and nurses in intensive care units during the Covid-19 crisis
BioPIC	Nanoscopy techniques enabling quick and accurate Covid-19 diagnostics.
TEFPLASNOM	Raman spectroscopy based technology for real-time detection and identification of the SARS-CoV-2 virions.
PHIL	Non-invasively image technology for studying the effects of SARS-CoV-2 on organs in vivo, based on endogenous contrast.

More detailed Information:

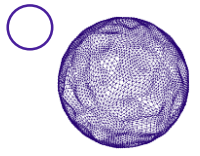
<https://phase1.attract-eu.com/attract-technologies-help-fight-covid-19/>

<https://phase1.attract-eu.com/attract-awardee-launches-new-travel-assistance-website-to-help-fight-covid-19/>

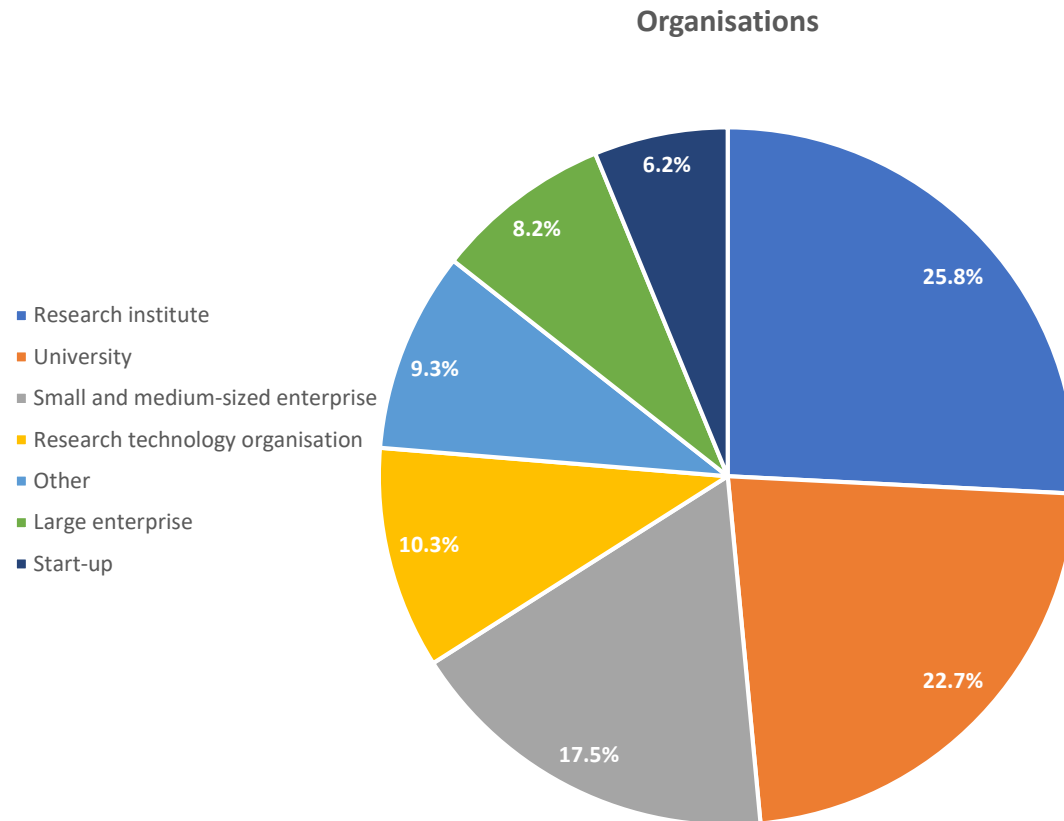


ATTRACT Phase 2 is now in progress

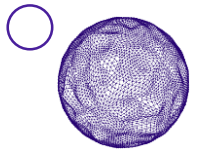
- Three open calls were handled for a total funding of €28 M for funding in accordance with the EC call text:
 - The most promising opportunities arising from ATTRACT Phase 1, for their transition from the lab to the market;
 - Young innovators from universities developing ideas and prototypes for social innovation in collaboration with professional researchers within the ATTRACT ecosystem based on Design Thinking methodologies.
 - Professional scholars undertaking a socio-economic study of the ATTRACT initiative.
- The evaluation process of the calls, by three different and call-related Independent Committees, has concluded and all the projects have started.
- The different Independent Committees have selected for being funded:
 - 18 R&D&I projects.
 - 8 projects contributing to the overall Socioeconomic study of the ATTRACT initiative.
 - 10 projects financing ideas and prototypes of Young Innovators.



Update on ATTRACT Phase 2: Some preliminary statistics (18 R&D&I funded projects)

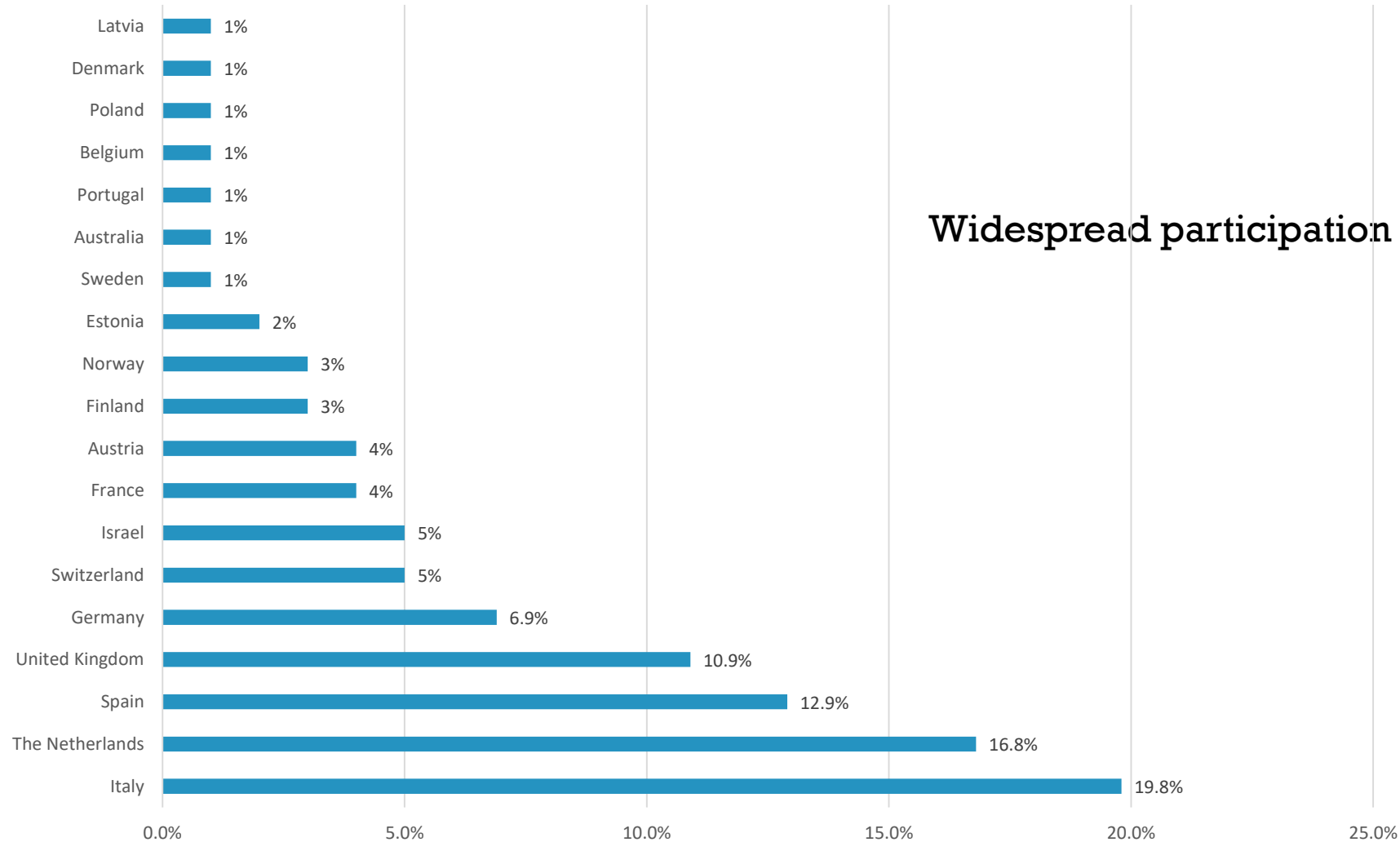


Strong Industrial participation (32%).

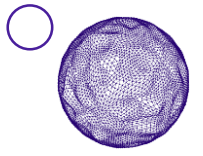


Update on ATTRACT Phase 2: Some preliminary statistics (18 R&D&I funded projects)

Distribution by country

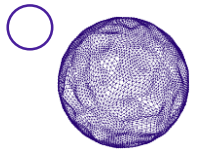


Widespread participation among EU MS and AC



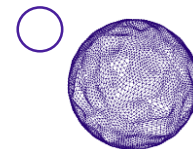
A new round of Phase 1(B): ATTRACT EIC Innovation Ecosystems

- The ATTRACT Consortium responded to the 5M€ call launched by the EIC Innovation Ecosystems: *HORIZON-EIE-2021-SCALEUP-01-02: Scaling up deep tech ecosystems.*
- It was approved by the EC and the Grant Agreement is now for signing.
- This new development of the ATTRACT initiative will specially focus on:
 - Breakthrough technologies from fundamental science applied to Sustainability Challenges, thus in connection with EC's key strategic initiatives such as the Green Deal.



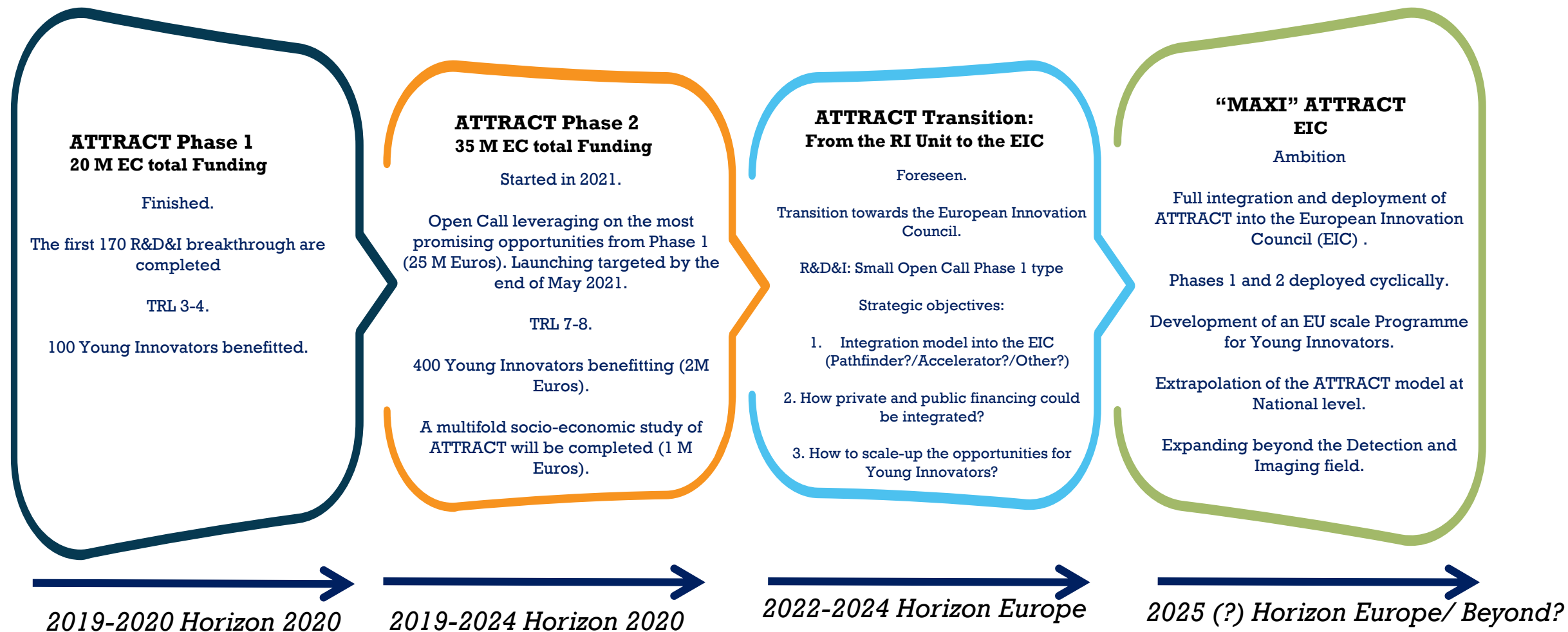
Some reflections

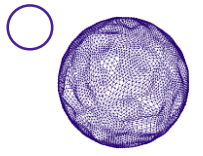
- The ATTRACT initiative is consolidated as a framework for deploying an Innovation Ecosystem in Europe in the field of breakthrough detection and imaging technologies.
- The first quantitative and qualitative evidence indicates that ATTRACT is contributing to accelerate the translation of science-driven technologies to the market.
- The continuous support of the EC, both through the Framework Programmes, but as well with expertise, is key.
- As the EC very well knows, it takes a great effort to build an innovation ecosystem, but very little one to let it die if the nurturing and willingness disappears.



ATTRACT: How we are deploying it? What's next?

“From R&D&I communities to brimming Ecosystems”

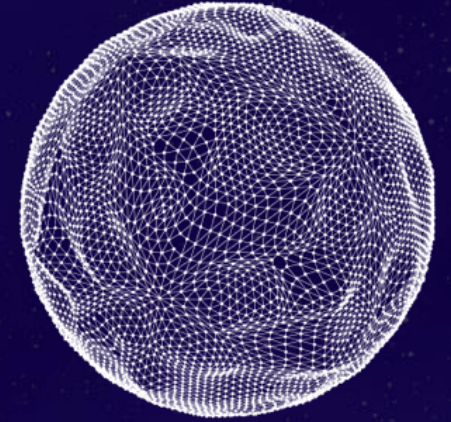




ATTRACT Phases 1 & 2: More Information

<https://attract-eu.com/>

- ATTRACT Phase 1 Facts and Figures: <https://attract-eu.com/facts-and-figures/>
- Phase 1 Funded Projects: <https://phase1.attract-eu.com/showroom/projects/>
- Phase 1 Young Innovators' Projects: <https://phase1.attract-eu.com/showroom/student-projects/>
- Phase 2 Funded R&D&I Projects: <https://attract-eu.com/attract-calls/rdi-projects-thematic-call/>



Thanks!



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