



Norwegian CERN technology activities and opportunities

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12 September 2022

Outline

- **Norwegians@CERN**
- **Industrial activities**
- **Knowledge transfer activities**
- **CERN innovation outreach**
- **Funding opportunities**

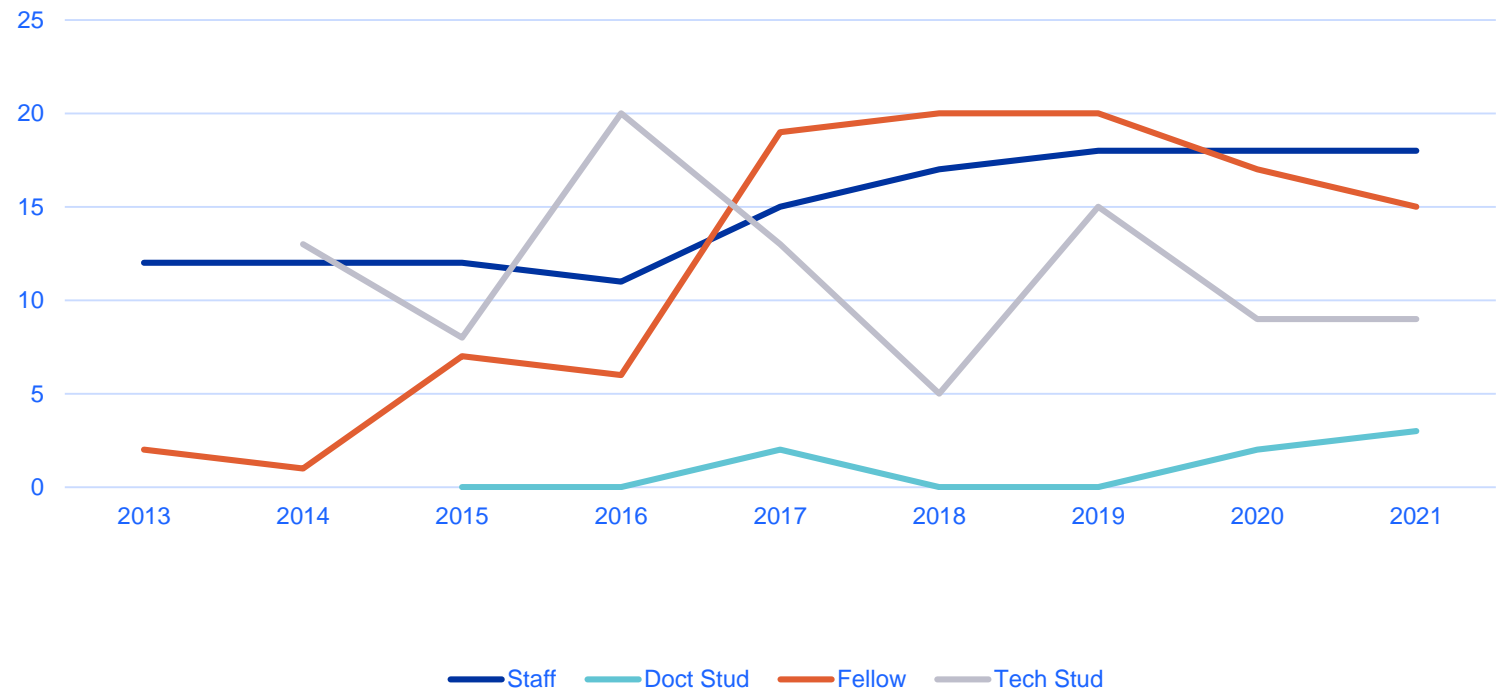
Norwegians@CERN

NO 2021 contribution: 2.24%

	NO	CERN		% (wrt MS/AMS)
		MS/AMS	NMS	
ADMIN		27	0	0%
COAS	2	151	33	1%
DOCT	3	236	5	1%
FELL	15	745	41	2%
SASS		34	4	0%
PJAS	3	189	29	2%
STAFF	18	2663	11	1%
TECH	9	179	0	5%
TRNE		121	3	0%
Visiting Scientists	2	450	122	0%
Grand Total	52	4795	248	1%
		5043		

Data 24 November 2021
NO 1st nationality

Norwegians@CERN



Industrial activities

Norwegian suppliers in the following areas:

- Mechanical production and machining
- Electronics
- Electro mechanics/ Mechatronics
- Cranes
- Switchboards
- IT equipment
- Special products/software

ILO activities:

- Help CERN identify potential suppliers in Norway
- Organize visits for Norwegian companies at CERN
- Organize visits for technical experts and buyers from CERN
- Give the companies support and guidance in negotiations



Some examples of Norwegian suppliers

hapro.

 SINTEF





AARBAKKE 

 SE-TECH A.S. CNC MASKINERING
DREIING/FRESING



smartoptics

 MUNCK CRANES INC.



AS Metallteknikk

 Benestad



 WESTCONTROL
ELECTRONICS



 HTS maskinteknikk

 HMR

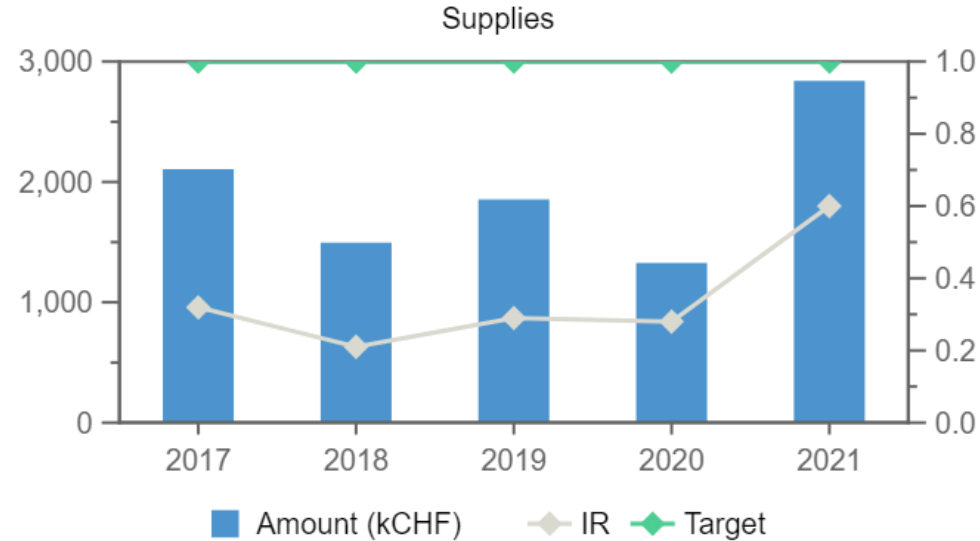
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PASSION FOR PRECISION

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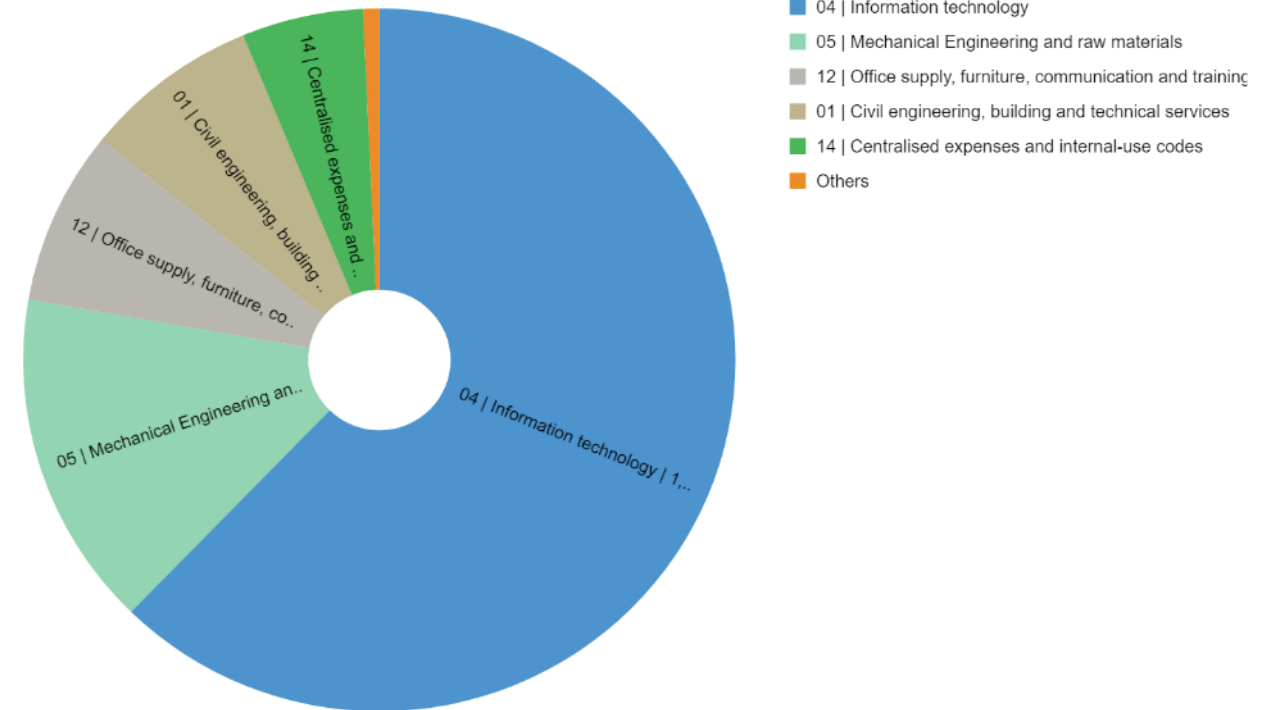


Industrial return and expenditure by activity

Annual Industrial Return



Expenditure by (Activity|Procurement) Code (kCHF)



Norway@CERN 31 May -1 June 2022

- 10 companies participated
- 55 B2B meetings organized
- Most likely this is the last edition of national industry days. In the future the national industry days will be replaced by thematic industry days.

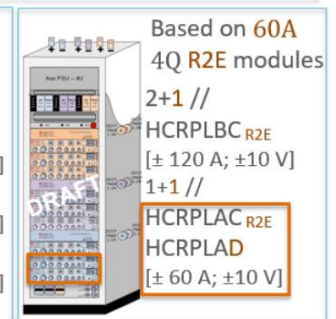
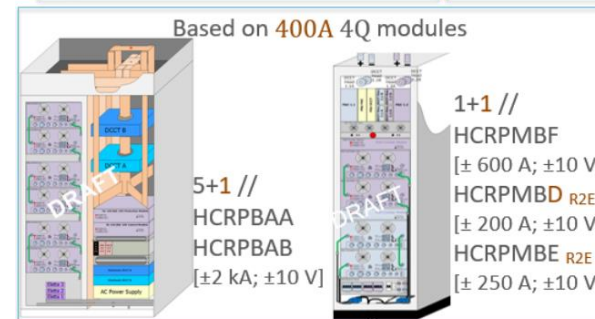
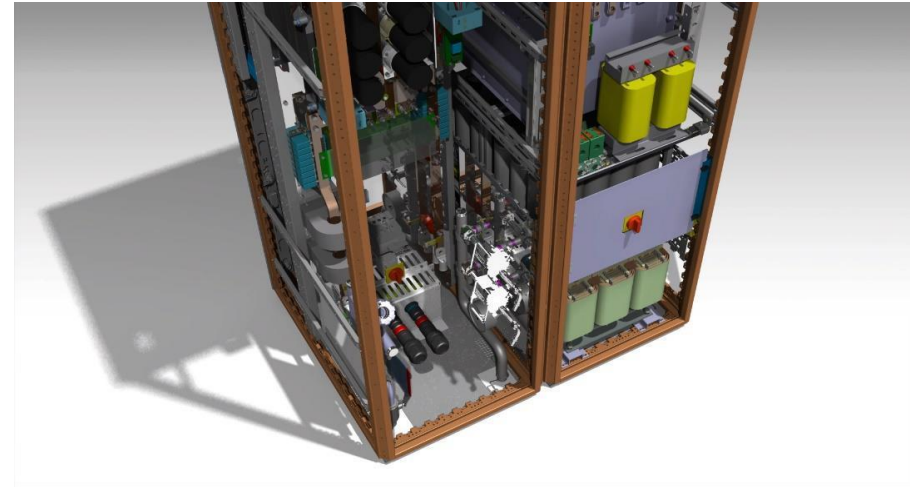


First edition: Thematic industry days

19-20 September 2022

Cabling, assembly and industrialization of electrical cabinets/switchboards, power converters and switchgears

- **Presentations:**
 - Well defined, forthcoming needs
 - Recurrent needs (sourcing takes time, so although the needs are not yet defined; this event gives the possibility to meet new potential suppliers)
 - **B2B meetings with CERN technical staff**
- 5 Norwegian companies will participate**



CERN – NTNU Screening Week



Knowledge Transfer

14 sessions so far

52 technologies screened in total

More than 300 students have visited CERN and worked with the KT group

Providing a large exposure of CERN technologies to Norwegian industry

2021: Virtual event 11-16 October

- 37 students participated
- 3 technologies screened (typically 4-5 / year)
 - EOS – an open-source, remote access data storage
 - SWAP (Smart Wall Pipes and Ducts)
 - CERN VM-FS (CERN Virtual Machine File System)
- **Next edition: 24-28 October 2022**



Video from 2017:

<https://www.youtube.com/watch?v=QLkWpxKkQxQ>

Other KT activities

Normally 1-2 administrative students and 1-2 fellows from Norway each year

1 Norwegian PhD student in KT from NTNU

- “The social impact of CERN’s technological, human, and branding capital”

Norwegian entrepreneurship students as participants in the CERN Entrepreneurship Student Programme (CESP)

- 5 weeks programme for Master's-level students to develop entrepreneurial skills

Also, UiA has a specific interest in Entrepreneur training and education



Knowledge Transfer



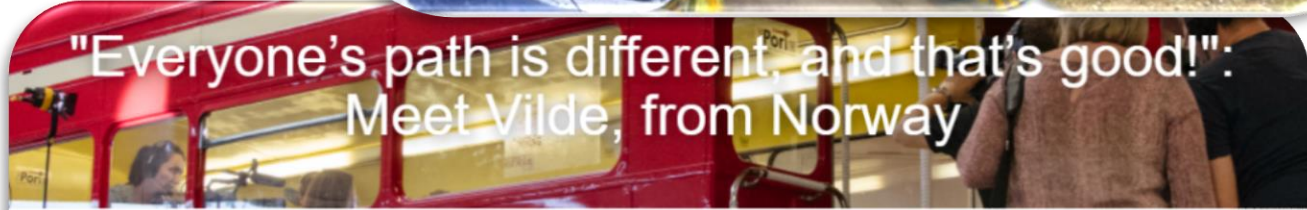
CERNbassadors



"it is a very varied job, and I like that": meet Håvard, electromechanical technician from Norway

“ I get to challenge myself in areas and with technology you don't see any other place in the world. ”

<https://careers.cern/Haavard>



"Everyone's path is different, and that's good!": Meet Vilde, from Norway

<https://careers.cern/vilde>

“ The only approach that will make you happy in the end is finding what truly motivates you. ”

Hi there, I'm Vilde from Norway, and I'd like to share the story of how I ended up at CERN, and how my life has changed because of it.



Technology & Innovation - An overview over outreach opportunities

WP Technology

Applying the science

The technology WP in NorCC wants to develop a strategy to increase the relevance of Norwegian technology that can be transferred to CERN. We believe that the key to increased CERN relevance, is increased collaboration between Norwegian industry and SME and researchers. The framework in the CERN system is already established and well-functioning, Norwegian actors “just” needs to use it and tap into the opportunities together.

The thematic frame is wide, and we know that Norwegian industry has capabilities and a strong tradition of pioneering technology in the oil & gas/offshore sector – we need this pioneering spirit to develop an effectful impact in CERN. Thematically, the scope can cover applications from medical to aerospace and environment.



Technology Readiness Level (TRL)

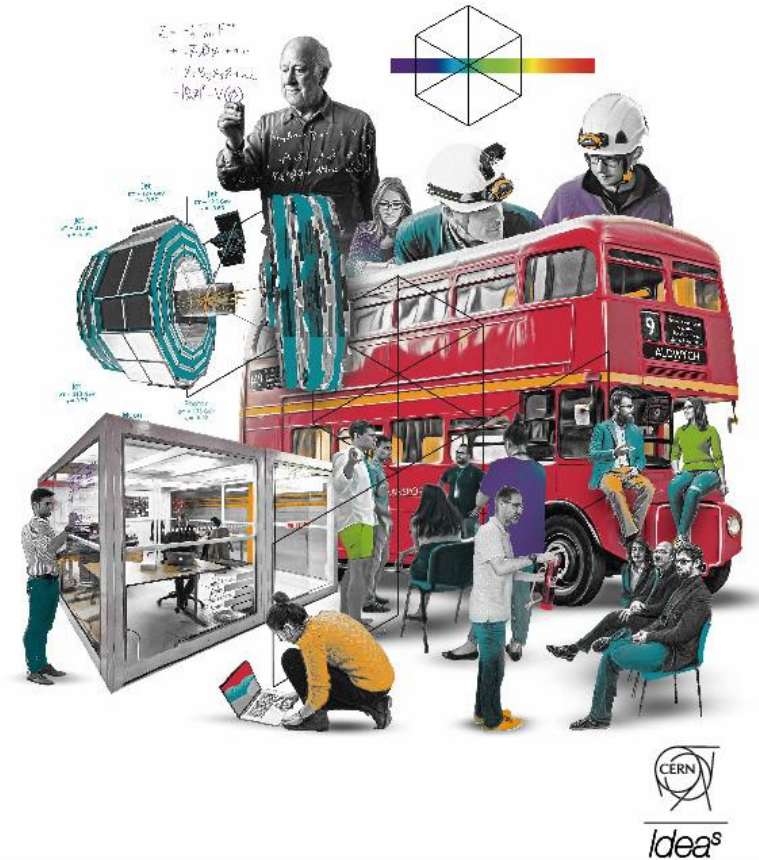
In a strategic frame a well-defined and clear focus on expectations on the readiness level of technology is advantageous to bear in mind. Not only is the TRL focus important to define the right level of content, but it also defines the funding channels. For instance, the Research Council of Norway is focused on TRL 1 to 4, whilst Innovation Norway will focus on 5 to 8. In the EU system, Horizon Europe Pillar 1 is TRL 1-2, Pillar 2 is TRL 3-4 and Pillar 3 is TRL 5-8.

TECHNOLOGY READINESS LEVEL (TRL)

RESEARCH DEVELOPMENT DEPLOYMENT	9	ACTUAL SYSTEM PROVEN IN OPERATIONAL ENVIRONMENT
	8	SYSTEM COMPLETE AND QUALIFIED
	7	SYSTEM PROTOTYPE DEMONSTRATION IN OPERATIONAL ENVIRONMENT
	6	TECHNOLOGY DEMONSTRATED IN RELEVANT ENVIRONMENT
	5	TECHNOLOGY VALIDATED IN RELEVANT ENVIRONMENT
	4	TECHNOLOGY VALIDATED IN LAB
	3	EXPERIMENTAL PROOF OF CONCEPT
	2	TECHNOLOGY CONCEPT FORMULATED
	1	BASIC PRINCIPLES OBSERVED

Ideasquare

IdeaSquare
The innovation space at CERN
Progress Report 2019-2020

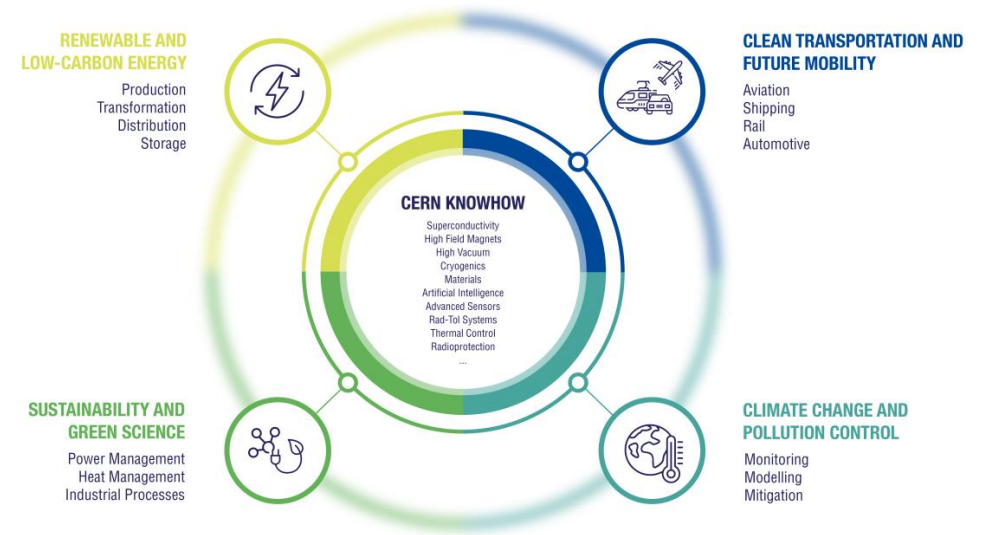


IdeaSquare is a test facility at CERN that hosts detector research and development projects and facilitates MSc student programme. Main activities are bootcamps for students that aims to connect curious minds to accelerate ideas through collaboration, R&D prototyping and development projects.

- Educational programmes
- Prototyping facilities
- R&D&I
- EU projects
- Events
- Knowledge innovation

CIPEA

The CERN Innovation Programme on Environmental Applications (CIPEA) will harness CERN's innovation potential in environmental technologies. The primary objective of the programme is to encourage CERN experts to come up with ideas for environmental applications based on CERN's technologies, know-how and facilities. Hopefully, some of these ideas will give rise to impactful projects in collaboration with external partners.



Green Village

Green Village features a residential building, offices, a hotel and a conference center - all designed with a careful eye for the future. Technological innovation, integrated spaces for living and working, ease of access that emphasizes soft mobility. With distinctive architecture, pathways leading through the park, and squares for meeting outdoors, Green Village is designed to foster meaningful interaction among all who live, work or visit there.

Are currently looking for pilots within: Smart Energy, Improved Waste Management, Green and Smart Mobility.



CERN OpenLab

CERN openlab is a unique public-private partnership that works to accelerate the development of cutting-edge ICT solutions for the worldwide LHC community and wider scientific research. Through CERN openlab, **CERN** collaborates with leading ICT companies and research institutes.

Organises summer schools for students focus on advanced IT/computing, high-energy physics and HW/SW technology.



Knowledge Transfer

The Knowledge Transfer group at CERN aims to engage with experts in science, technology and industry in order to create opportunities for the transfer of CERN's technology and know-how. The goal is to accelerate innovation and maximize the global positive impact of CERN on society. This is done by promoting and transferring the technological and human capital developed at CERN. The CERN KT group promotes CERN as a centre of technological excellence and promotes the positive impact of fundamental research organisations on society.



ATTRACT

The programme's co-innovation approach seeks to act as a bridge between two communities – research and industry – with apparently different motivations and goals for undertaking research and development and innovation (R&D&I). This approach hinges on:

The identification of win-win opportunities for both research and industrial actors, during the very early stages of the innovation value chain (TRL). The strengthening of mutual trust, cooperation and interdisciplinary blending, along the later stages of the innovation cycle (i.e. TRL 4 and beyond).

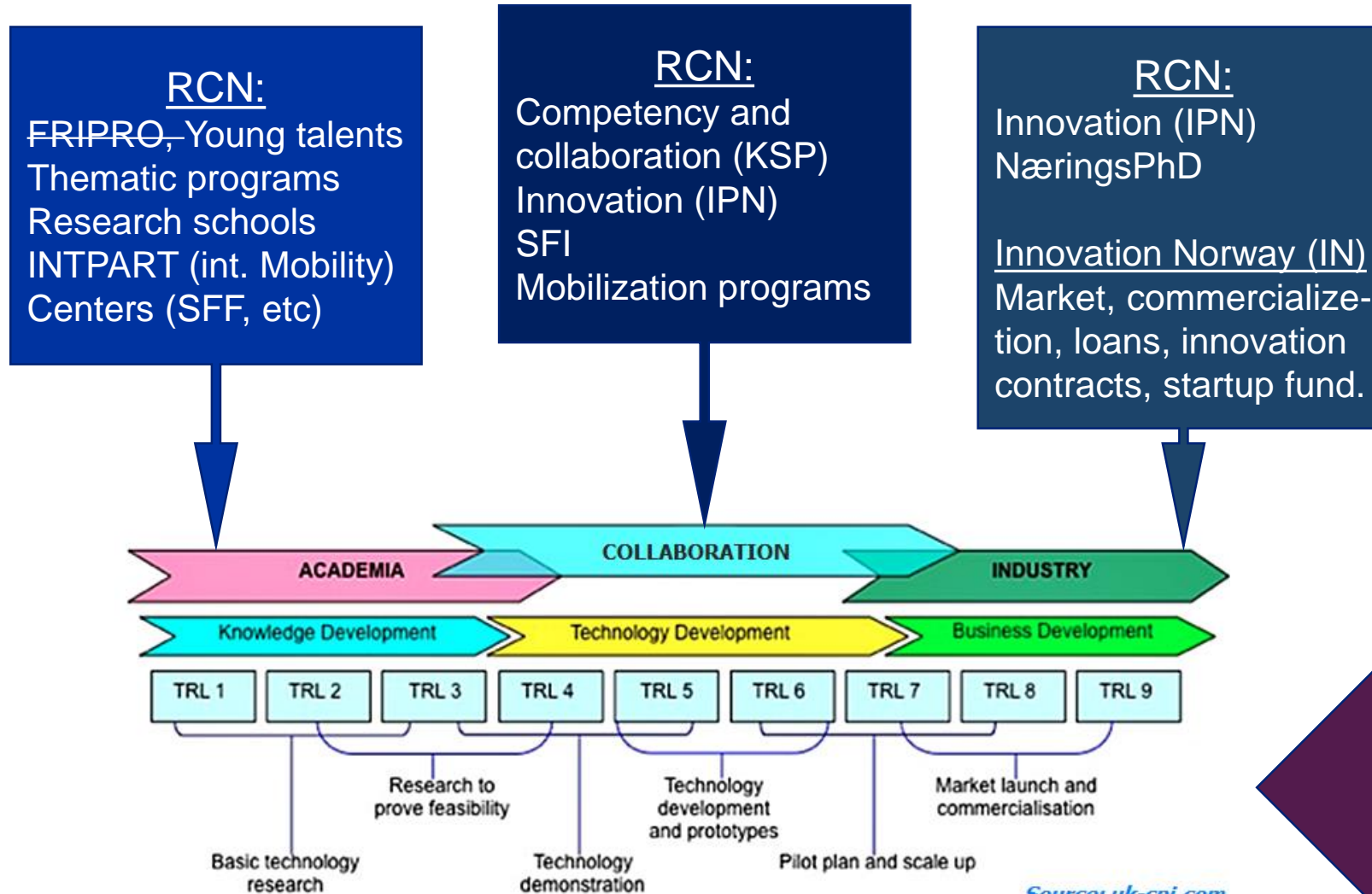
The hypothesis, which will be tested in ATTRACT phase 2, is whether the overall benefit of co-innovation provides:

- The shortening of time for ideas and concepts generated by fundamental science to produce a tangible benefit for industry and society.
- The enhanced generation and availability of cutting-edge commercialized instruments that advance fundamental science.

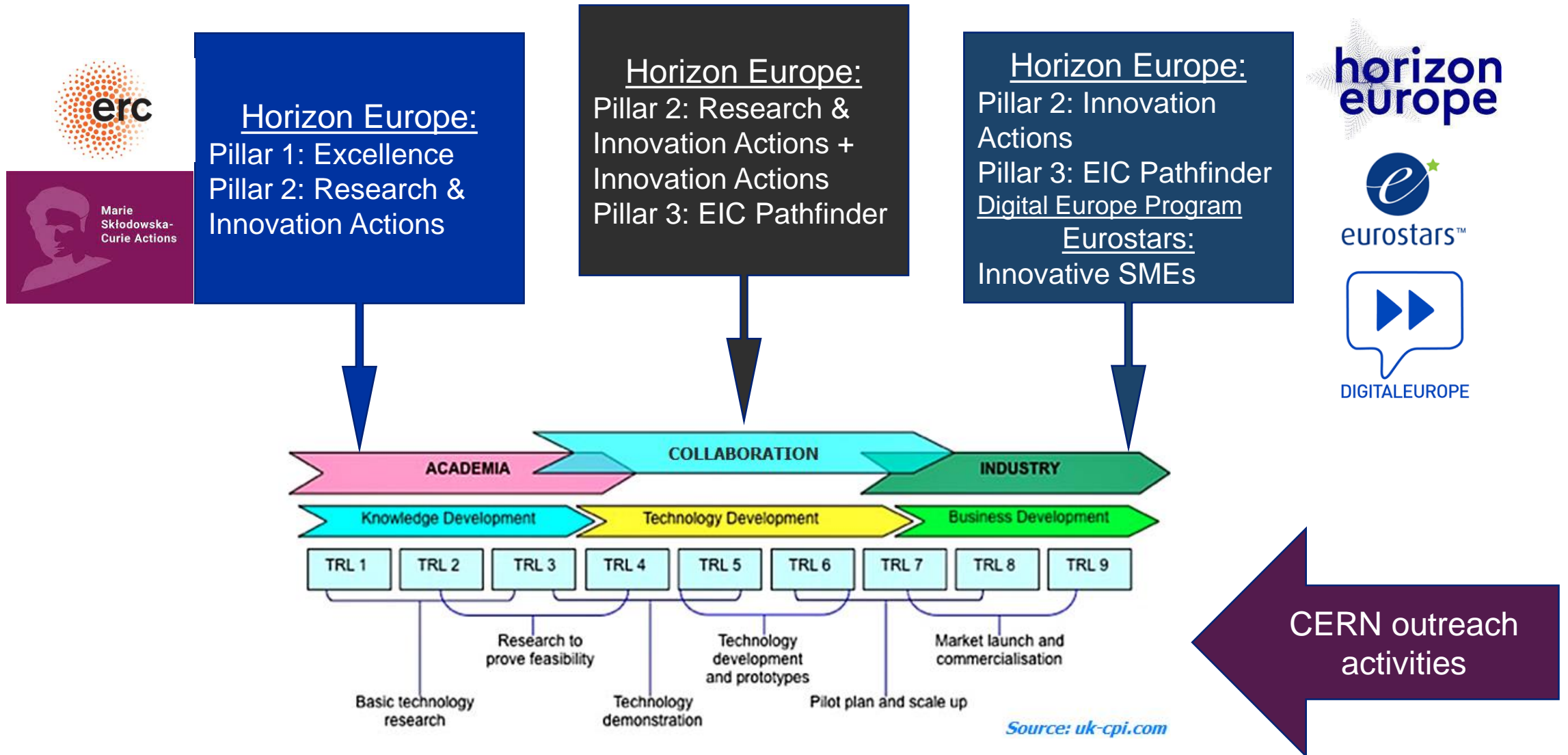


Systematizing serendipity for big science infrastructures: the ATTRACT project

Funding opportunities -> Norwegian sources



Funding opportunities -> European sources



Prerequisites for successful technology development project

- **Interest from CERN**

- “CERN Ambassador” with budget and time

Or

- Project with KT Group/CERN IdeaSquare/CERN Openlab/Green Village

- **Interest from Norwegian researchers**

+ funding and time

And/Or

- **Interest from Norwegian industry**

- The company needs to earn money or get access to valuable technology

Possibilities?

Detector/Readout electronics

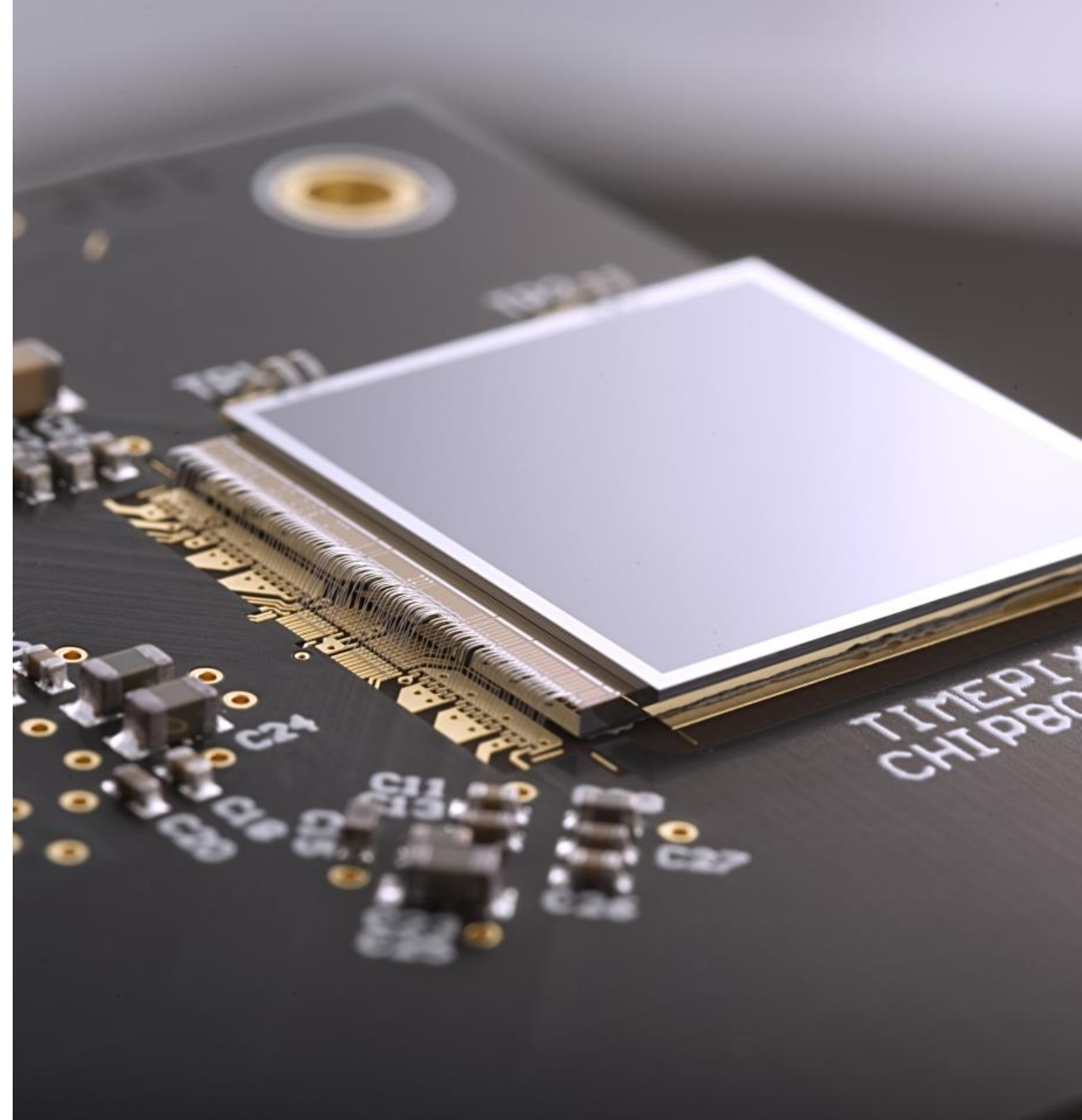
- Research groups: UiO, UiB
- Industry: IDEAS, SINTEF Minalab

Medical analysis and treatment

- Research groups: UiO, UiB, (NTNU)
- Interest from hospitals: (Haukeland, Oslo University Hospital ...)

Big data/Machine Learning

- Research groups: UiO, UiA, NTNU, HVL...
- Interest from industry: Inmeta, SINTEF Digital



Possibilities?

Power Supplies

- Two current CERN PhD projects, NTNU
- Industry: Eltek (1000 employees), large provider of advanced power supplies to CERN



Vacuum/Gas systems

- Research groups: NTNU, UiA, UiS
- Industry: Pipeotech, Process industry

Green Technologies?

- CERN “Green Village” project and CIPEA



How can the Norwegian CERN community become more engaged in the opportunities?

01

Create interfaces

02

Engage engineers and data scientists

03

Involve industrial clusters

04

Consider Norwegian ATTRACT «like» program

05

Display examples