‘Accelerator and Magnet Infrastructure for Cooperation and Innovation’

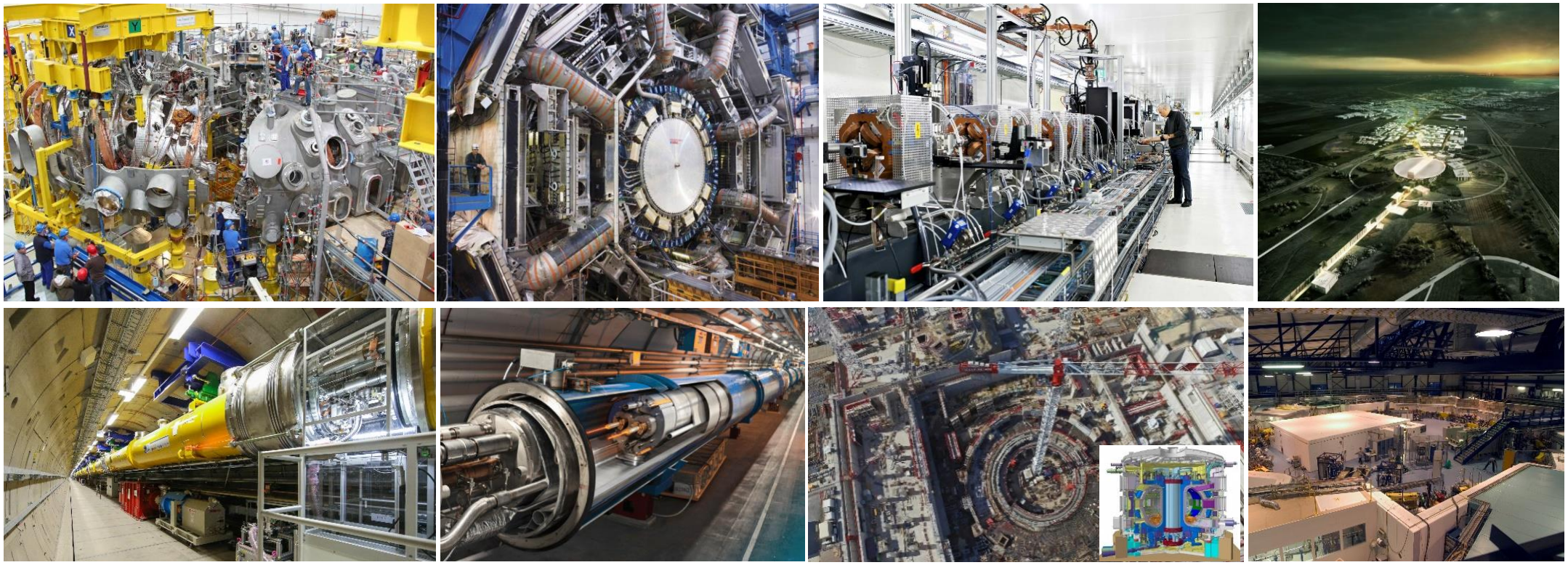
Olivier Napoly, coordinator

Objectives and Main Results

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION
Research infrastructure

AMICI is about European leadership in Big Science,

based on accelerator and SC magnet



in a sometimes collaborative, sometimes competitive spirit with our strong N. American and Asian contenders.

AMICI (Jan. 2017 – Oct. 2019)

EUROPEAN COMMISSION
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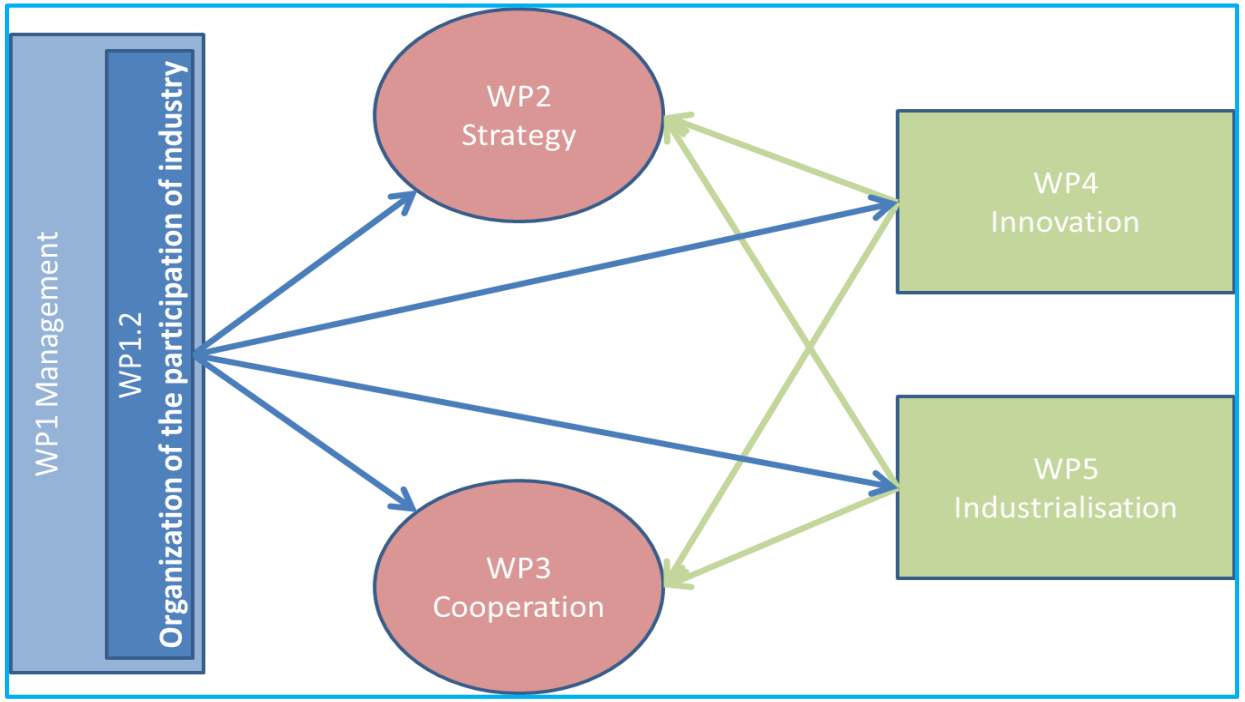
Research infrastructure

AMICI, for '**Accelerator and Magnet Infrastructure for Cooperation and Innovation**', is an Horizon 2020 '**Coordination and Support Action**' project, funded by the EC.

Its general goal is to propose a model for the sustainability of the Technology Infrastructure dedicated to Accelerators and Superconducting Magnets in Europe, serving **scientific research and innovation**:

- from the National Laboratories standpoint, the focus is on **sustaining the Technology Infrastructure.**
- from the EC standpoint, the focus is on **strengthening Innovation**.

Both aspects are intertwined, and require some level of **strategy** and **cooperation** that AMICI has attempted to bring.



AMICI Consortium

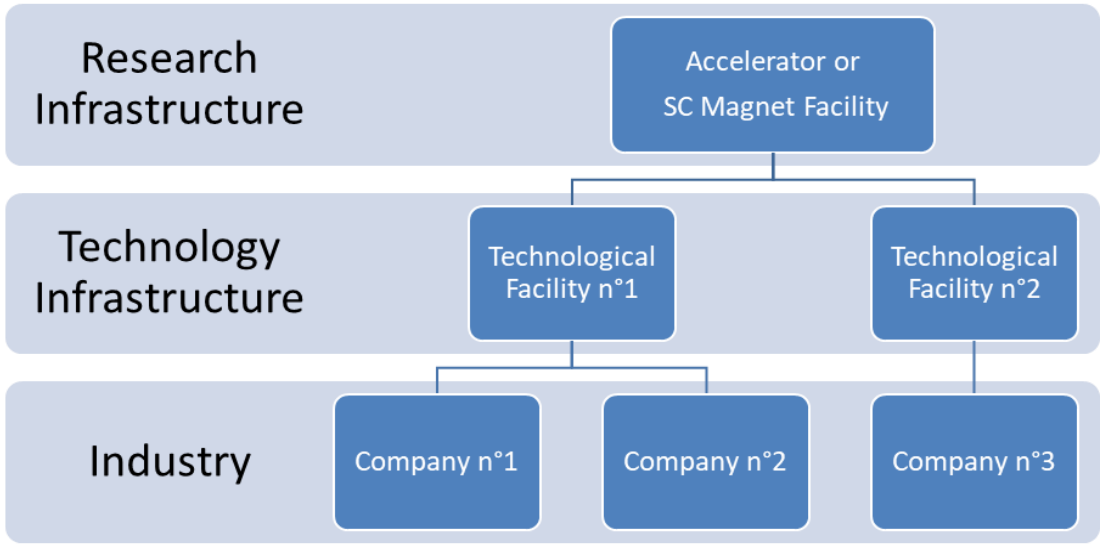
Science & Technology
Facilities Council

PAUL SCHERRER INSTITUT
PSI

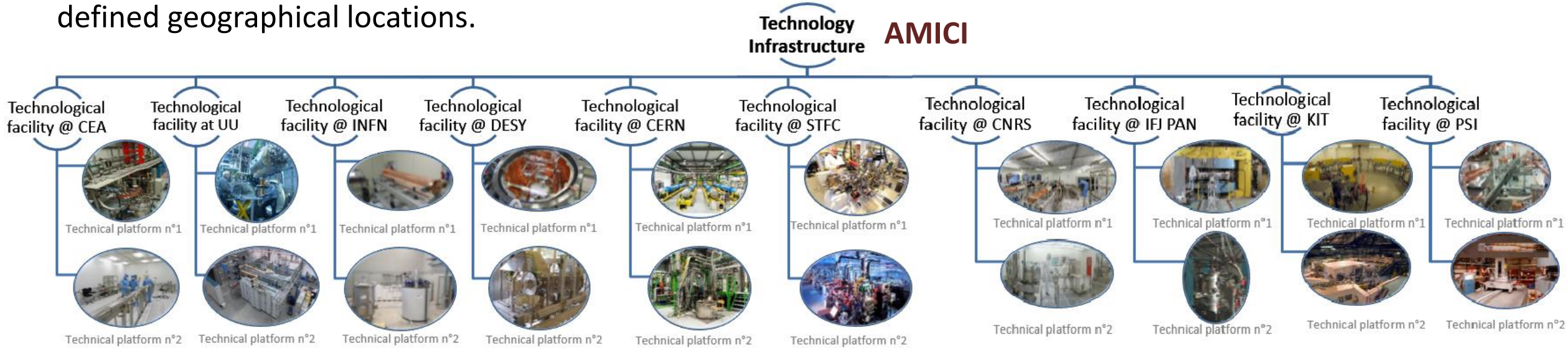
UPPSALA
UNIVERSITET

AMICI, the European Technology Infrastructure

- **Research Infrastructure** – A Research Infrastructure is a facility aimed at conducting top-level research activities in a given scientific field.
- **Technology Infrastructure** – A Technology Infrastructure is a network of Technological Facilities that are used for the construction of Research Infrastructures
- **Technological Facility** – A Technological Facility is a cluster of Technical Platforms that belong to an institute, at well-defined geographical locations.

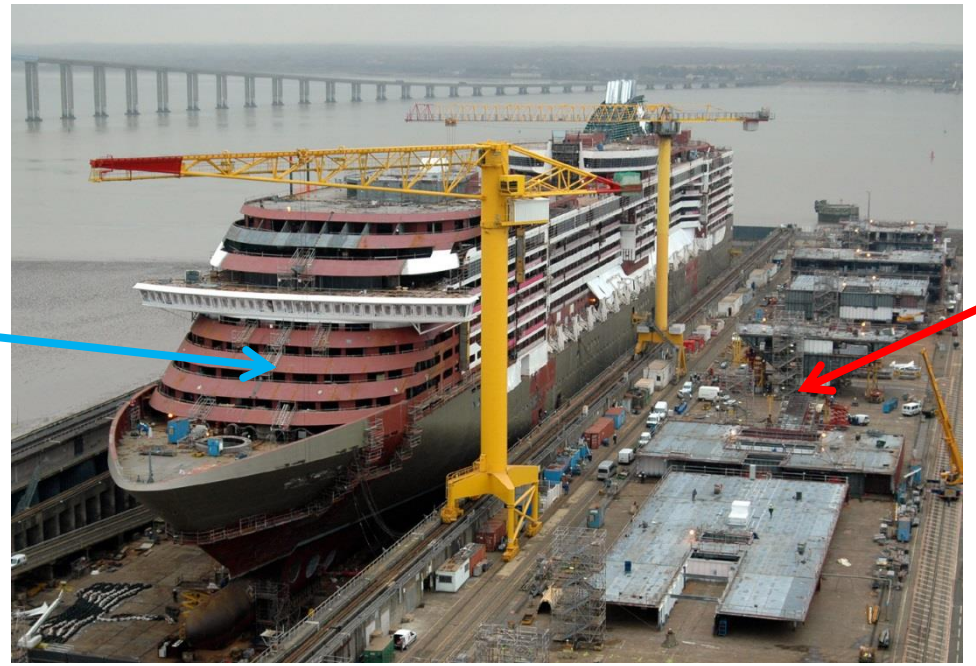


AMICI



Recollection from the Kick-Off Meeting

'**RI**' with its own funding plan for construction and operation: a bright future !



'**TI**' with intermittent funding plan: a bright future thanks to AMICI !

Objectives from Kick-Off Meeting vs. *Results*

The AMICI project will ensure that:

A) a stronger and optimised integration commitment model between the large existing technological facilities (TFs) is developed and agreed upon,

- *(WP2) Conditions for the sustainability of the TFs have been analyzed showing that support from the European science and technology funding agencies is crucial and that a better coordination of efforts, avoiding unnecessary duplication but covering, in an optimized and cost-efficient way, all significant needs for the technology developments required by the new frontline Research Infrastructures would be welcome.*
- *(WP3) Founded on a collaboration agreement between core AMICI partners, a networking model between the main stakeholders (Industry, National Laboratories, Universities and Research Infrastructures) has been proposed which would:*
  - *guaranty the sustainability of the European TI,*
  - *contribute to overcome the identified barriers between TFs and industry, and*
  - *establish an ecosystem that would maintain Europe at the forefront of science and innovation.*

Objectives from Kick-Off Meeting vs. *Results*

The AMICI project will ensure that:

B) this integrated ecosystem is attracting industries and is fostering innovation based on accelerator and SC magnets cutting-edge developments,

- *(WP4) Relations with industry has been analyzed and barriers for a stronger engagement between TFs and industry identified. Propositions to overcome these barriers were made which would result in a transition from a primarily RI-driven model to a broader ecosystem supporting enhanced partnership with Industry.*
- *(WP5) The conditions for the involvement of the industry in the prototyping phase have been investigated, showing that industry should be associated as early as possible to the design for future products beyond the scope of the specific prototyping activities, and respecting a subsidiarity principle, i.e. favoring developments in industry whenever possible.*

Objectives from Kick-Off Meeting vs. *Results*

The AMICI project will ensure that:

B) this integrated ecosystem is attracting industries and is fostering innovation based on accelerator and SC magnets cutting-edge developments,

- *(WP5) A possible structure and content for a common data base for materials and components has been proposed, which would allow sharing the knowledge acquired within the TFs.*
- *(WP5) The benefit and conditions of apprenticeship has been evaluated both for industry personnel trained at the Technology Infrastructure and for scientific staff trained at company sites. The importance of well-understood and functional System Engineering and Quality Assurance plans was recognized as another powerful mean to improve the quality of industrial products and services received by the Technology Infrastructure for the construction of Research Infrastructures.*

Objectives from Kick-Off Meeting vs. *Results*

The AMICI project will ensure that:

C) that strategy and roadmaps are clearly defined and understood to strongly position European industries and SMEs on the market of the construction of new Research Infrastructures worldwide

- *(WP1) The different Technical Platforms have been mapped with their characteristics and functionalities*
- *(WP2) The global landscape of future accelerator and magnet based RIs has been described*
- *(WP2) Key Technological Areas for the construction of future RIs have been identified and the necessary developments in TFs analyzed*
- *(WP5) A new European Standard "Helium cryostats – protection against excessive pressure" has been developed to be submitted to the European Committee for Standardization CEN. This is seen as an example of procedure that could be applied to other cases.*

Objectives from Kick-Off Meeting vs. *Results*

The AMICI project will ensure that:

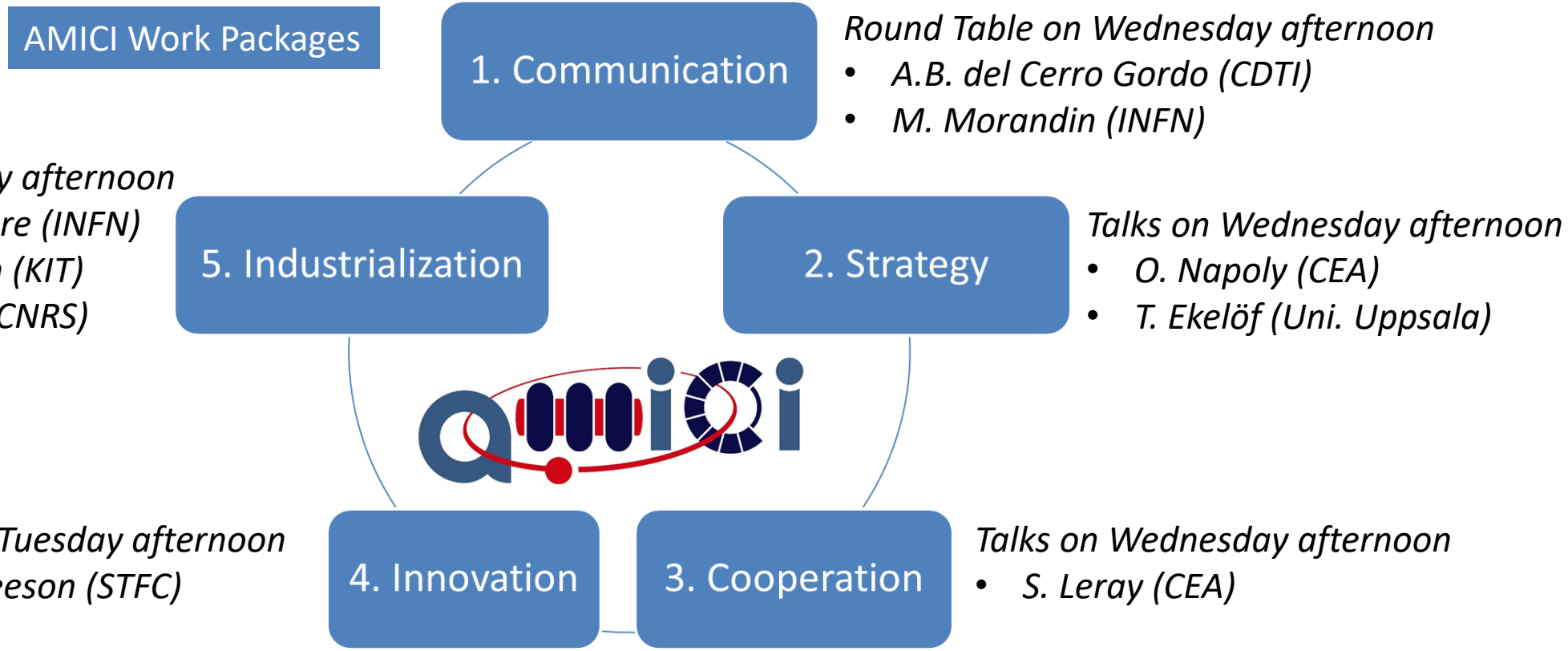
D) that potential societal applications are identified and disseminated to the relevant partners of this ecosystem.

- *(WP4) A survey of potential markets for societal applications has been made, showing that innovation activities between AMICI Partners and Lateral Markets, in order to develop accelerator-related societal applications, have favored the healthcare sector, with some representation in the security sector whilst opportunities for potential developments in the energy sector are comparatively unexplored.* ***The possible role of TFs in their deployment is identified****.*

The Industry Forum (17-18 Sept. 2019, Brussels)

The main goals of this Forum, set in the H2020 Grant Agreement, are as follows:

1) to bring together scientists and industry (~50 participants, ~60 % from industry)
2) to present the work done in the different AMICI Work Packages
3) to discuss the long-term strategy for the Technology Infrastructure



Goals of the Industry Forum

The Forum agenda follows a logical sequence of three themes:

1st Day: ***where we stand***

- reports on the outcome of the work carried out in the AMICI project regarding 'Innovation' and 'Industrialization'
- experience for exploiting AMICI technical platforms
- success stories from some companies who are present.

2nd day, morning: ***the global landscape and future challenges***

- describe the landscape of projects worldwide where involvement of the European technology infrastructure and engagement of industry will be essential
- present the key areas where significant technological developments will be needed

2nd day, afternoon: ***sustaining and exploiting the European Technology Infrastructure***

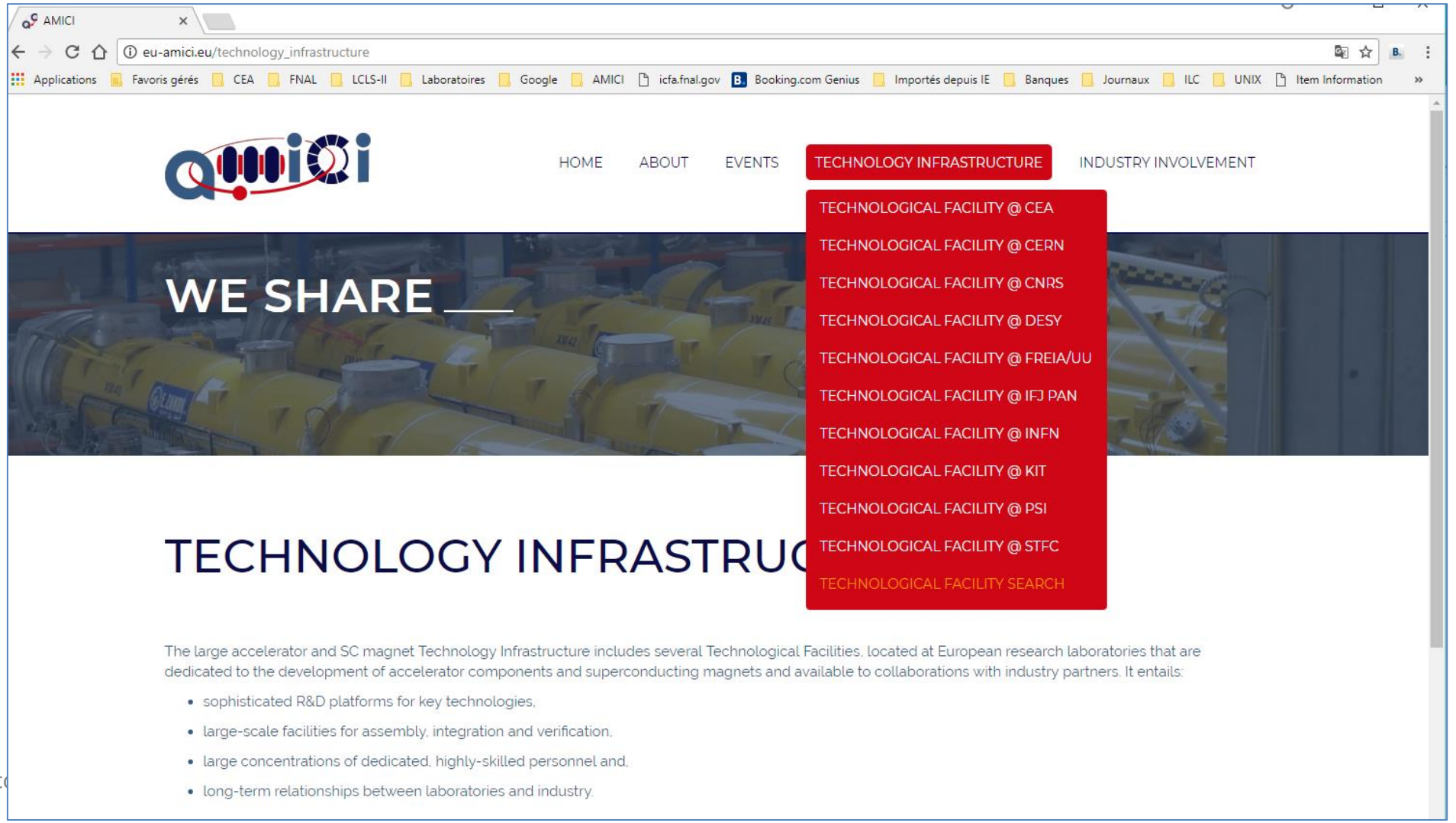
- the rationale for sustainability from the Big Science point of view
- the proposed organization of a European Technology Infrastructure which can provide new services and opportunities of cooperation with industry.

The round table, at the end, provided feedback on the outcomes of this logical process, in particular regarding the plans for the future.

Technical Platforms available to Industry

Main step : http://eu-amici.eu

– **Developing list and description of AMICI TFs**

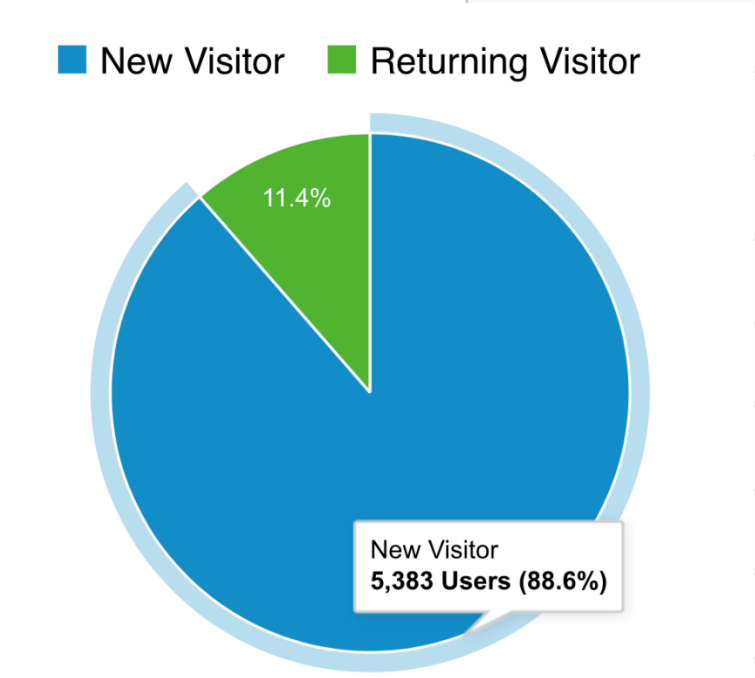


AMICI Web Site

http://eu-amici.eu (created and maintained by IFJ PAN)

Visitors

		5,383 % of Total: 100.00% (5,383)	5,383 % of Total: 100.00% (5,383)
1.	United States	1,492	27.10%
2.	France	568	10.32%
3.	Italy	493	8.95%
4.	Canada	369	6.70%
5.	Germany	321	5.83%
6.	Switzerland	228	4.14%
7.	United Kingdom	193	3.51%
8.	Poland	182	3.31%
9.	China	165	3.00%
10.	Spain	147	2.67%



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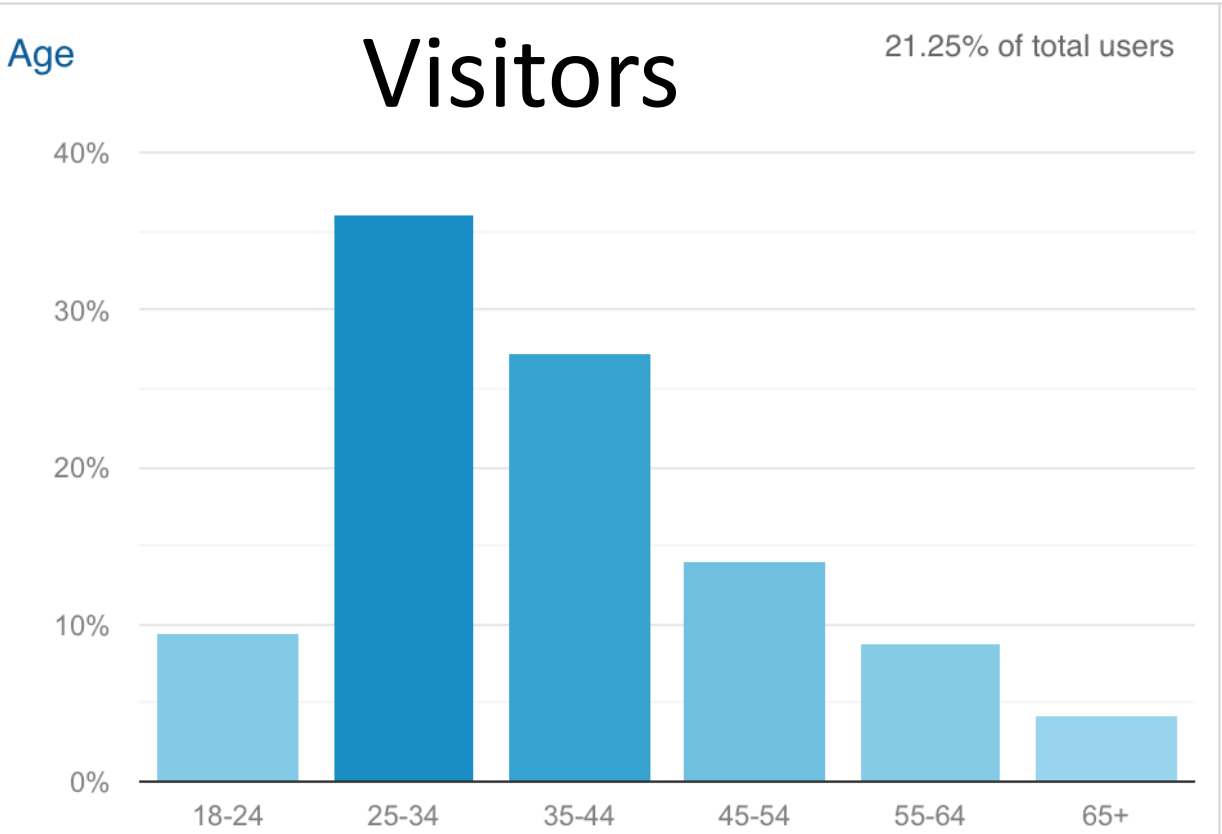
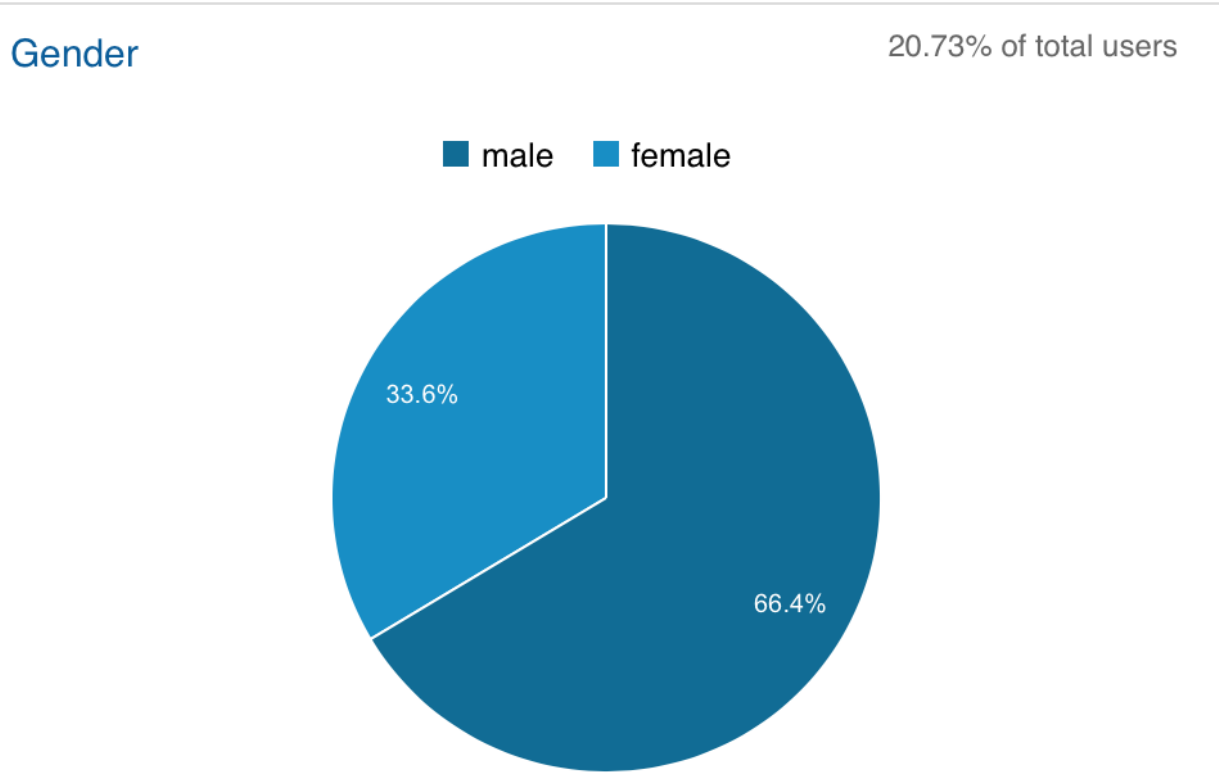
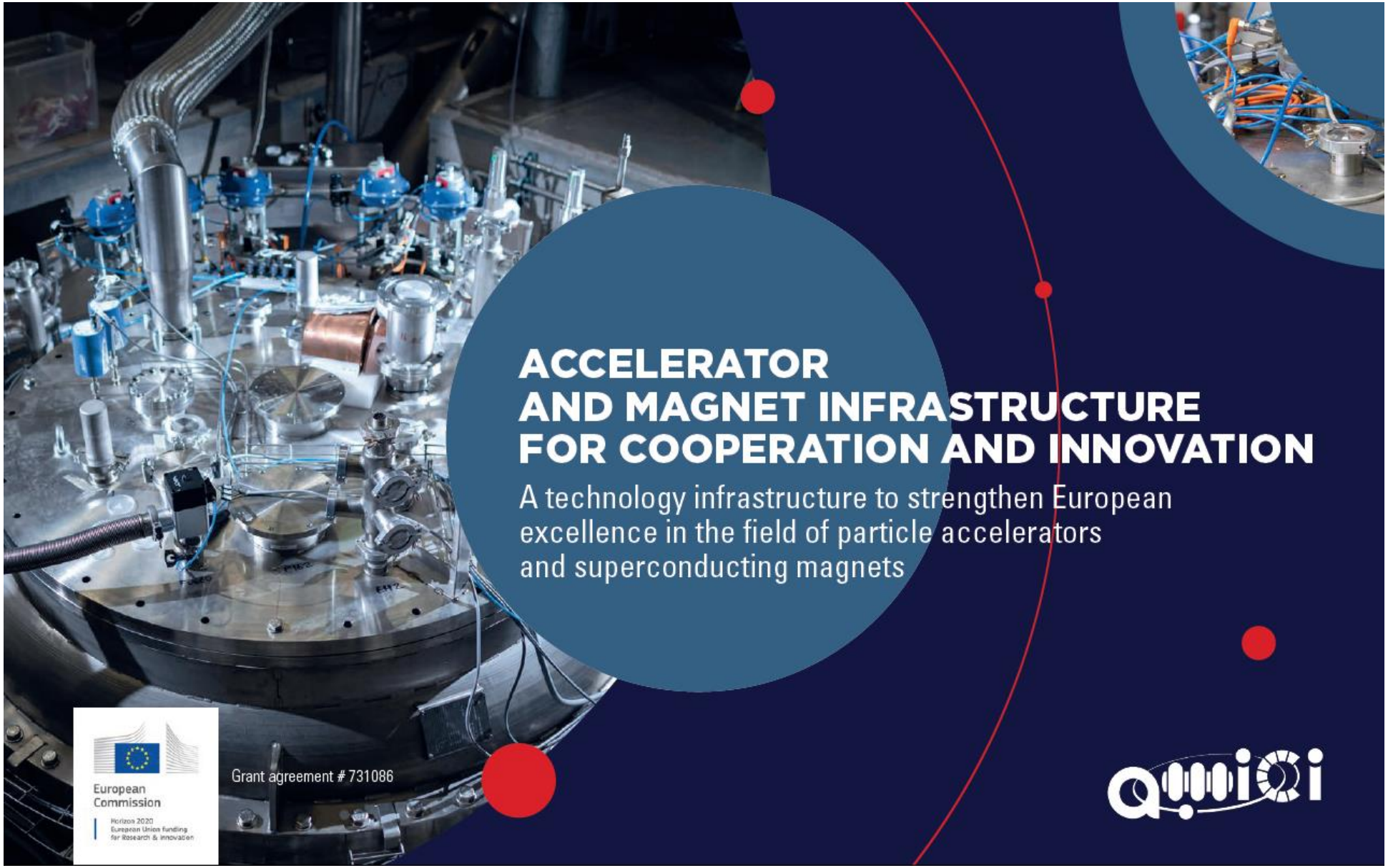




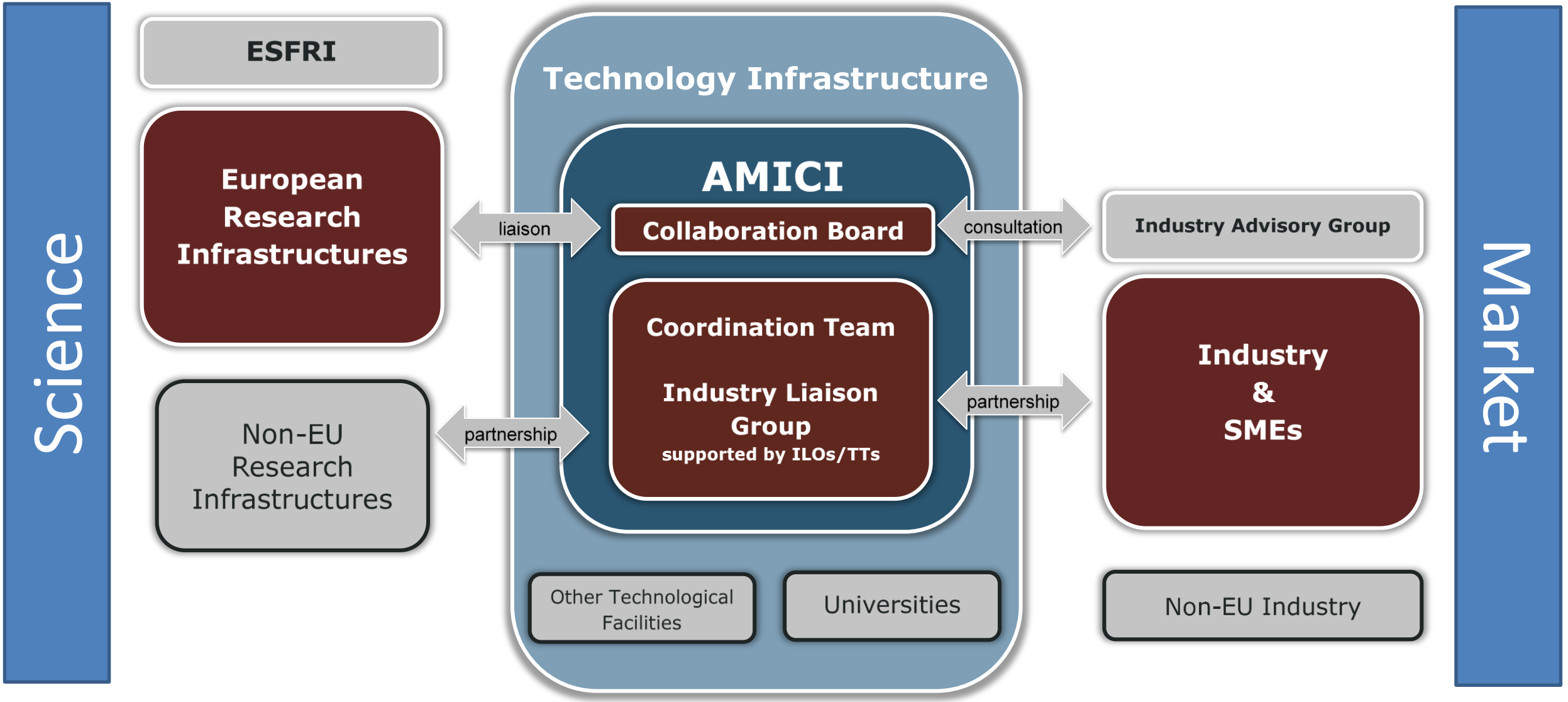
How do we obtain this personal information ???

AMICI Booklet

http://eu-amici.eu/download/Brochure_AMICI.pdf



AMICI Collaboration Agreement



AMICI Deliverables (WP1)

Ref.	N°	Deliverable Name	Deliverable Type	Task	Delivered by Contractor	Initially foreseen (in months)	Achieved (in months)
D1.1	1	Minutes of the Kick-off Meeting	Report	Management	CEA	2	2
D1.2	2	Definition of the participation of industry	Report	Management	INFN	4	4
D1.3	3	Public website with searchable databases and communication tools	Other	Management	IFJ-PAN	11	11
D1.4	4	Minutes from the 1st annual and GA meetings	Report	Management	CEA	12	15
D1.5	5	Progress and financial 1st reports	Report	Management	CEA	18	21
D1.6	6	European Forum on accelerators and SC magnets Technological Infrastructures	Other	Management	INFN	24	33
D1.7	7	Report on dissemination and data management	Report	Management	IFJ-PAN	30	
D1.8	8	Minutes from the 2nd annual and GA meetings	Report	Management	CEA	24	27
D1.9	9	Minutes from the 3rd annual and GA meetings	Report	Management	CEA	30	
D1.10	10	Progress and financial 2nd reports	Report	Management	CEA	30	

AMICI Deliverables (WP2-WP5)

	Deliverable		Due date	Lead beneficiary	Final version	Approval by Coordinator	Approval by the SC	Approval by EC
WP2	D2.1	Report on Key Technological Areas survey and prospective outlook	March 2019	CNRS	Final material (action CNRS)			
	D2.2	Report on the Technological Roadmaps for the different KTA	May 2019	CEA	Final material (action CEA)			
	D2.3	Report on propositions to guarantee the long term sustainability of TIs	June 2019	UU	Final draft in circulation (action UU)			
WP3	D3.1	Report on Eligibility Criteria	Sept. 2018	CEA	Received on 25/09/18	Approved	Approved	Approved
	D3.2	Report on the networking and coordination model	June 2019	IFJ PAN	Received on 03/07/19	Approved	Approved	Approved
	D3.3	Report about the proposed model of collaboration agreement	June 2019	DESY	Received on 12/07/19	Approved	Approved	Approved
WP4	D4.1	Report on accelerator market study	June 2019	STFC	Received on 04/09/19	Approved	Approved	Submitted
	D4.2	Report on SC market market study	Aug. 2019	CEA	Received on 29/08/19	Approved	pending	
	D4.3	Report on best practice collaboration between industry and technology	Aug. 2019	INFN	Received on 09/08/19	Approved	Approved	
WP5	D5.1	Definition of the possible structure and content of a database for materials and components	June 2019	CNRS	Final Draft in circulation (action CNRS)			
	D5.2	Final report on the required conditions for apprenticeships program in TI	June 2019	CEA	Received on 07/09/19	Approved	pending	
	D5.3	General harmonized guidelines for the safety of cryogenic equipment	June 2019	KIT	Received on 17/09/19	Approved	Approved	Submitted
	D5.4	Final report on the required conditions for apprenticeships program in industries	June 2019	INFN	Received on 07/10/19	Approved	pending	
	D5.5	Final report on conditions for developing prototypes in industry	June 2019	INFN	Received on 10/09/19	Approved	Approved	Submitted

Conclusions (anticipating on WP presentations to follow)

- The AMICI scope of work will be completed and delivered.
- Some material (e.g. Web Site, KTA and TI technology roadmaps, Database, …) lay the foundations of future detailed work, along the evolution of our field.
- Partnership with industry has been central and very active over the past 3 years, but the 'cultural' gap is clearly present. Industry partnership actions to close that gap are the main challenge for the future: working groups, forums, co-innovation, etc…
- *Economics* is far more complex a field than *Physics* and *Technology*: hence, AMICI scientists could/would not design the TI 'business model'. For that purpose, help is needed from outsiders.
- We are convinced that 'particle beams', 'high magnetic fields' and 'cryogenics' are promising ingredients for yet undisclosed innovation and societal applications.
- We introduced the concept of 'Technology Infrastructure' and we believe that it would usefully extend and applies to other communities.