



Research Infrastructures & Industry

What ingredients for a successful relationship?

**Carlo Rizzuto,
ELI-DC AISBL, Director General**

*ELI Workshop - Industrial applications of high-power lasers
Dolní Břežany, Czech Republic, 24-25 May 2018*

- World-leading, most advanced **international laser research infrastructure**
- Funded between **EU (regional development, R&D) and national funds**
- Largest **Research Infrastructure** built in **new EU Countries**
- Recognised as a European priority facility **since 2006** (ESFRI Roadmap)
- An opportunity for European science and industry

Attosecond Laser Science, which will capitalize on new regimes of time resolution (***ELI-ALPS, Szeged, HU***)

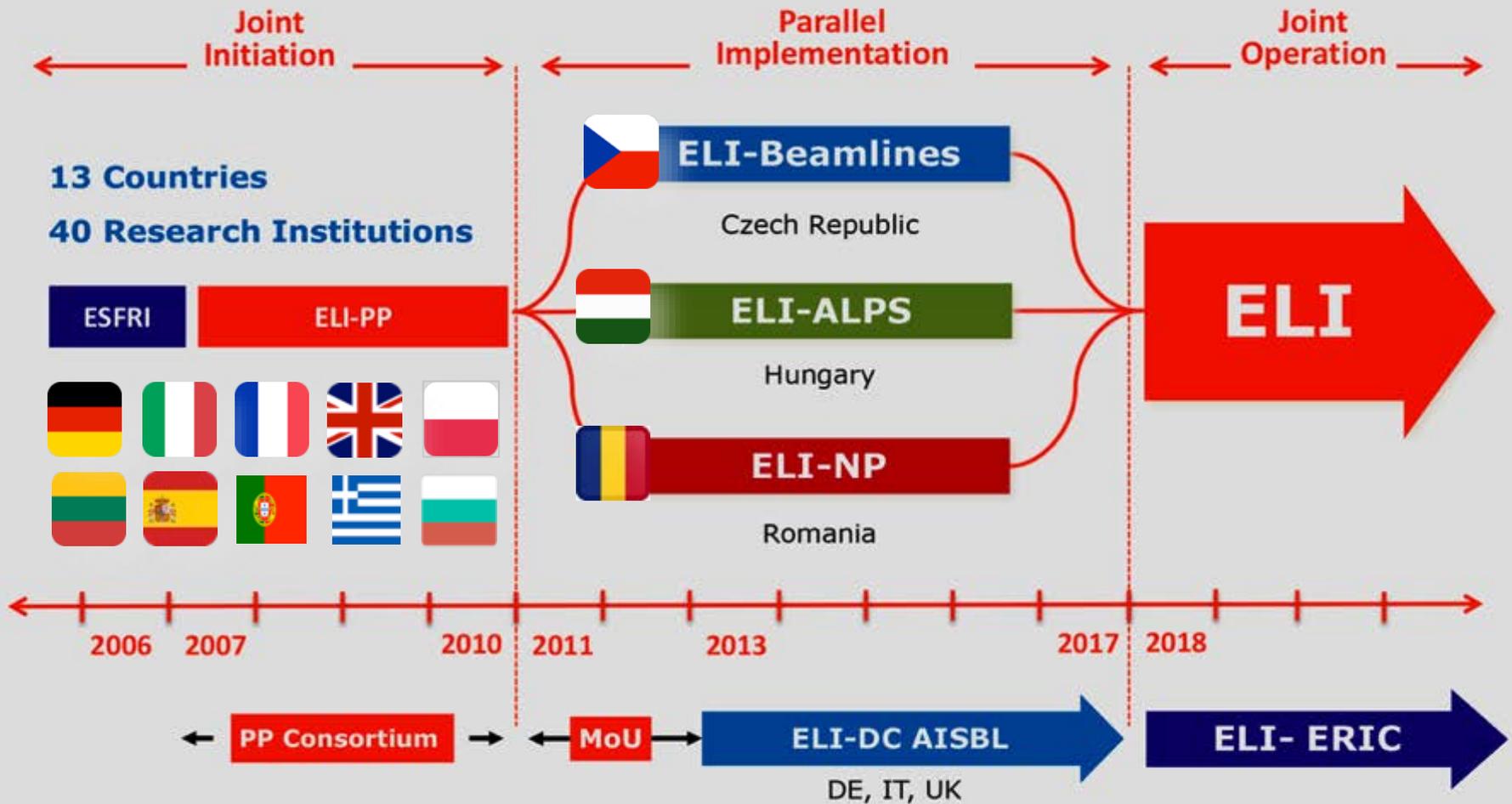
High-Energy Beam Facility, responsible for development and application of ultra-short pulses of high-energy particles and radiation stemming from relativistic and later ultrarelativistic interaction (***ELI-Beamlines, Prague, CZ***)

Nuclear Physics Facility with ultra-intense lasers and brilliant gamma beams (up to 19 MeV) enabling also brilliant neutron beam generation with a largely controlled variety of energies (***ELI-NP, Magurele, RO***)

Ultra-High-Field Science centred on direct physics of unprecedented laser field strength (***ELI 4 TBD***)



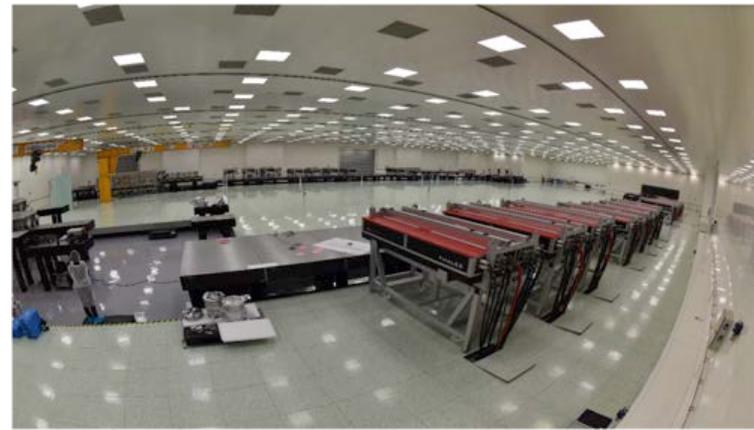
How Did We Get Here?



The ambitious goals of the ELI project required the development of laser sources well beyond the start-of-the art of the technology.

To face these challenges, ELI injected a unprecedented investment in laser technology industry:

- More than **€488 million in contracts**
- Companies from **19 European countries**
- Of that, almost all of the **€200 million in technology contracts** outside the Host countries.



Some of the technology challenges addressed by ELI

- High average power, high efficiency laser diodes for the amplifiers.
- High average power operation of the laser amplifiers.
- Large diameter, high quality optical components (mirrors, crystals, diffraction gratings)
- Reliable operation of large and complex machines thanks to control command systems.

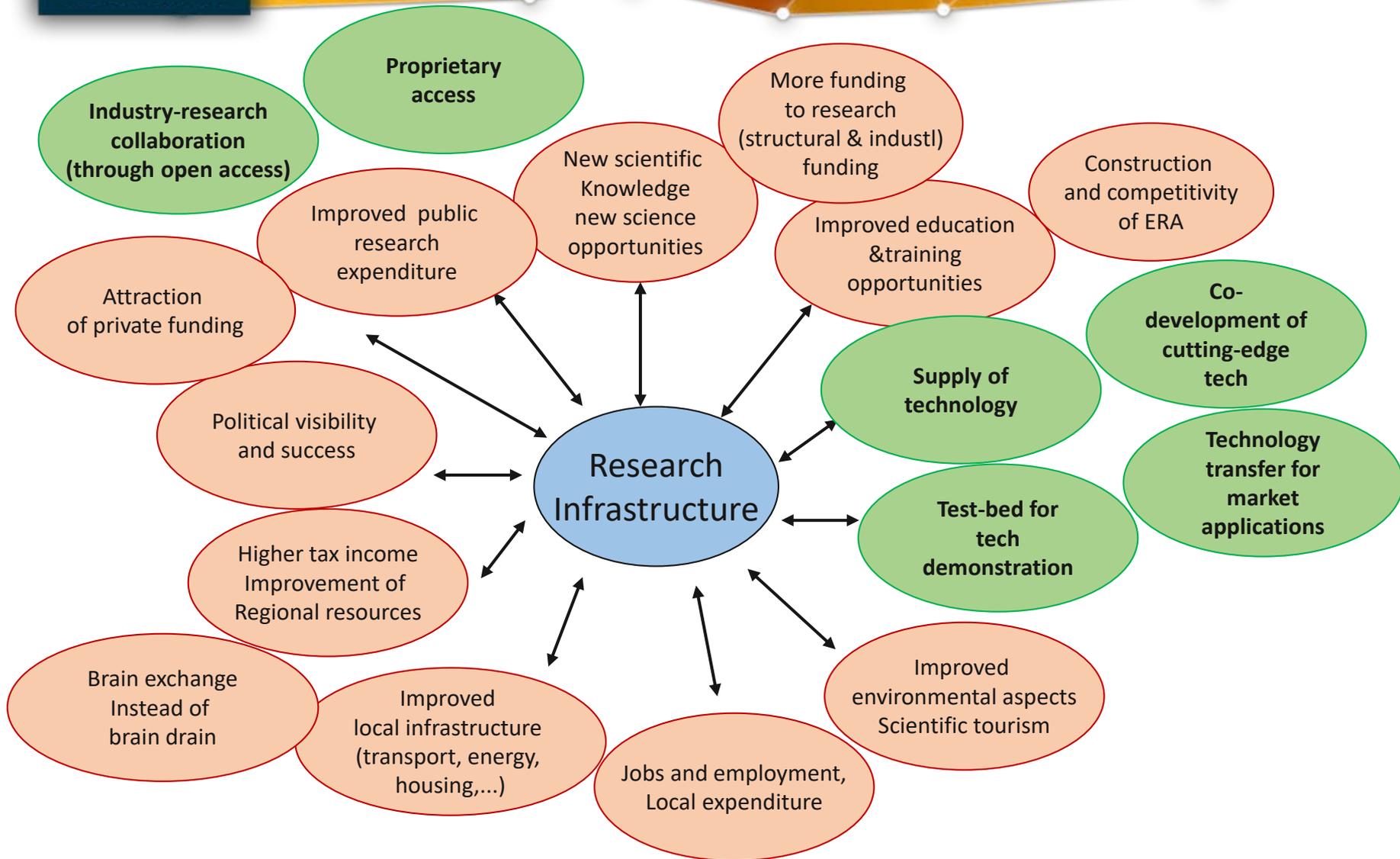


A Pan-European Research Infrastructure (in the sense of ESFRI) is a “Facility” for service to “Research” which:

- Offers cutting-edge, essential service to research, on a non-economic basis, within an ERA outlook
- Awards free open access through international peer-review competition at world level
- Has its results published/shared in the public domain
- **Provides proprietary and/or training access to a limited extent**
- Has clear pan-European added value (e.g. at least 30% of selected users coming from non-host countries)

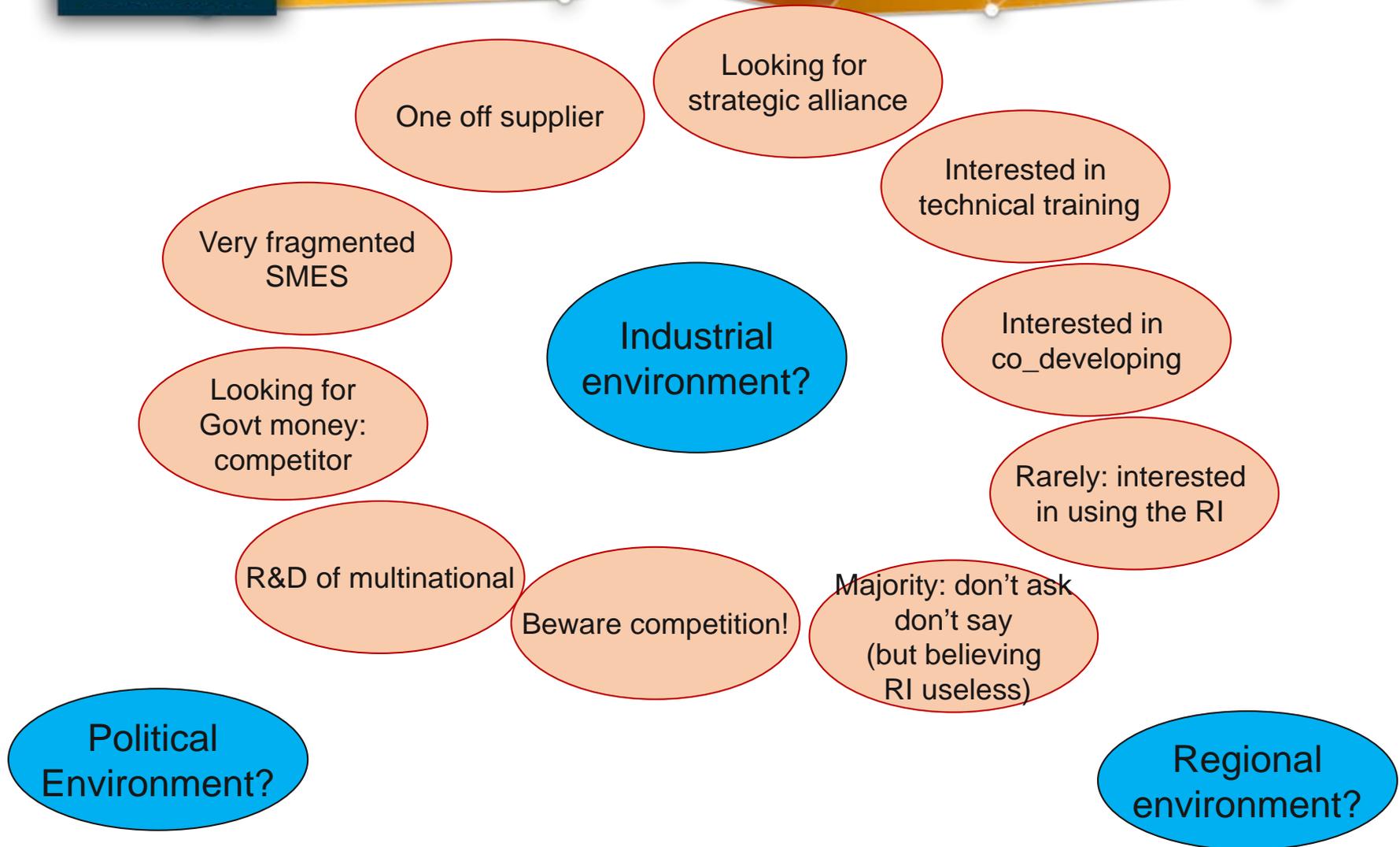
RIs and Industry

What Impacts for the Industry?



- **RI a non-economic activity....how to match with Industry, an economic activity... its core business?!**
- **Short-term motivation: get procurements and/or public support for development**
- **Possible longer term motivation: RI= “observatory” to acquire/test new solutions, new technologies, advanced technical training, but only if costs make economic sense**
- **A less known aspect is the relevance of open access as supporting industry-public research relationship: access through a University ($\approx 20\%$) is cheaper!**

The picture is a bit more complex for the industry



The RIs and the industry have a multi-faceted relation that will be analyzed by the themes of this workshop. In detail we will address*

Industry as a user

Industry can buy **commercial access** to the RIs for proprietary research and can access to the IP generated by the facility (**protection and commercialization of intellectual property**)

Industry as a supplier and co-developer

RIs can collaborate with the industry for a **joint development of technology.**

*See also the report “ESFRI Scripta Volume III, Innovation-oriented cooperation of Research Infrastructures, European Strategy Forum on Research Infrastructures Innovation Working Group”

Research infrastructures and Industry – what ingredients for a successful relationship?

- A clear message about the goals of a RIs (research, development, innovation) is necessary to efficiently communicate with industry
- Industry and RIs must exchange as much as possible on their interaction, to get rid of the cultural differences and the misunderstanding – **like during this workshop!**
- Innovation is not only in the content, but also in the format of the collaboration