

INDUSTRY INNOVATION AND THE ROLE OF RESEARCH INFRASTRUCTURES

How CERIC-ERIC, the Central European Research Infrastructure Consortium, could help hundreds of firms to easy access to solutions on materials development, processing and use.

Europe's industry is currently in a leading position in many sectors in global markets and it provides jobs for 32 million people, with 1.5 million of these jobs created since 2013.¹ But according to European Commission's priorities, a modernization is required in order to maintain and increase its competitiveness and to stimulate job creation.¹ Due also to globalization and new market conditions the industry landscape is continuously changing, and cost-cutting policies are not enough anymore to be competitive. The Commission underlines the importance of a high performing industry: among the key factors to maintain its leading role worldwide there is the industry capability to adapt to changes and the ability to innovate through the adoption of new technologies. Innovation creates new businesses and is the fundamental source of growth in business and industry.

Key factors to successful innovation according to Industry

In 2003, Henry Chesbrough² promoted the concept of open innovation: innovation has to be more distributed and more decentralized, having a more participatory approach. The concept is based on the fact that the knowledge and skills useful to be competitive cannot all be found inside the same company and no company could innovate effectively on its own. If we look at the way Friedman and Angelus define what open innovation is, i.e. "[...] the process of managing the interaction and collaboration of multiple partners to deliver new solutions within a business ecosystem"³, it perfectly summarizes how collaboration between players of the same or of different value chains is key to achieve significant results.

These definitions match with current market requirements from industry. According to the survey on mainly large firms carried out by European Commission in 2016⁴, collaborations and knowledge transfer between public and private players are crucial to improve industrial innovation outputs.

¹ Communication from the commission to the European parliament, the european council, the council, the European economic and social committee, the committee of the regions and the european investment bank. September 2017.

² Chesbrough, Henry William (1 March 2003). *Open Innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business School Press. ISBN 978-1578518371.

³ Best Practices in Collaborative Innovation. How Manufacturers and Retailers Can Profit from Collaborative Innovation. Kalypso White Paper, 2009, Mike Friedman and Helayne Angelus

⁴ The 2016 EU Survey on Industrial R&D Investment Trends, 2016.

The survey points out some of the needs and factors that can support European industry research and innovation, and especially highlights how public R&D market players are considered by industry as a source of opportunities for enhancing its innovation capacity.

The figure below shows the importance for industry to have access to more research resources: initiatives that increase collaboration and outsourcing with the public sector, and that improve access to public research centres, laboratories and infrastructures, are some of the main factors with a high potential for supporting R&D and innovation in industry.

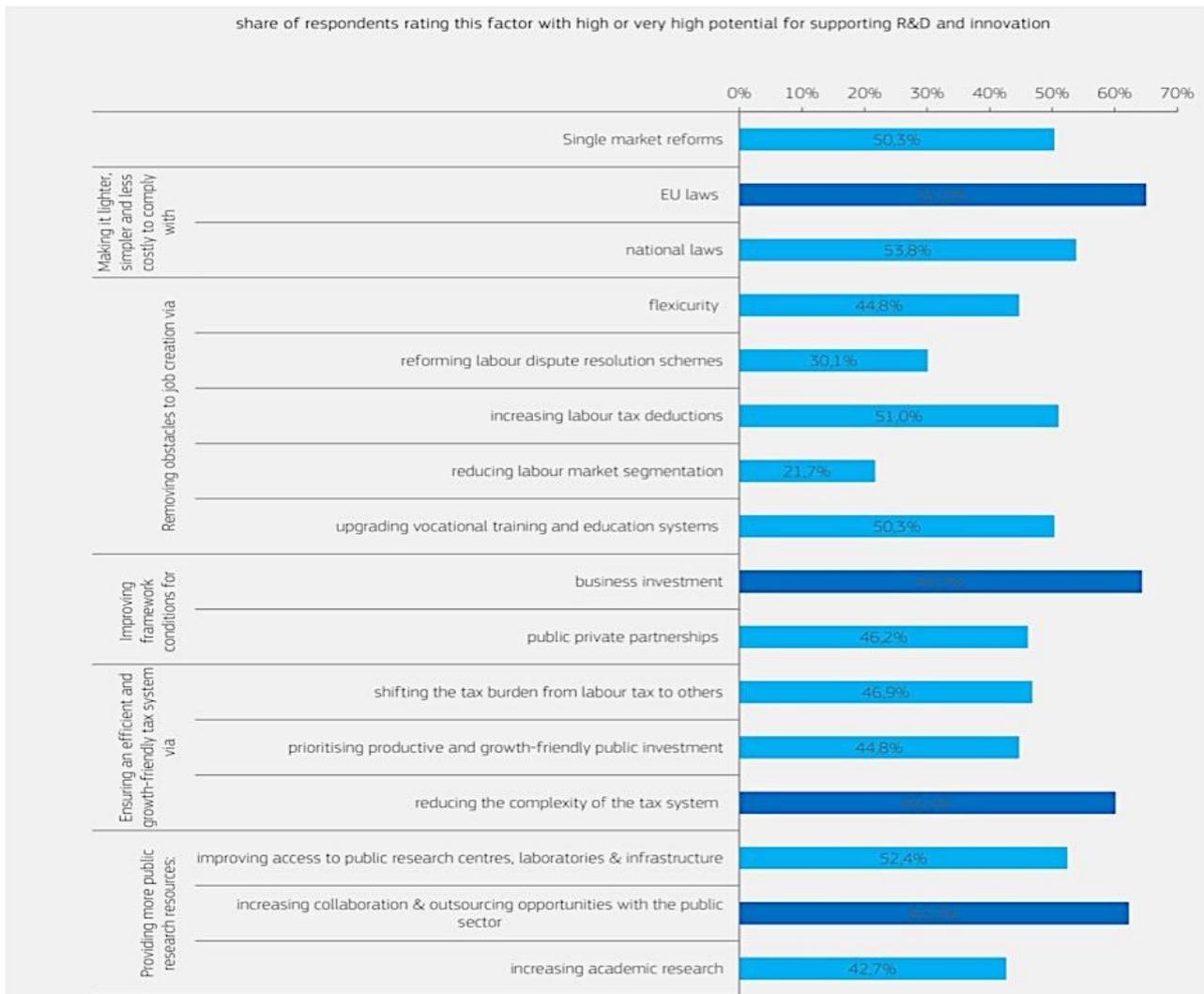


Fig. 1 Potential of structural reforms for increasing R&D and innovation. Source: European Commission JRC-B (2016)

The same survey shows companies' most preferred locations for carrying out their R&D activities. Main industries consider strategic to decentralize their research activities in more than one country and especially in the following ones¹:

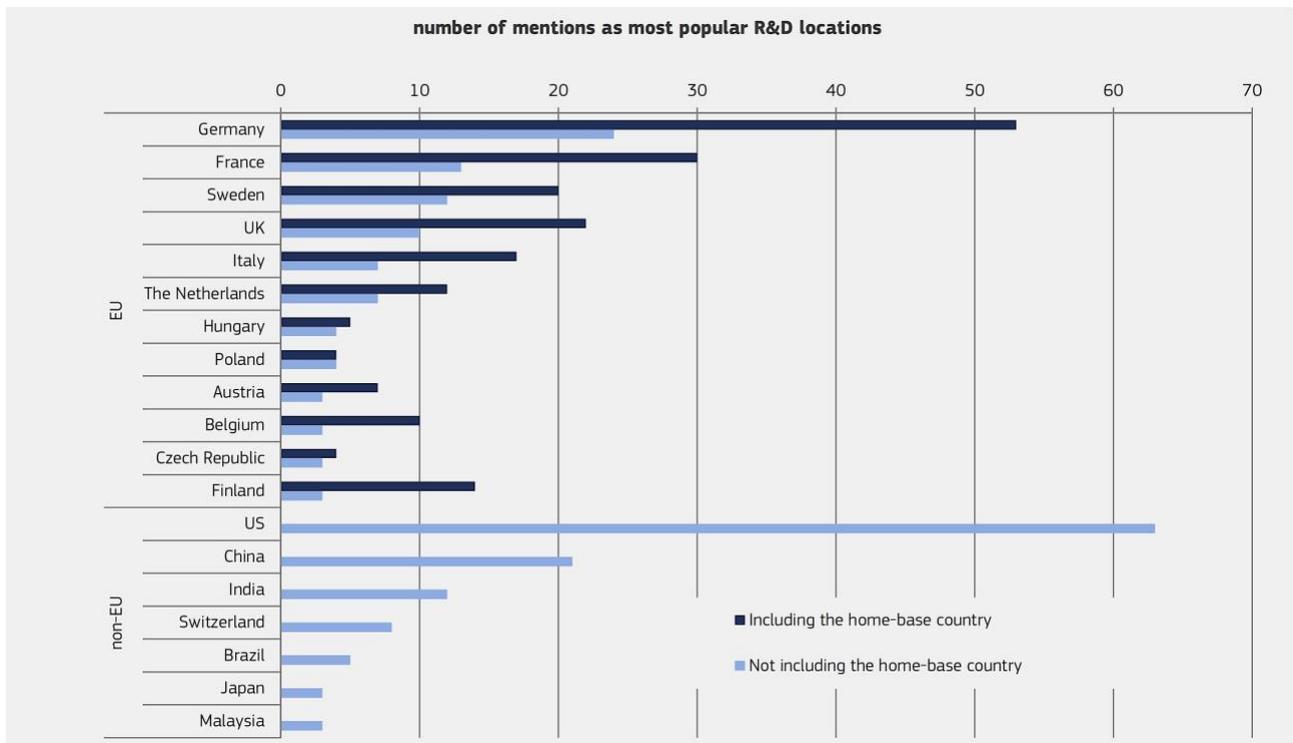


Figure 2. Most popular countries for companies' R&D. Source: European Commission JRC-B (2016).

According to the same study, the two main factors for locating or carrying out R&D activities in certain countries are the access to specialized R&D knowledge and results, and the high availability of researchers (both number and availability to work with industry). Another factor is the proximity of high technology poles and incubators.

Data obtained by the survey also shows how European industry evaluates access to research resources, and collaboration with research infrastructures: the location of R&D activities in different strategic countries with access to high level expertise is considered a primary element to strengthen innovation.

Materials as a driving force for innovation in industry

It is widely acknowledged that the use and processing of materials have been some of the main driving forces for development, playing a key role in boosting and accelerating innovation in the majority of industrial sectors.

Angela Belcher, W.M. Keck Professor of Energy at the Massachusetts Institute of Technology in Cambridge, stated: *"If you look around at your desk and your car and what you're using, a lot of those technologies have been possible thanks to advances in materials. In fact, many of the current challenges in the world — from energy to healthcare — will benefit from improvements and*

innovation in new materials and from our ability to control their size, their atomic structure and the production process. Advances in materials are not only about creating new materials, however. They are also about making existing ones smaller, putting them together in new ways, making them less expensive and changing their form factors.”⁵

It’s difficult to determine how much new and advanced materials have an impact on economy. Just to have an idea, according to a report by Oxford Research AS⁶, the market for applications of value added materials (VAMs), that are just a part of new and advanced materials, has the potential to grow more than 7 times by 2050.

Table 1. VAMs market share forecast by sector in billions of euros.

	2008	2015	2020	2030	2050
Energy	7,1	14,3	18,9	37,0	175,7
Transport	9,6	13,1	15,8	24,3	52,6
Environmental	24,6	38,2	48,0	86,8	352,2
Health	27,0	32,1	37,4	55,0	115,2
ICT	29,6	38,8	46,6	70,7	152,2
Others	3,6	13,5	19,3	42,2	250,8
Total	101,7	150,0	186,1	316,0	1098,6

In a more recent study by Transparency Market Research⁷, it is forecasted that the demand for advanced materials will continue to grow for the period 2016-2024 worldwide. It is expected that traditional materials like plastics or metals will be replaced with new solutions that are light in weight, with higher strength and excellent resistance to abrasion and corrosion, and in general with the capability to resist to extreme conditions. Emerging technologies and advancements in product development and manufacturing are expected to keep the demand for advanced materials high during the forecast period.

Although it is difficult to make a precise quantification of the economic influence on European economy of materials’ development and use, there is no doubt that they are important market drivers for industrial growth and innovation.

⁵ “Why Advanced Materials are Drivers for the Future Economy — Q&A with Angela Belcher.” GE Look ahead Posted October 17, 2014

⁶ “Technology and market perspective for future Value Added Materials.” Final Report from Oxford Research AS, 2012

⁷ Advanced Materials Market (Product - Ceramics, Glasses, Polymers, Composites, and Metals & Alloys; Application - Medical Devices, Automotive, Aerospace, Electricals & Electronics, Industrial, and Power) - Global Industry Analysis, Size, Share, Growth, Trends, and Forecast 2016 - 2024

CERIC, a Research Infrastructure Consortium to support European innovation as a whole in nanotechnology, materials and biomaterials science.

Among the different initiatives, Europe is carrying on to support and enhance its competitiveness, large research infrastructures are important, yet often overlooked ones.

Among these, the **Central European Research Infrastructures Consortium (CERIC)** responds to some of the needs of industry in the fields of innovation. It is a distributed multidisciplinary research infrastructure providing access to its research facilities and services, to external users in the fields **of materials and biomaterials science, and nanotechnology.**

Access to CERIC is open to researchers from all over the world through two Calls for Proposals per year.

It is free of charge for non-proprietary research requiring access to one or more techniques allowing structural investigation, analysis, synthesis and imaging of materials and biomaterials down to the nano-scale. The condition for free access is publication of the results of the experiments ([Download the CERIC brochure](#)).

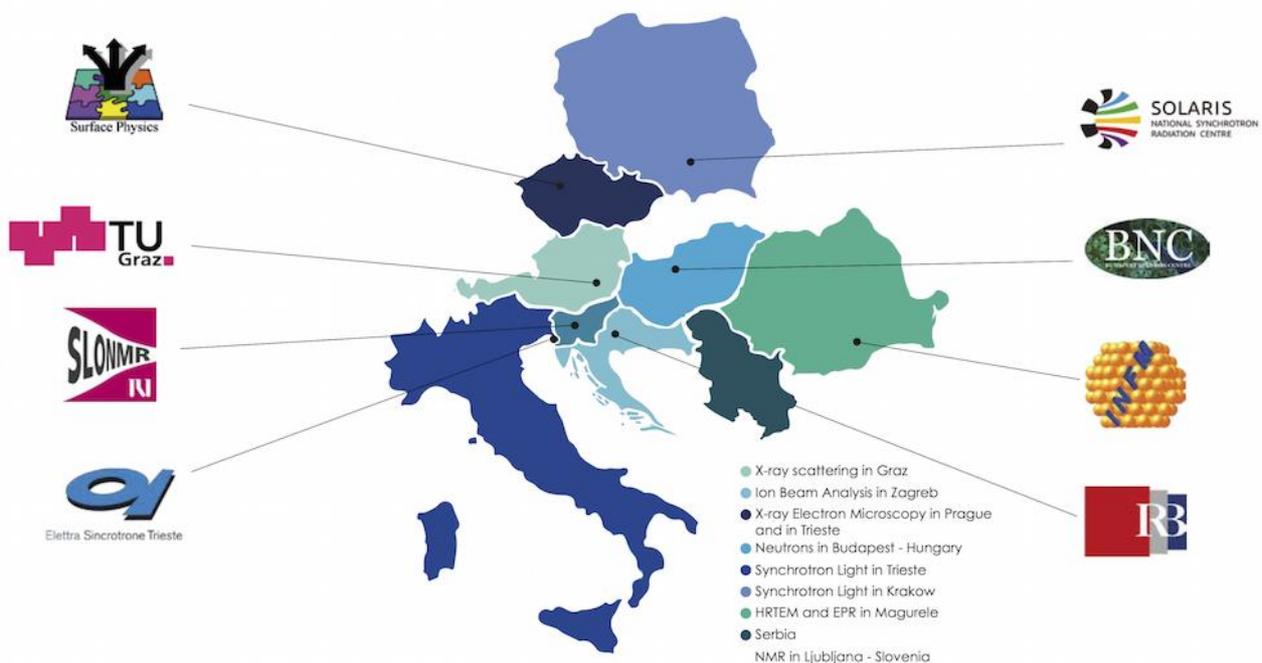


Figure 3. CERIC Facilities and locations in Europe.

The scientific equipment and expertise of CERIC can be accessed by industry too. With a single entry point, CERIC unlocks the potential of multi-technique research infrastructures to industry for all technical and research issues related to materials, enabling companies to use excellent facilities in



8 European strategic countries: [Austria](#), [Croatia](#), [Czech Republic](#), [Hungary](#), [Italy](#), [Poland](#), [Romania](#) and [Slovenia](#). CERIC offers to companies a wide a range of solutions according to their needs: analytical services, in order to target specific issues related to materials' development, quality control and manufacturing processes, or co-development of both privately- and publicly-funded research projects.

CERIC offers a solution to industry needs of collaboration, outsourcing and access to research infrastructures in a strategic field such as materials science, hence giving to companies a real chance to foster their innovation results, profiting from the knowledge and techniques of advanced European infrastructures.

