

RESEARCH INFRASTRUCTURES AND COOPERATION WITH INDUSTRY

Jana Arbeiter
Faculty of Social Sciences
University of Ljubljana
Ljubljana, Slovenia
jana.arbeiter@fdv.uni-lj.si

Barbara Brečko
Faculty of Social Sciences
University of Ljubljana
Ljubljana, Slovenia
barbara.brecko@fdv.uni-lj.si

Maja Bučar
Faculty of Social Sciences
University of Ljubljana
Ljubljana, Slovenia
maja.bucar@fdv.uni-lj.si

ABSTRACT

The paper addresses the experience of European Strategic Framework on Research Infrastructure (ESFRI) Landmarks in their work with partners from industry. While the main mission of the RIs is to provide infrastructure support to scientific work, they are also cooperating intensively with the industry. Our survey among 42 ESFRI Landmarks showed that as many as 82% of them have a strong and well-established cooperation with partners. However, there are still several barriers to cooperation on both sides, with the management of intellectual property being an important one.

KEYWORDS

Research infrastructures, industry, cooperation, barriers, intellectual property.

1 INTRODUCTION

One of the most important achievements of the European Research Area (ERA) has been the establishment of research infrastructures (RIs) at the European level. With coordination efforts of European Strategic Forum on Research Infrastructures (ESFRI), the roadmaps of EU RIs have been developed[1], a set of Working Groups[2] formed to support the work of RIs as well as help provided by the ESFRI and EC to meet fully the objectives of RIs. The RIs are essential pillars supporting European basic research, yet their impact extends beyond the scientific community. They are facilities that provide resources and services for all research communities to conduct research and foster innovation, suggesting that they intensively cooperate with industry as well. The cooperation includes also transfer of knowledge/ technology developed jointly with using equipment or/ and data or/and testing facilities of the RIs.

In their cooperation with industry, RIs often encounter similar problems as we can observe in the relationship between public research organizations (PROs) and private sector [3]. To identify

the level and type of cooperation between RIs and industry, we prepared a special survey, sent to ESFRI Landmarks. The survey had the ambition to also identify main barriers to closer cooperation and suggest possible policy actions to stimulate this important cooperation. The findings of the survey were presented at the ESFRI Forum in Brno, 2022 [4] as well as by the ESFRI Drafting Group on RI – industry cooperation. Some of the observations and findings from the discussion at these fora have been integrated into the text as well. The end objective of our analysis was to contribute to the implementation of ERA Action 8 [5], and in this way to the creation of competitive innovation ecosystem at EU level.

2 THE SURVEY

The survey on RIs industry cooperation was prepared by the support team to ESFRI Chair in 2022[6]. The questionnaire was sent to 43 ESFRI Landmarks. 35 replies were received. Of these, 49% Landmarks responded that they regularly cooperate with industry, while 34% do so occasionally [7]. This confirmed our initial assumption that the cooperation between RIs and industry is well established. It mostly takes place at national level [8]. Most common form of cooperation is joint research projects, which are either financed at the EU level or by the national research funds. RIs offer industry access to their equipment, offer them various services, access to data, etc. They believe that cooperation with industry is beneficial to them and plan to expand it: 72% of the respondents actively stimulate the cooperation. The tools to promote cooperation are various. RIs involve industrial partners in decision-making bodies as members of strategic/ scientific boards. Several reported on the establishment of specialized offices, which serve as contact points for industry. Another way to promote cooperation is the preparation of special industry- focused days to present the potential forms of cooperation and services they can offer. It is interesting that RIs are engaged in so many different activities to promote cooperation although it is not very important in terms of revenue. At best, according to our survey, the RIs state that no more than 10% of their revenues are derived from industry. In part, the reasons for this may lie in unclear regulations as to commercial activities of publicly- financed infrastructures in some countries.

The importance of cooperation is reflected in the high percentage of responses on the future plans to intensify the cooperation: as

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many as 92% of the RI respondents wish to expand the cooperation and plan to actively engage in this. One of the motivation factors is the fact that RIs can complement traditionally insufficient financial resources received from the government(s) with the money from business sector. This may enable them to invest in appropriate new research equipment as well as maintain the existing infrastructure, either directly relevant for the research cooperation or expanding the options for basic research. In times of increasing costs of investment in sophisticated research equipment this is becoming increasingly important factor.

Among the factors which may hinder cooperation the lack of interest on the side of industrial partners in their area of work was most often cited by the RIs. However, several suggestions were provided as to the needed activities at the policy level as well as at the level of RIs to promote and ease the cooperation, with a clear objective to make transfer of knowledge from RIs to industry smoother.

3 ACTIVITIES TO PROMOTE COOPERATION

3.1 At RI's level

To promote cooperation with industry, RIs themselves have indicated that they should do more to increase the visibility of the services they are capable of offering. Various activities were proposed by the respondents. Let us share the most interesting proposals.

The appointment of an industry liaison officer was identified as an important action to bridge the communication gap between scientists working in RIs and the researchers from industry. As several other studies on cooperation between public research organisations (institutes or/and universities) have identified (among others, see [9] Bučar and Rojec, 2019; [10] Jensen et al., 2010; [11] Arvanitis and Bolli, 2009), the objectives of the researchers in the public research organisations (PROs) and the representatives of the industry are often highly different. While the criteria in many countries for successful research are based on the publication record and this has significant impact on the funding, the industrial research is focused on more immediate goal of finding optimal solutions to the business processes, be it in manufacturing or in services. The trend in PROs is towards open science and many of the funding agencies require the results of the research to be available widely and free of costs. On the other hand, industry needs to protect the findings as their intellectual property. Careful balancing on how to meet the requirements of the two different approaches and at the same time reach a working arrangement for both parties is needed. It seems that some RIs have been more successful in this than the others, thus sharing of the experiences may ease the cooperation for others.

Also, the already mentioned involvement of industrial representatives in different RI's decision-making bodies should be systematically encouraged. The latter would be important in shaping the RIs development strategy since input from industry would indicate which research fields are considered as most relevant for the RIs to focus on.

Additional dilemma faced by RIs is how to communicate with partners from industry. Differences in the objectives of

participating in cooperation need to be openly discussed and at least initially, this may take some time. A clear understanding of each other's objectives, and respect for these, need to be a starting point in establishing the cooperation. This is often achieved best by regular exchange of personnel or by close interaction of the key personnel from both partners working on a particular issue. Here, the issue of motivation on the side of individual researchers working in RIs, was identified as possible issue that needs special attention. The so called "liaison officer" in RI would need to be specifically stimulated to engage in cooperation with the industry, since this could mean that the traditional path of career progress through publications and citations would be slowed down. To cooperate with industry especially in the area of knowledge/ technology transfer, specialised staff is needed, which is often not available in RIs.

3.2 At the policy level

Issues related to financing of the cooperation were identified as a barrier to cooperation. On one hand, some RIs mentioned that it is sometimes expected that since they receive public financing, they should not be charging industrial partners for their services. On the other hand, the regulations in some cases make it too complicated to carry out commercialization of services to industry. The lack of suitable business models de-stimulates some of the RIs to pursue cooperation more actively, so it was suggested that a special platform, where sharing good practices and successful modes of cooperation are shared among RIs. This would help less experienced ones to learn from those with extensive practice of working with industry. Samples of agreements on sharing intellectual property benefits would be helpful as well.

The respondents to the survey proposed that such a platform should be established by EC so as to serve to RIs in all member states. It could be used to share good practices in all areas of cooperation: from legal and financial issues, overall appropriate business models, negotiations on intellectual property issues, personnel issues, etc.

Other policy measures suggested to support the cooperation include:

- a) Financing of joint research projects, where the cooperation between RIs and industry could be recognized as a positive characteristic of project application;
- b) Encouragement of exchange of personnel and/or hosting of researchers from industry by RIs (for example, to carry out Ph.D. research);
- c) Special grants to SMEs to co-finance some of the costs of using the services of RIs;
- d) The cooperation of RIs and industry should be actively promoted both at EC level as well as at the level of Member States, with specific resources available for such a promotion.

4 CONCLUDING OBSERVATIONS

The survey findings aligned closely with our initial assumptions concerning the collaborative engagement between RIs and industry. There is significant interest on the side of RIs to expand such cooperation. Recognized barriers, including the misalignment of objectives between RIs and industrial partners, have already been subject to policy interventions at various levels. There are several measures at national and EC level [12], which could be utilized to support such cooperation, yet it often seems that the awareness of their existence is still limited, especially among the SMEs.

Overall, the survey underscored transformative potential of RI-industry collaboration in fostering a competitive innovation ecosystem across the European union, bearing an important significance in the context of the ERA's overarching objectives. The imperative role of ESFRI in promoting the cooperation of RIs and industry and addressing barriers therein cannot be overstated. Within the policy discussions on European innovation ecosystems, the role and extent of cooperation of RIs with industry needs to be appropriately recognized. This is particularly significant if the enhancement of knowledge/technology transfer from public research to industry is to be implemented, thereby contributing to the competitiveness of the European industry.

In summary, RIs have the pivotal role as enablers of scientific progress and innovation in Europe. However, the evolving cooperation between RIs and industry shows the potential for mutual benefit, both in designing appropriate research questions as by further development of technology transfer from RIs to industry. This is calling for continuous efforts at both the operational and policy levels, where the role of ESFRI is of high importance in order to nurture a competitive innovation ecosystem across the European Union.

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