

Use of National and International Research Infrastructures in Evaluation of International Project Award Potential of Slovak Research Institutions

Shearman Adriana – Zendulková Danica

Centrum vedecko-technických informácií Slovenskej republiky/Slovak Centre of Scientific and Technical Information
Lamačská cesta 8/A, 811 04 Bratislava, Slovak Republic
adriana.shearman@cvtisr.sk; danica.zendulkova@cvtisr.sk

Extended abstract

The Slovak research base comprises public and state-funded research organisations including higher education institutions (the Slovak Academy of Sciences public, research institutions and universities), private research organisations, enterprises and not-for-profit research organisations (referred to as research institutions: RIs). An RI is eligible for state research funding only if such an RI holds a certificate issued by the Ministry of Education, Science, Research and Sport of the Slovak Republic as to its competence to conduct research. In addition, in compliance with Act 172/2005 Coll., an RI is obliged to register in the Slovak Research Information System (SK CRIS) (1). Many RIs benefit from their participation in national as well as international grant schemes, contributing to the global research knowledge and, via the technology transfer process, introducing new products and services.

However, the latest analyses of Slovakia's participation in Horizon 2020 projects reveal that, despite the relatively large number of projects proposed up to 1st January 2018 (1902), only 244 have been funded, of which more than 90% are related to research, development and innovations (2). These figures do not give a positive signal, especially in respect of the statement of the Slovak Government in its programme manifesto that *support for research, development and innovation is essential for stimulating Slovakia's developmental potential, its competitiveness, for concentrating resources, for growth in the innovation performance of enterprises, and for developing the principles and the culture of a new level of labour relationships* (3).

From this perspective, action is needed to tackle the issue of the low success-rate of Slovak RIs in the Horizon 2020 projects. One approach is to increase the quality of grant applications of those RIs which have already proposed and been awarded international research grants. The other approach is to extend the portfolio of the RIs to apply for international EU grants and funding schemes (with the 9th EU Framework Programme in mind). This latter can be achieved by thorough statistical as well as bibliometric analyses performed using national and international information infrastructures on research and research-related data. It may be assumed that the research institutions with a high level of engagement in domestic as well as international research grants (Horizon 2020 excluded), and whose research outputs are communicated and used by the global scientific community, can be regarded as potential candidates for the EU funding schemes.

In the first step, publicly-accessible data from the international CORDIS database were used to identify and exclude from the set those Slovak RIs which had been successfully involved in Horizon 2020 projects (just to list the most successful: the Slovak Academy of Sciences with 45 H-2020 projects, the Slovak University of Technology in Bratislava with 16 H-2020 projects, and Comenius University in Bratislava, the Technical University in Košice and Žilinská University, each with 6 H-2020 projects).

In the second step, data from the national research information database SK CRIS were extracted. SK CRIS, operated by the Slovak Centre of Scientific and Technical Information (CVTI SR), is the major and most complete publicly accessible national research information infrastructure, providing information on Slovak researchers, research institutions, projects and research outputs. 3285 projects in the SK CRIS database for 2017 were identified as having been implemented by Slovak RIs. Projects covering topics from natural sciences and technical sciences predominate (approximately 900 projects) while those projects aimed at research in agricultural sciences have the lowest representation (257 projects). On the basis of the data from CORDIS, the number of original projects extracted from SK CRIS was reduced to include only those projects of the RIs awarded with predominantly domestic projects funded by Slovak grant agencies: APVV (Slovak Research and Development Agency), VEGA

(Slovak Research Grant Agency) and KEGA (Slovak Grant Agency for Culture and Education). These RIs comprise eight universities: the University of Veterinary Medicine and Pharmacy in Košice, the University of Prešov, Alexander Dubček University in Trenčín, the University of Trnava, Ss Cyril and Methodius University in Trnava, Constantine the Philosopher in Nitra, Catholic University in Ružomberok and J. Selye University in Komárno. These are universities which were founded or re-activated subsequent to 1993 and, in general, with a relatively low number of research staff. Since the number of researchers is vital in order to be able to gain a more complete picture of an RI, this information was acquired from the national publicly accessible database Portal VŠ (Slovak university employees' registry). Some universities participate as members in international collaborations (e.g. Global Burden of Disease), possess highly cited papers and publish in the top scientific journals. From this perspective, the University in Trnava is one of the leading RIs.

A somewhat modified approach had to be applied to identifying both public as well as private-sector research institutions, since these possess a lower number of publications and projects. A preliminary search in SK CRIS showed that, in 2017, out of 306 RIs (faculties represented as independent subjects), 62 were private-sector and 14 were not-for-profit institutions. However, these, accounting for almost 25% of the RIs involved, implemented only 123 projects, which represents less than 4% of all the projects (3285) implemented in 2017. This is a clear example of unexplored potential.

The Web of Science Core Collection served as the electronic information resource for extracting information on these private-sector Slovak RIs. Their number was restricted to a minimum of five papers (article, conference proceedings or review) published over the period of 2013-2017. In this manner, nineteen private-sector RIs and four public RIs were identified and, subsequently, the projects affiliated to these institutions over the period of 2000 – 2017 were identified in the SK CRIS database.

The research areas in which the RIs are active represent a further important aspect of this study. The Web of Science Core Collection database can resolve this issue at the level of “highly-specific”, the so-called Web of Science categories. This categorisation deploys 252 categories derived from the categorisation of scientific journals. For practical reasons and for the purposes resulting from the smart specialisation of the Slovak Republic (RIS3 SK), as defined in its implementation plan (3), research areas were aggregated into five domains of RIS3 SK: D1 – Vehicles for 21st century; D2 – Industry for 21st century; D3 – Digital Slovakia and Creative industry; D4 – Population health and Medical technology, and D5 – Health food and environment. The results revealed that the majority of the RIs identified had a high potential in the D4 and D5 domains. To a lesser extent, the private RIs, in particular, are active in the D1 and D2 domains, unlike the public universities whose engagement in the D1 and D2 domains exhibits a steady decline.

Typical issues associated with the processing of data from large international databases, such as ambiguities and variations in names, incomplete data, etc. were encountered in this study and eliminated as far as possible. Greater interoperability of various research information systems and exchange of data between these systems could substantially contribute to and facilitate the acquisition and processing of data. This, however, can only be achieved by having standardisation in place, using common data formats (CERIF), implementing an application programming interface (API) and dedication to the continuous improvement in data quality. With the current developments in information and communication technologies embracing knowledge from non-conventional research disciplines such as neurology, artificial intelligence, computational linguistics and automation, this task appears to be easier to complete.

References:

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