WRITEN BY

MÁRIA BIELIKOVÁ
CEO
KInIT

BRIDGING ACADEMIA & INDUSTRY

Nowadays, it is recognized globally that collaboration and understanding between research institutions and business brings innovation with the potential for explosive growth. Bringing academia and business together can be a complex process. We describe an example of such collaboration that is systematically being carried out by establishing a new research institute inspired by the Fraunhofer or similar institutes.

More than 30 years after the disintegration of the Soviet bloc, the post-communist European countries have been marked by fast economic growth, fueled by cheap but skilled labor and taxation policies favoring production investments. At the same time, the research and innovation ecosystems of these countries have been stagnating. Slovakia is a typical example. The country experiences a long-term brain drain - during the last 15 years more than 5% of the population have deregistered from social insurance, indicating work abroad; more than 17% of high-school graduates leave every year to study abroad; computer science being one of the most affected fields.

Overcoming stagnation requires paradigmatic shifts towards new models of research and innovation facilitation. In Slovakia, research has always been funded and executed by public institutions and in general was largely detached from business, industry and industrial collaboration. Now, the Slovak industry has stepped in to fund a new model of research and innovation institution, more focused on academia-industrial collaboration with significant impact, and private funding.

Based on the experience from the worldwide best performing examples of public-private partnerships like the Fraunhofer institute, there is a consensus that reducing the problems listed above could be achieved by bringing academia and industry together, removing biases between them, and engaging them in joint projects with significant impact. Next, it is necessary to nurture talents for this type of collaboration and to foster excellence by actively seeking international collaboration.

> **Overcoming stagnation requires paradigmatic shifts towards new models of research and innovation facilitation.**

Conceptually there are two paths for approaching the problem: the “Fraunhofer path” (application-oriented basic research and applied research, strong industrial involvement with support of public funding) or the “Max Planck path” (basic research, strong public funding). The “Max Planck path” is covered by the Slovak Academy of Sciences. Its recent reform , which transformed SAS into a public institution is promising for the Slovak research space.

To make another step towards competitive and internationally recognizable research and simultaneously to address the above mentioned problems, the Kempelen Institute of Intelligent Technologies (KInIT), was founded in 2020. It was inspired by world centers in the field of intelligent technologies - the Fraunhofer institute or the German Research Center for Artificial Intelligence (DFKI). KInIT was established by the private sector with strong connections to academia as a non-profit independent research institute.

KInIT represents a new approach to research and development in Slovakia. It aims to motivate young people to build their careers in Slovakia, especially in research and knowledge transfer through innovations. It is the first institute of its kind in Slovakia that integrates academic research skills with the needs and experience of innovative companies. KInIT builds upon strong partnerships with researchers, research institutions and academia (national and abroad), many of whom have already expressed their enthusiasm for further collaboration.

The primary interest of researchers in KInIT is focused on Artificial Intelligence. Thanks to the advent of this research field, it is an optimal topic which is in high interest of the industry, academia, with massive potential in tech-transfer. Moreover, it can bring a high added value for the country.

The uniqueness of this model in Central and Eastern Europe refers to its funding - it is primarily funded through private contributions, donations, grants, and industry collaboration contracts. Multisource funding through a private-public partnership is the base of its economic model. KInIT is structured as an Interest Group of Legal Persons and re-invests all acquired funds into the development of the institute, research, and education in general.

The typical research cooperation is realized as a consultation or direct joint research team. The aim is to show that research helps industry in continuous improvement. As a result, the industry team members act as research ambassadors.

From its foundation, KInIT has focused on large companies, which are able to invest in such research cooperation. In order to make such service available to SMEs (which represent the vast majority of the Slovak industry) additional finances are necessary. Usually, the national authorities provide some part of such finances, which is not true for Slovakia nowadays, but there are such plans covered in the Slovakia recovery and resilience plan. Such joint cooperation is beneficial for both partners - the company acquires new knowledge, which is transformed in its products and services. Moreover, researchers are involved in tackling new challenges, which results in new skills.

A project with Gerulata Technologies represents a prototype example of cooperation between research institutes and industry. A joint team of the KInIT researchers and Gerulata engineers has introduced a new language model for Slovak, which helps improve the automatic processing of Slovak texts.

Within this cooperation, Gerulata Technologies used their resources to acquire large-sized data and computational power to train the model. KInIT provided specialized expertise and consultations for state-of-the-art realization of model training and rigorously evaluated the trained model. Both the model and scientific results were published, making the artifact and the knowledge available for all, mostly for other researchers, students and practitioners from academia or industry.

The resulting language model, named SlovakBERT (https://slovakbert.kinit.sk), is the first public large-scale neural language model for Slovak based on transformer technology. We believe it constitutes a significant milestone for Slovak NLP, as it can speed up progress in the underdeveloped field in our region and become a basis for subsequent research and many real-world applications. Kempelen institute was able to help an industrial partner to increase its competences in deep learning. Furthermore, we receive positive signals that the results of such collaboration can reinforce trust in research and foster further industrial collaborations to facilitate additional innovations.