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minib 21

marketing of scientific and research organizations

no. 3(21)/2016

research for future

eISSN 2353-8414
pISSN 2353-8503
september 2016

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Open Access

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10.14611/minib.21.09.2016.12

Summary

In the paper have been analyzed issues related to the reserach institutes in Poland in last decade. The problematic question is: What is the role and place of research institutes in Poland in innovative policy with particular regard to their usefulness in the implementation of the Knowledge Based Economy (KBE).

Keywords: innovative policy, science, research and development, research institutes, Knowledge Based Economy

Introduction

At present, there are 115 research institutes operating in Poland, 70 of which are technical institutes, 23 medical, 14 science and agricultural, and 8 humanities and economic science institutes. The largest number of research institutes are subject to the Ministry of Development. Most research institutes are in the sciences and engineering and life sciences group. Among the research institutes, there are 14 National Research Institutes that are operating under the amended act.[1] In terms of the number of institutes, the Mazovian Voivodship is clearly in the lead with as many as 71 entities. The Silesian Voivodship, which has 14 entities, is in second place with an over 5-times smaller number. In the Łódź, Lesser Poland, Greater Poland and Lublin Voivodships, the numbers range from 4 to 10 entities. The remaining regions have single entities.

Legal and organisational framework of operation

Research and development institutes have been operating on the basis of the 1985 Act, which was amended several times in the years 1991–2010.[2] At present, the legal and organisational framework of research institute operation is defined in the Act on research institutes of 30 April 2010 (Journal of Laws of 2010, No. 96, item 618). Research institutes in the meaning of Article 1 item 1 of this Act are state organisational units, which are legally, organisationally, economically and financially distinct, conducting scientific research and development works directed at their implementation and practical application. These institutes have a legal personality. Research institutes can be given the status of a National Research Institute (NRI) when they fulfil important tasks in the planning and implementation of state policies.

The conferral of state research institute status may be made at the request of the minister supervising the institute, after consulting the competent minister for science and the minister in charge of public finance. According to the Act, the formal oversight over research institutes is executed by the relevant minister. The bodies of such an institute include the scientific council and the director — appointed by the body exercising

supervision over the given unit — recruited via a competitive procedure. Research institutes manage their assets independently. Upon liquidation, assets become the property of the State Treasury. The organisational structure of relevant institutes is determined in accordance with the Organisational Rules and Regulations set by the Director and approved by the Scientific Council and trade unions. Its shape depends on the tasks performed by relevant entities and should be compliant with the charter or bylaws of a given organisational unit. The charter or bylaws establish the detailed scope and range of activities of a research institute and are adopted by the Scientific Council, subject to the opinion of trade unions and approved by the minister supervising the given entity. Research institutes can be transformed into institutes of the Polish Academy of Sciences (PAS), incorporated into the structures of a public higher education institution and be subject to commercialisation and privatisation. The 2010 Act provides the detailed rules for the financial management of institutes.

Institutes manage any acquired and assigned assets independently and act on their own behalf and for their own account in trade. Institutes may also establish scientific and industrial centres. The organisational structure of such a centre may encompass a group of legally independent institutes and other organisational entities that can cooperate by forming clusters, technology parks, technology platforms and other organisational forms appropriate for the purposes and the objects of the relevant centre. The Act of 2010 was developed to facilitate the adjustment of research institutes to building a new knowledge based economy and addressing new challenges consisting of transforming R&D centres into research institutes. The new provisions were intended to serve as an incentive for institutes to merge with educational establishments and PAS institutes in order to reinforce their research potential and have the capacity to compete on the European research market. The mission and objectives of research institutes have been precisely laid down in the Act. They are meant to be characterised by the fact that they conduct research directed at implementation and practical application. The term "research and development unit" has been replaced in the new Act by the name "research institute". This results from the consolidation of many units and the new term provides a better definition of a research centre of great importance on the national and

international arena. The following belong to the core activities of these institutes: the conduct of scientific research and development works, their practical implementation, as well as their expert, standardisation, certification, teaching, etc., activities. The operational framework of these institutes has been specified as has the general principle of reinvesting profits earned to augment the development of institutes. Their scope of activities has been restructured by creating a catalogue of core activities, whereas the rules for conduct of business and the possibility for leaving profits in the institute have been set out in detail along with the requirements pertaining to the function of Director being raised, now requiring such a person to at least hold an academic degree of "doktor" (PhD) and have a good command of a foreign language accompanied by experience in management. Changes in the evaluation commission for the selection of candidates for the post of Director have also been introduced and academic qualification matters have been reorganised. Audits have been foreseen every three years for institutes: within which the financial and management activities as well as the organisation of work will be checked by the competent minister. The new provisions also provide for the performance of mandatory periodical scientific evaluations of the research institutes.

Evaluation of scientific units

The 2013 rules of parametric assessment of scientific institutions were aimed at establishing the scientific level of institutes and the quality of the research and development works conducted by them. The assessment was performed by the Committee for the Evaluation of Scientific Units (CESU) specially appointed for this purpose. Following this assessment, every unit was allocated one of four categories:

A+– Nationally leading level,
A – Very good level,
B – Acceptable level with the recommendation of enhancement of scientific activity,
C – Unsatisfactory level.

The level of subsidies granted to these institutions was dependent on this assessment. A scientific unit that was allocated category C received a grant to maintain its research capacity for a period of 6 months from the day of category allocation, which included the financing of its restructuring costs. The first results of the Polish scientific unit parametric assessments were announced in September 2013. They were evaluated according to a specially adopted algorithm and compared in four groups of sciences: the humanities and social sciences, life sciences, exact and engineering sciences, and the arts and artistic output sciences. Over 960 institutions were assessed. In order to safeguard the objectivity and comparability of the assessment outcomes, the following was scored: scientific and creative achievements, scientific potential, material effects of scientific activities and the most significant effects of scientific activity as indicated by the unit. The category awarded by CESU has a direct impact on the amount of funding since the algorithm according to which the grant from the budget is calculated also takes into account the category awarded to a scientific unit.

Input of research institutes into innovative policy making

Research institutes have a non-uniform structure in terms of the mission, tasks and objectives attributed to them. In many cases, they represent a different scientific level and research infrastructure. They operate mainly in the field of technical and engineering sciences, and agricultural and health sciences. There are only a few entities that operate in the area of humanities. From this perspective, it is difficult to generally, in an undifferentiated manner, unambiguously characterise their research capacity. Technical institutes are somewhat the closest to the tasks that directly target cooperation with enterprises and the implementation of technological solutions into the economy. In agricultural institutes, the goals are more dispersed and are based on ministry-developed multiannual programmes.

Medical institutes are presently in the most difficult situation as they divide their activities in principal into the research and scientific part and the therapeutic part. The problem is the extremely high costs in the therapeutic area, which in turn lead to the overall critical economic situation of these entities.

Analysing research institutes as entities that play a significant role in the formulation of the innovative policy in Poland, their actual participation in its development is worth considering. Recently, a very pro-active attitude can be noticed among the circles representing research institutes — for instance, in the preparation of the draft bill on research institutes and then in opinioning it and preparing the criteria for the new parametric assessment of scientific units in 2017. The General Council of Research Institutions (GCRI) plays an important role in this. Research institutions have for many years participated, through the mediation of the GCRI, in the economic and social and particularly the scientific and innovative policies. Opinions and recommendations are regularly submitted to the state authorities and public administration, actions are undertaken intended to solve common problems relating to institute stakeholders as well as to the advancement of science, to improved innovation and effectiveness of the economy, and to the development of research staff and particularly of young scientists and researchers. Conferences, congresses, seminars, workshops, trainings and exhibitions on the achievements of the institutes as well as press conferences are cyclically organised through the GCRI office. This is accompanied by information, promotional and publishing activities. The GCRI office edits and publishes the "GCRI newsletter", cooperates with the media and governmental and nongovernmental organisations144. The Council has an important role in providing opinions on regulations, arrangements and acts with a direct or indirect impact on the advancement of science and of the economy in Poland.

Towards the end of 2014, a report prepared by Index Copernicus called "The Input of Research Institutes in the Achievements of Polish Science and the Representation of Institute Representatives in the Consultative Bodies of the Ministry of Science and Higher Education" was sent to selected ministries, government agencies, and decision makers.[3] The purpose of the study was to find the answer to the questions posed by the GCRI: "Is the representation of research institutions in the consultative bodies of the Ministry of Science and Higher Education, which have an impact on shaping the scientific policy, adequate to the input of research institutions in the achievements of Polish sciences?" Publicly available data provided by the Ministry of Science and Higher Education for the period

encompassed by the evaluation, namely, from 2009 to 2012, was subject to quantitative analysis.

The following conclusions were published based on the detailed report:

- The percentage share of the representatives of research institutions in the consultative bodies of the Ministry of Science and Higher Education came to around 14 percent compared to the total number of representatives;
- The share in number of research institution research staff in the total volume of employees in scientific units amounts to around 13 percent;
- Research institutions publish the greatest number of articles within peer-reviewed conference articles indexed in the Web of Science;
- In the field of monographs, they are responsible for producing about 7 percent of the achievements compared to other scientific units;
- In volume terms, research institutions are responsible for the generation of 28 percent of the scientific achievements in the field of patents;
- In the period from 2009–2012, research institutions were responsible for 40 percent of the total expenditure on research infrastructure and salaries paid from the own resources of scientific units;
- In the period from 2009–2012, research institutions were implementing national and international projects worth 31 million zloty in total;
- The number of laboratories owned by research institutions approved by competent organisations stands at 591. This constitutes over 70 percent of the total number of all the laboratories submitted by the scientific units;
- In monetary terms, in the years 2009–2012, research institutions were responsible for 84 percent of the revenues resulting from the commercialisation of research results, including the sale of expertise and studies, etc., that reported by scientific units.

A comprehensive quantitative analysis prepared by a team of Index Copernicus experts showed that the total contribution of research institutions to the achievements of Polish sciences came to 34 percent. The above data leads to the arrival of conclusions concerning the great relevance and usefulness of these establishments in the commercialisation of research and its transfer to the economy. They

generate more than 40 times greater revenue on account of this than educational establishments. Research institutions invest in their own research activities from their own funds three times greater amounts on average than higher education establishments. However, they have significantly smaller achievements in the field of publishing in scientific journals and monographs. In many cases, this results from the statutory tasks that are attributed to them and from the inadequate financial means obtained from the state budget for the development of their scientific activity. All in all, it seems that a particularly high disproportion can be noticed to the detriment of scientific institutions in the representation of their representatives in the consultative and expert bodies of Ministry of Science and Higher Education. Research institutions want to have an tangible impact on shaping Polish scientific and innovation policy and they should be given the opportunity to do just this.

Summary

Concluding the deliberations on scientific institutions as one of the innovation policy players in Poland, it can firmly be stated that these organisations have undergone a series of legal and organisational transformations that have led to changes in their functioning over the past two decades. Their number has significantly decreased compared to earlier years and the Act on Research Institutions was amended. They have taken active part in the reform of Polish science; the participation of research institutions in joint projects with economic operators has increased — the direct effect of which has been the introduction of many innovative products and services to the economy. Their social and economic image is also gradually changing from a negative to a positive one in the media. As a result, the need for this kind of establishments to exist and flourish in a modern, innovative economy is starting to be recognised.

The financial situation of research institutions is very vulnerable and unstable. The maintenance of economic stability depends largely on the market situation. The arduous project development procedure, the long

period of waiting for the outcomes of tenders is not at all conducive to the financial liquidity of given research organisations. The frequent changes in financing rules and the regular cuts in annual statutory activity grants have shifted the focus of research institution activities to service activities and concentrated them on winning bids for contracts. At the same time, the possibilities for conducting typical research and scientific and teaching activities subject to the award of a grant under the Act have been limited. The changes relating to research institutions have been summarised in Table 1.

Table 1. **Attempted evaluation of consecutive changes in the functioning of research institutions over the last decade within the restructuring of these establishments**

Positive developments	Negative developments
The restructuring process that has practically been in place since the beginning of the 1990s to the present day. The consolidation of institutes into larger units that have a strong position in the country and abroad.	Restructuring processes have not brought about positive developments in all cases, for instance, in the privatisation process of units or in the consolidation of weaker institutions with successful establishments on the market.
The amendment of the 2010 Act on Research Institutions specifying the tasks and objectives of these entities, the possibility of creating scientific and industrial centres, whose main objective is the implementation of research and participation in large international projects, thus the strengthening of competition of the international market.	The steady year-by-year reduction in the statutory grant mainly assigned to scientific activity
Financial assistance from European Union funds for the years 2004-2006, 2007-2013 and 2014-2020.	The oversight of medical institute issue that has remained unclarified.
Increased activity of research institutions in European Union Framework Programmes	The lack of tax incentives for companies investing in research and development activity.
Amendment of the Public Procurement Law.	The assessment of scientific units in 2013 has not been prepared in terms of the proper assessment of research institution activities

Source: Own elaboration.

The future of institutions and government plans

The implementation of changes in the Polish science sector, also encompassing the reform of research institutions, was announced at the beginning of 2016, one year after the changes implemented in the global political arena and in government bodies. In January 2016, an Inter-Ministerial Committee on Innovation was established. Pursuant to Order No. 6 of the President of the Council of Ministers, the tasks of the Committee will include the "development of proposals intended to increase the innovation of the Polish science sector and economy". The Committee is composed of secretaries and undersecretaries of state from 10 ministries: Development, Science and Higher Education, Digitalisation, Finance, State Treasury, National Defence, Environment, Health, National Education, and Energy. The project called "The Agenda for Sustainable Development" was published in May 2016, which also identifies the key tasks to be developed and implemented by 2020 and will constitute an instrument for the flexible management of the main developmental processes in the country. This document also includes the following provisions pertaining to innovation and research institutions:

1. "Corporate Constitution" — a new, coherent act governing the rules of business in Poland;
2. A new Act on the Promotion of Innovation — preceded by the "Innovation White Paper";
3. **The reform of research institutions to enhance the transfer of knowledge to business, address strategic needs of the state through the consolidation, commercialisation and coordination of undertaken actions;**
4. Actions to help mobilise private capital for carrying out R&D works, increasing the market potential of conducted research and the degree of commercialisation of R&D results, which also include:
   - Strong support (from public funds) for innovative solutions that also have a positive environmental effect,
   - Increasing the thematic concentration of R&D&I spending based on National Smart Specialisations and Key National Clusters (e.g., first speed programmes),

5. **The reform of research institutions, namely the prioritising of research institutions in terms of sector specialisations ensuring the possibility of interdisciplinary research, the consolidation of research institutions — the creation of entities that are capable of competing on a global market, rewarding cooperation with industry through an adjustment of the system of evaluation of institute activity performance;**
6. Animating cooperation between the science and business sectors and the establishment of strategic business partnerships — broader utilisation of the potential of Working Groups for National Smart Specialisations (NSS) and Smart Labs.
7. Enhancing the use of the existing R&D infrastructure.

Another evaluation of research entities will be conducted in 2017. Consultations are currently in progress with the general public on the draft bill on the criteria and method of granting of the scientific category to scientific institutions. The draft bill amending the rules relating to the categorisation system for scientific institutions was created as a result of a public debate. After the completion of the environmental debate, opinions on the ideas of the Committee for the Evaluation of Scientific Units[4] were collected and analysed and later used to develop the consulted draft bill. CESU proposals also concerned a change in the evaluation rules, the simplification of procedures and taking greater account of the diversity of achievements and the innovativeness of scientific units. The proposed changes resulted from an analysis of the results of parameterisation conducted in 2013, which also included questionnaires, remarks and comments submitted by scientific units. They are also the fruit of numerous consultations with conferences of rectors, the Presidium of the Polish Academy of Sciences, and the leadership of the Ministry of Science and Higher Education. The new financing rules of science that are in force since 1 January 2015 and the proposals presented by CESU belong to the strategy for the implementation of strategic objectives of the Ministry of Science. They will reinforce the quality, innovation, and interdisciplinarity of research as well as be conducive to the openness and the internationalisation of Polish science.

Note that six research institutions have been wound up over the last few decades, while others were subject to privatisation or consolidation. Consolidation was not always conducive to the strengthening the research potential, although it was, in many cases, an advantageous solution for weaker and inefficient establishments that would otherwise be closed down. On the other hand, however, it also reduced the potential of stronger entities. Accession to the European Union is a time to make use of the possibilities for obtaining external funding but also a time of having to face strong competition from research institutions from the so-called Community of Fifteen.

There are many factors contributing to the proper functioning of the R&D sphere in every country and the duplication of patterns from highly developed countries in the reform of science in Poland must always be carefully thought out and tailored to the contemporary realities of a given State. Examples of other highly developed innovative States clearly demonstrate that neither excessive reliance on a free market without the interference of the State nor excessive bureaucracy and centralisation are constructive tools in building a knowledge based economy.

This publication was prepared on the basis of the doctoral thesis titled "Research Institutions in Polish Innovation Politics within the Framework of Membership in the European Union" written in the Institute of Political Sciences of the Cardinal Stefan Wyszyński University (UCSW) under the supervision of Prof. Aniela Dylus. The thesis was reviewed by Prof. Leszek Rafalski and dr hab. Piotr Broda-Wysocki. The defence of the doctoral dissertation was held 15 October 2015 at the Institute of Political Sciences, UCSW.

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[1] http://isap.sejm.gov.pl/DetailsServlet?id=WDU20100960618 (27.08.2016)

[2] Cf. Act of 25 July 1985 on Research and Development Units (Journal of Laws of 2008, No. 159, item 993, as amended). Repealed. Act of 5 July 2007 on the amendment to the Act on Research and Development Units (Journal of Laws of 2007, No. 134, item 934). Act of 30 April 2010 on Research Institutes (Journal of Laws of 2010, No. 96, item 618).

[3] Index Copernicus "The Input of Research Institutes in the Achievements of Polish Science and the Representation of Institute Representatives in the Consultative bodies of the Ministry of Science and Higher Education", Warsaw 2014.

[4] The Committee for the Evaluation of Scientific Units — established in 2010 within the higher education reform — is an opinion giving and advisory body of the Ministry of Science and Higher Education. It is to evaluate the work of all scientific units, thus, also institutes like the Polish Academy of Sciences, reserach institutions or certain higher education faculties.

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