## OUTLINE OF THE ACTIVITIES OF RESEARCH INSTITUTES AND THEIR IMPACT ON THE DEVELOPMENT OF INNOVATION IN THE POLISH ECONOMY

ZARYS DZIAŁALNOŚCI INSTYTUTÓW BADAWCZYCH ORAZ ICH WPŁYW NA ROZWÓJ INNOWACYJNOŚCI POLSKIEJ GOSPODARKI

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**Abstract:** The purpose of this article is to discuss issues concerning the influence of the scientific and business communities on the level of the development of innovation by characterising selected aspects of the activities of research institutes; the National Centre for Research and Development, and the area of tax legislation that has been directed towards supporting entrepreneurs conducting research and development activities. The development of science is the foundation of technical and social progress and a source of dynamic economic growth. Without scientific and research activities, it is difficult to imagine the development of civilisation, which in its current form of technological advancement requires in-depth scientific knowledge. This publication analyses the role of research institutes in creating modern technologies, and points to solutions that can support the building of cooperation between different entities in innovative activities.

Keywords: research institute, innovation, R&D relief, technological revolution, science funding

**Streszczenie:** Rewolucja naukowo-techniczna, której najnowszym katalizatorem stała się pandemia COVID-19, uruchomiła procesy przemian zarówno w nauce, technice, środkach produkcji, jak też w sposobie zarządzania zasobami ludzkimi. Jednak ta rewolucja to nie tylko nowe technologie oraz zmiany społeczne i kulturowe, to także przyspieszenie postępu cywilizacyjnego poprzez m.in. zwiększenie innowacyjności. Celem artykułu jest omówienie zagadnień dotyczących wpływu środowisk naukowych i biznesowych na poziom rozwoju innowacyjności poprzez scharakteryzowanie wybranych aspektów działalności instytutów badawczych, Narodowego Centrum Badań i Rozwoju oraz tego obszaru ustawodawstwa podatkowego, które zostało ukierunkowane na wsparcie przedsiębiorców prowadzących działalność badawczo-rozwojową. Rozwój nauki jest fundamentem postępu technicznego i społecznego oraz źródłem dynamicznego wzrostu gospodarczego. Bez działalności naukowo-badawczej trudno wyobrazić sobie rozwój cywilizacji, która w obecnej formie zaawansowania technologicznego wymaga pogłębionej wiedzy naukowej. Niniejsza publikacja analizuje rolę instytutów badawczych w tworzeniu nowoczesnych technologii oraz wskazuje na rozwiązania, które mogą wspierać budowanie współpracy różnych podmiotów w ramach działań innowacyjnych. **Słowa kluczowe:** instytut badawczy, innowacyjność, ulga B+R, rewolucja technologiczna, finansowanie nauki

#### Introduction

The scientific and technological revolution, most recently catalysed by the COVID-19 pandemic<sup>1</sup>, has set in motion processes of change in science, technology, means of production; as well as in the way human resources are managed. However, this technological revolution is not only about new

technologies and social and cultural changes, it is also about accelerating the progress of civilisation through increased innovation. The publication discusses issues concerning the influence of the scientific and business communities on the level of the development of innovation by characterising selected aspects of the activities of research

elimination of as many as 85 million jobs globally. Read more on this topic in the report *Prognozowane zmiany na rynku pracy. Przegląd scenariuszy* developed on behalf of the Polish Agency for Enterprise Development.



<sup>&</sup>lt;sup>1</sup> According to the World Economic Forum, pandemicdriven technological developments will lead to a situation where the division of work time between humans and machines will be nearly equal by 2025. This means the

institutes; the National Centre for Research and Development, and the area of tax legislation that directed towards supporting has been entrepreneurs who conduct research and development activities. The considerations presented in this work are the result of many years of my own research (Wyszomirska-Łapczyńska, 2014, 2019, 2022) and participation in the work of the VAT Team of the Scientific and Technical Council to the Minister of Internal Affairs and Administration<sup>2</sup>, and in the proceedings of the administrative court in cases concerning the taxation of projects subsidised by the National Centre for Research and Development.

In the Polish system of higher education and science, one of the organisational and legal forms of conducting scientific and research activity are research institutes, whose legal status and scope of activity is currently regulated by the Act on research institutes. However, before research institutes assumed their present legal form, for several decades they had operated in various forms, starting with the first such units established on Polish soil in the second half of the 19th century, through the 15 research institutes which operated vigorously during the Second Republic of Poland, to the modern period of the institutes' activity - counting from the early post-war years until the present day. In the first years after the end of the Second World War, with a view to the reconstruction of a specific area of the economy, individual institutes were established on the basis of separate lex specialis acts, and it was only the Decree of the Council of Ministers on the organisation of science and higher education, adopted in 1947, that prepared the legal basis for the establishment of scientific and research institutions subordinate to the Minister of Education. A year later, a decree was issued establishing the Main Scientific and Research Institutes of Industry, which were replaced in 1951 by the Scientific and Research Institutes. In a further amendment that took place in 1961, the legislator proposed two types of departmental science and research institutes, i.e. inter-industry institutes - managed by individual ministries, and industry institutes - supervised by the Unions, grouping a particular industry or service sector during the communist period (1945-1981). The last legal act regulating the activity of the institutes before the system transformation, was the Act on research and development units of 1985, which

included scientific and research and development institutes, research and development centres, central laboratories and other organisational units whose primary task was to carry out scientific research and development work serving social life and specific areas of the national economy (Articles 1 and 2 of the Act). The political and economic changes that took place in Poland after 1989 triggered the process of transition of the Polish economy from a centrally controlled economy to a free market economy. Price liberalisation, privatisation of the economy, the development of the capital market and intensification of foreign direct investment took place. Therefore, in such a new economic reality the need arose to reform research and development units and to adapt their activities to the needs of the free market. The first amendments to the law took place as early as 2000, while further attempts to streamline and modernise the activities of research and development units were proposed by the legislator in the Act of 5 July 2007 amending the act on research and development units. However, the amendments to the regulations mentioned above did not meet all the expectations placed on them, which is why a new Act on research institutes was passed in 2010, which has been amended several times and is still in force today. An analysis of the various stages of the evolution of the regulations on research institutes allows for the formulation of a thesis that links all regulations - regardless of the political and social conditions in which the institutes operated. The research carried out in this respect entitles one to conclude that the common denominator was and still is the particular importance of research institutes for the development of Polish science and for increasing innovation and efficiency in the economy.

# Research institutes as a form of scientific and economic activity of the State

The *de lege lata* status of research institutes is defined by the Act on research institutes. It regulates both the organisational and legal status of research institutes, the subject of their activities, the principles of economy, the institute's bodies, personnel and supervisory issues, as well as introducing the possibility of privatisation and commercialisation of institutes and opening the institutes to cooperation with the private capital.

<sup>&</sup>lt;sup>2</sup> Coordinator of the VAT Team, appointed by Resolution No. 3/2019 of the Scientific and Technical Council to the Minister of Internal Affairs and Administration of 11 June 2019 on the appointment of a task force on the issue of

taxation of goods and services tax on grants provided by the National Research and Development Centre for research and development projects in the area of "Security and Defence".

According to the statutory definition, a research institute is a state organisational unit separated in legal, organisational, economic and financial terms, which conducts scientific research and development work aimed at their implementation and application in practice (Article 1(1) of the Act). An institute may be established if there is a need to conduct activities in a given field and the necessary staff with appropriate qualifications and research and laboratory apparatus, IT potential and other necessary material and technical conditions are provided. The basis for the establishment of an institute is a decree of the Council of Ministers issued upon the proposal of the minister competent for the planned activity of the institute, submitted after consultation with the Minister for Higher Education and Science. Due to the fact that institutes are supervised by the competent ministers, they are often referred to as "departmental institutes". The extent and nature of supervision depends on the type of organisational relationship and functional between the supervisory authority and the supervised entity. However, irrespective of the nature of these links and the intensity of supervisory interference, there are common elements to each type of supervision. In all cases, supervision serves the purpose of preventing or remedying violations by the authority taking sovereign action to bring about or maintain a state of lawfulness. In addition to the leading criterion of legality, the authority also uses complementary criteria in its supervisory activities, such as the assessment of the purposefulness, economy and integrity of the supervised entities.

In the Act on research institutes, the legislator has singled out a special category of institute. A research institute, being a state legal person, may be granted the status of a "state research institute" if there is a need to commission it to perform, on a continuous basis, tasks of particular importance for the planning and implementation of state policy, the performance of which is necessary to ensure defence and public security, the operation of the judiciary, the protection of national heritage, the development of education and culture, physical culture and sport and the improvement of the quality of life of the citizens (Dytko, 2018). It should be mentioned that there are currently 95 research institutes operating in Poland, of which only 24 have the status of a "state research institute", which indicates their special

character and position among other research units<sup>3</sup>.

The adaptation of research institutes to the surrounding reality is a continuous process. Therefore, it can be predicted that it will continue as long as these activities influence technical and social progress. The current state of affairs clearly indicates that the impact of the institutes on the economy is increasing due to the need to introduce advanced technologies, without which the civilisational development of the country is no longer possible in the 21st century.

A special role in strengthening the potential of the institutes is played by the General Council of Research Institutes (RGIB), which, in accordance with Article 33(1) of the Act on research institutes, represents all research institutes, including the institutes of the Łukasiewicz Research Network. The Council, composed of 31 democratically elected representatives of research institutes, represents the interests of the institute community both nationally and internationally. It also plays a major role in economic and social policy, in particular science and innovation policy, through representing vis-à-vis the authorities of state and local governments, scientific, economic and social organisations and opinion formers. RGIB also participates in economic and social as well as scientific and innovation policy. It submits opinions and postulates to the state authorities and administration, undertakes activities aimed at solving problems common to the environment of research institutes, as well as for the development of science, improvement of innovation and efficiency of the economy. It should be noted that research institutes carry out a broad spectrum of for the economy, infrastructure, research environment, agriculture, health services and, of course, security in the broadest sense. A large group of institutes fulfil public service obligations, and numerous solutions created in the laboratories of research institutes serve the country's defence. As Professor Leszek Rafalski emphasises "very important for the General Council of Research Institutes is the activity of the institutes precisely for the improvement of the country's security in many aspects, especially defence, but also cyber security, energy security, and health, environment, food and nutrition"4.

The Institute's fulfilment of its statutory core, ancillary and so-called "other" tasks does not exclude the possibility of the Institute operating

<sup>&</sup>lt;sup>3</sup> The number of institutes, including national research institutes, was determined on the basis of the list contained in the IB Database of the General Council of Research Institutes.

<sup>&</sup>lt;sup>4</sup> Interview with prof. Leszek Rafalski, PhD Eng. – Chairman of the General Council of Research Institutes of 21 February 2022.

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within scientific and industrial centres. "Other" does not exclude the possibility of the institute's operation within scientific and industrial centres. The condition for the establishment of such a centre is the establishment of scientific and economic cooperation by at least one research institute and at least one unit of the economic sector. The centres may also include universities and scientific institutes of the Polish Academy of Sciences and foreign scientific institutions. Scientific and industrial centres operate on the basis of agreements concluded between the interested entities, and their main tasks include, among others, cooperation in the implementation of the results of the scientific and technical work of the centre, organising the exchange of employees and students between institutes and universities and entrepreneurs, initiating and coordinating the participation of institutes, entrepreneurs and universities in international research programmes or acquiring and servicing international research projects, joint national research projects and those financed from the European funds (Sojkin, 2010). It should also be noted that by providing commercial services to the entrepreneurs and the state authorities and institutions, research institutes increase their financial and organisational potential and enhance innovation and competitiveness of other entrepreneurs. In pursuing the objectives mentioned above, they act strictly as entrepreneurs, which in the case of research

institutes combines public activity with profitoriented commercial activity.

#### The role of the National Centre for Research and Development in the implementation of the State's scientific, scientific-technical and innovation policy

The process of financing scientific research and development works carried out by consortia established by research institutes, entrepreneurs and scientific institutions is part of the strategy of economic development. The National Centre for Research and Development (hereinafter: NCBR) remains the "intermediary" between the consortia and the State Treasury – the recipient of the results of scientific research and development works.

The Centre operates on the basis of the Act on the National Centre for Research and Development, according to which NCBR is an executive agency within the meaning of Article 18 of the Act on Public Finance, established for the implementation of tasks concerning the state's scientific, scientific-technical and innovation policy. According to the data published recently on the implementation of the NCBR's budget for the implementation of programmes in 2020, it follows that within the framework of national programmes, the Centre spent the amount of PLN 789.960 million, of which the largest part in the amount of as much as PLN 233.885 million was allocated to "Security and Defence".



**Figure 1.** Implementation of the NCBR budget for programme implementation in 2020 Source: NCBR activity report for 2020.

Through the implementation of programmes and projects, NCBR not only increases the potential of Polish scientific and industrial entities, but also strives for technological independence through the creation of Polish "know-how" in the area of technologies critical for national security and defence. The programmes and projects are developed in accordance with the assumptions of priority technological areas defined for the 7th strategic direction of scientific research and development works - national security and defence, included in the National Research Programme (KPB) established by the Resolution of the Council of Ministers No. 164/2011 of 16 August 2011. Strategic programmes - aimed at solving specific scientific, technical or social problems - are developed on the basis of the National Research Programme, approved by the Resolution of the Council of Ministers of 16 August 2011. The designation of strategic directions of scientific research and development works by the National Research Programme provides the NCBR Council with the basis for the development of draft programmes, the implementation of which integrates the best scientific and research teams and business circles around areas crucial for the country's economic dynamisation.

Pursuant to Article 27(1) of the Act, the Centre manages strategic scientific research and development programmes and finances or co-finances these programmes. Strategic programmes of scientific research and development works, including those for national defence and security, are financed from funds referred to in Article 365(11) of the Act - Law on Higher Education and Science, which does not exclude the possibility of financing NCBR's tasks also from funds coming from sources other than the state budget. At the same time, it should be noted that NCBR, apart from managing strategic projects, may also implement programmes of scientific research or development works that have not been established in the state's scientific policy specified by the Council of Ministers. Obviously, the priorities indicated by the Council of Ministers with regard to the functioning of the system of higher education and science are a strategic document; nevertheless the long-standing activity of the Centre indicates that NCBR implements a broad spectrum of research and development works.

In conclusion, the delegation of such broad competences and instruments for granting funding to the Centre indicates the special role that the State has assigned to this executive agency in the implementation of undertakings stimulating the civilizational development of the country. NCBR is certainly a key centre initiating, supporting and creating innovative technological and social solutions. The volume of the donated funds is also impressive. Over the last ten years (until 2021), NCBR provided 66 billion zlotys of European and national funds to Polish enterprises, universities and research institutes to support R&D works, encouraging both experienced innovators and start-ups and scientists to start working on their innovations<sup>1</sup>. In fulfilling its tasks, NCBR also significantly supports research institutes, which to a large extent carry out strategic programmes of scientific research and development works precisely with the funds obtained from the National Centre for Research and Development.

### The R&D tax credit

When discussing the impact of scientific and research activities on the civilisational and economic development of the country, one cannot overlook the contribution of the tax legislator in creating instruments to encourage entrepreneurs to develop their business activities also in the area of research and development. One form of incentive for research and innovation work is the introduction in 2016 of the research and development tax credit, known as R&D for short. It is currently the most attractive way to support entrepreneurs engaged in research and development activities, and the scale of the relief shows how important this type of activity is for the development of the country's economy.

R&D relief, related to research and development activities, is regulated in Article 18d(1) of the Act on Corporate Income Tax. Pursuant to the aforementioned provision, a taxpayer earning income other than the income from capital gains deducts from the tax base, determined in accordance with Article 18, the tax deductible costs incurred for research and development activities, hereinafter referred to as "the qualified costs". The amount of the deduction may not exceed the amount of the income earned by the taxpayer from the income other than from capital gains in a tax year. The essence of the allowance thus boils down to the possibility of deducting outlays and expenses by those entrepreneurs who systematically allocate resources to discovering new technologies, expanding their knowledge and finding new applications for various production technologies and inventions.

As part of the R&D relief, one can deduct, *inter alia*, outlays for remuneration, employees' social security contributions, as well as a part of the expenses incurred for, *inter alia*, the use of equipment or the purchase of raw materials and

<sup>&</sup>lt;sup>1</sup> Excerpt from an interview with the Director of NCBR of 2 December 2021.

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materials for research and development works. Entrepreneurs may deduct eligible costs incurred as part of research classified as fundamental, provided that such research is conducted on the basis of a contract or agreement with one of the entities indicated in Article 7(1)(1), (2) and (4) to (8) of the Act – Law on Higher Education and Science.

Thus, an entrepreneur, wishing to take advantage of the relief, will be obliged to establish cooperation with a research institute, a university, a federation of entities of the higher education and science system, a scientific institute of the Polish Academy of Sciences, an international scientific institute, the Łukasiewicz Centre – operating on the basis of the Act on Łukasiewicz Research Network, an institute operating within the Łukasiewicz Research Network, the Polish Academy of Arts and Sciences or any other entity conducting mainly scientific activity in an independent and continuous manner. According to a report by the National Centre for Research and Development, over the years 2015-2021, large companies in Poland have submitted applications to NCBR for funding a total of PLN 20.99 billion.



**Figure 2.** Funding of R&D activities in large companies and absorption potential in the next financial perspective Source: Report of the National Center for Research and Development, Analysis and Evaluation Section.

#### Assessment of the innovativeness and competitiveness of the Polish economy in comparison with other EU countries

The presentation of the historical outline of the evolution of regulations concerning research institutes and the discussion of the role of NCBR and the General Council of Research Institutes was a deliberate effort to emphasise the importance of these entities in building a modern economy. Poland's membership of the European Union and the dependence of the country's economy on new innovative solutions has influenced the current shape of the higher education and science system and the activities of research institutes and entities financing research and development activities. The strict dependence of the level of economic development on the degree of innovation is an obvious and unquestionable fact. However, another issue requiring consideration is the assessment of the

innovativeness and competitiveness of the Polish economy in comparison to other EU countries and the role of research institutes in bringing science and business together. In light of the data of the EU innovation ranking (European Innovation Scoreboard), out of the surveyed 27 EU countries, Poland was ranked fourth from the bottom in 2019 and was classified as a "moderate innovator".

The aforementioned study pointed to the weak innovative activity of enterprises, the low number of patent applications in the European Patent Office procedure or the low revenue from the sale of patents and licences abroad, as well as the low ratio of R&D expenditure to GDP.

As far as the contribution of research institutes to innovation development is concerned, it has also been established as low and in need of significant improvement. Such conclusions were included both in the *Strategy for Responsible Development until 2020 (with an outlook until 2030)*, as well as in the information of the Supreme Chamber of Control on the results of the audit concerning financial management of research institutes (case no.: KGP.430.012.2020; reg. no. 181/2020/P/20/014/KGP).

The Supreme Chamber of Control, referring to the SOR diagnosis based on the Deloitte report found that "research institutes insufficiently fulfil their mission of bringing science closer to business (The Deloitte Central European Corporate R&D Report 2018). In turn, the low propensity of companies to cooperate with other entities (both business and the world of science) greatly affects their innovativeness. Research indicates that seeking a project partner is often perceived by entrepreneurs as a formal requirement, necessary to obtain financial support, rather than as a source of economic benefit" (page 8 of the information on the results of the audit).



**Figure 3.** Innovation performance of EU countries according to the European Innovation Scoreboard Source: *European Innovation Scoreboard*. Retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/ QANDA\_20\_1150 (10.05.2022).

#### Conclusions

What actions could facilitate more effective cooperation between business and science and thus increase the level of innovation in the Polish economy? It seems that it is necessary to remove systemic barriers and improve innovation support instruments at the national and regional levels. The state should also allocate more resources to R&D relief and intensify interest in the results of research work on the part of the economy, which would directly increase the profit of research institutes from the sale of their intellectual output.

The issues addressed in this article are an attempt to bring closer the issues related to both the legal status and the positioning of research institutes in the economic and scientific space.

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Due to the fact that all spheres of public life politics, the country's economy and, of course, all kinds of innovation processes are inextricably linked to legal regulations, the publication discusses a number of legal acts with particular emphasis on the Act on Higher Education and Science, the Act on Research Institutes, the Act on NCBR and the Act on Corporate Income Tax. As a result of the legal analysis, the author formulated the thesis that the effectiveness of legislation depends on the degree of development of the legislation and finding a common denominator between the intentions of the authors of the legislation and the social and economic needs. At the same time, the article proposes solutions that would "stimulate" the innovativeness of Polish entities conducting scientific and R&D activities.

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