



ROLE OF A TECHNOLOGY TRANSFER PLATFORM IN COMMERCIALIZATION OF RESEARCH RESULTS



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Summary

Creating a technology platform facilitating the process of knowledge and technology transfer is one of the ways to strengthen the ties between the R&D sector and industry.

Technology platform is a tool supporting marketing activities undertaken at research organisations, which enables effective implementation of research results. Concurrently, it also helps one to identify actual market needs and requirements as far as innovative technologies are concerned.

Within the platform, innovative product and process technologies are promoted and effective technology transfer mechanisms and structures are established and assessed. Besides, the platform enables the analysis of potential innovation development directions rooted in the actual market needs and economic trends.

The articles presents good practices in the activity of a technology platform developed at a R&D organisation and gives an overview of successful cooperation with industry enhancing commercialisation of research results.

Keywords: technology platform, cooperation network, science to business, commercialisation of research results, marketing, dissemination

Introduction

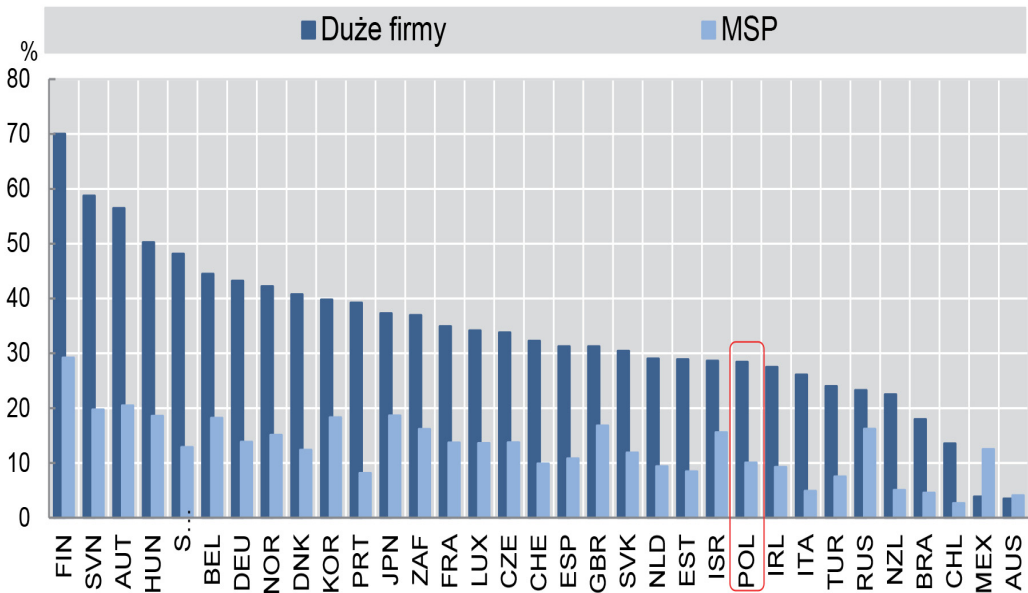
Economic conditions, as well as the changing system of financing research with funds from the European Union pose new challenges ahead of scientific-research institutions, above all in the process of commercialization of R&D results, where conducting research motivated by market needs is becoming an important aspect. In highly industrialized countries big business entities, including international concerns, work intensively in their laboratory centres on solving technological problems encountered during their operations. This is a different economic model than the one in Poland, which is formed mainly by companies from the group of small and medium companies without research facilities and R&D structures, which clearly points to the need to work out mechanisms in the relations between science and business in order to carry out implementation projects supporting innovativeness and competitiveness of Polish industry, leading to greater efficiency of the economy.

OECD data (OECD, 2013) show that only every third big company in Poland cooperated with research units on the development of innovative products and services. Among companies from the SME sector only one out of ten companies cooperated with research units (picture 1.).

This result puts Poland outside the top 20 among the countries listed by OECD. Similarly, Poland occupies a distant position in OECD's list of countries with highest share of private spending in total spending on research and development. With the share of private capital in financing research and development at just 1% of GDP Poland is outside the top 30 and is well below the average for both the whole OECD and 28 EU Member States.

Taking into consideration the comparably strong influx of public funds to the R&D sector, associated with the access to EU structural funds, mobilizing private capital to invest in research and development will define the development of this area of economy in the long term. For this reason, all forms of supporting cooperation between science and entrepreneurs are particularly precious.

Picture 1. Companies cooperating in the area of innovation with universities, or public research units, taking into consideration company size, 2008–2010



Source: *OECD Science Technology and Industry Scoreboard 2013*. OECD publishing
http://dx.doi.org/10.1787/sti_scoreboard-2013-en (02092015).

One of the methods which can contribute to improving cooperation between research-scientific units and business entities, facilitate reducing barriers existing between the participants of the process of implementing innovative solutions in business practice and thus support the processes of commercialization of R&D works is the construction of networks (platforms) of cooperation between the scientific and business environment.

Organizational structures supporting the process of commercialization of the results of R&D works

What plays a crucial role in the process of diffusion of innovations are organizational structures supporting the efficient implementation of the process of transfer of research results to industry, stimulating the practical

utilization of the results of research in commercial applications, especially in the SME sector. These structures are involved in the implementation of various stages of the research and implementation process and offer diversified forms of support for the transfer of technology to market practice, from consulting services and trainings eg. on the subject of creating spin-off companies, licensing and patenting the results of research works, to active search for the recipients of research results and providing them with financial support.

The conducted analysis of literature on the subject (Kowalczyk, Mazurkiewicz, Trzos, 2000; Santarek, 2008; Comacchio, Bonesso, Pizzi, 2012; Bąkowski, Mażewska, 2015) suggests that in countries characterized by high level of innovativeness and high competitiveness the most popular organizations supporting the efficient implementation of the process of transfer of research results to the industry are innovation and entrepreneurship centres including, among others: science-technology parks, business incubators, technology transfer offices, innovation centres. Also the networks of cooperation between the R&D sector and the industry play a major role.

The network of cooperation between the R&D sector and industry is understood as a long-term, formalized relationship between partners cooperating with an area allowing the implementation of a common venture.

International experiences show that network forms of cooperation are beneficial for both scientific units and companies, they intensify the processes of commercialization, they reduce the severity of negative phenomena on the labour market, they stimulate the growth of companies' competitiveness.

On the basis of conducted analyses it was concluded that (Walasik, 2012) network cooperation facilitates the process of collecting, processing and using knowledge and the transfer of technology. It also streamlines communication between entities interested in implementing an innovation. Network cooperation makes it possible to achieve the effect of scale, stimulate the intensification of innovative processes in companies. The network makes it possible to transform knowledge into products through sharing focused operational tools, sometimes sharing financial assets necessary in this process, which would normally be unattainable for an individual company, especially from the SME sector.

Cooperation networks can be formed through the establishment of project consortia (eg. Industriell Dynamik, Sweden), or based on Internet applications (eg. Madri+d, Spain). Cooperation networks help companies initiate actions associated with innovations (eg. Syntens, Holland), they promote the development of research and implement the policy of stimulating and encouraging innovativeness (eg. Setn, Great Britain), they hold conferences and organize fairs (eg. Syntens, Holland), they help find project partners and trade partners (eg. NanoBioNet, Germany). Platforms provide assistance in the process of transforming solutions constituting the effects of scientific research into innovative products, processes and services generating added value (eg. Jinnove, Francia), they support the development of start-up and spin-out companies (eg. Yet2.com, USA), they deal with business consulting for companies (eg. Syntens, Holland), they launch programmes supporting entrepreneurs, e.g. in form of grants (eg. Jinnove, France), they run marketing activities supporting entrepreneurs (eg. Syntens, Holland), they deal with promoting science and technology and offer apprenticeships, as well as trainings (eg. Syntens, Holandia, Madri+d, Spain).

What contributes greatly to the effective functioning of network forms of cooperation are advantageous regulatory conditions, transparent system of protection and control over intellectual property, as well as a transparent mechanism of commercialization. In Polish economy these are the factors that have to be regulated to allow networks to develop fully, efficiently using high potential of Polish scientists and stimulating the economic growth of the country.

Main tasks of a technological platform

The goal of a networking form of cooperation created as a technological platform, embedded in the organizational structure of a scientific-research unit is disseminating information about the conducted scientific, development and implementation activity and about innovative projects, new technologies developed by the science sector, as well as organizing and supervising the establishment of scientific-industrial consortia focused on the implementation of research-implementation projects. Among the

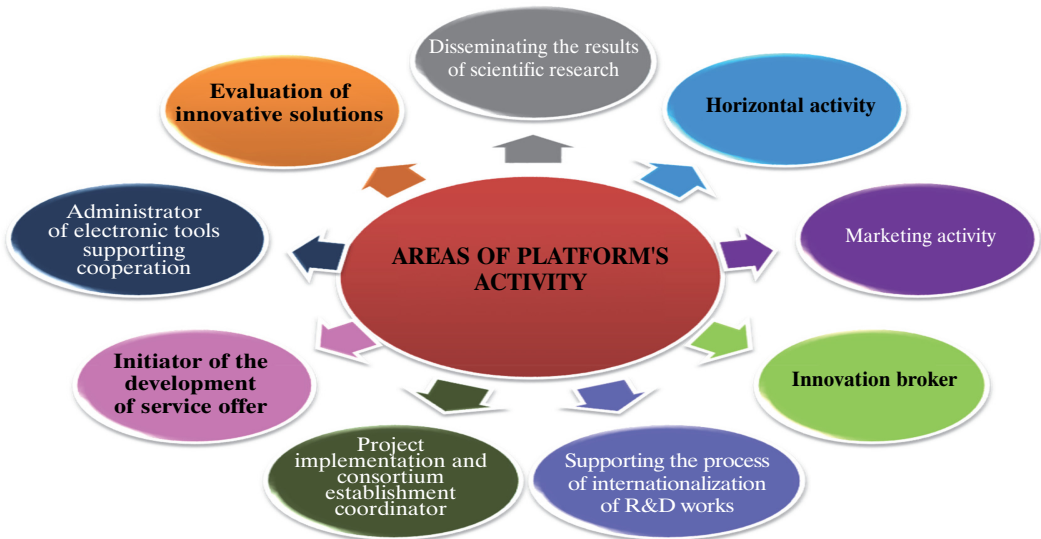
directional (partial) goals of the platform there are:

- diffusion of knowledge about projects conducted by scientific-research units, including granting access to research results to members of a platform, as well as disseminating information about innovative technological solutions in the economy;
- creating effective structures and mechanisms for the transfer of R&D results and the assessment of these structures;
- commercialization of innovative technological solutions in the economy;
- generating new ideas concerning innovative solutions.

Achieving goals requires from a scientific-research unit taking such steps as: (Picture 2):

- **Disseminating scientific research results** — conducting dissemination activities¹, including the identification of the results of R&D works with an appropriate market potential eg. by using a designed and implemented complex system of assessment of technologies (Mazurkiewicz, Poteralska, 2012, p. 5).
- **Horizontal activity** — working out and illustrating the contents promoting the activity of a research-scientific unit and platform, supervision over the preparation of promotional products and the distribution of these products among the target groups, building a positive image and strengthening the brand of a product in the country and around the world.
- **Marketing activity** — working out and implementing a marketing strategy, the participation of scientific-research unit in fairs, events, branch meetings, holding conferences, seminars, coordination of works conducted in course of submitting documents in contests organized by various external institutions (eg. Laur Innowacyjności), creating product offer using the marketing mix concept.
- **Supporting the process of internationalization of R&D works** — taking actions in an area complying with the strategy of a scientific-research unit focused on the internationalization of R&D works, creating international scientific-industrial consortia in order to participate in international contests (among others: Horyzont 2020).

Picture 2. Areas of activity of a technological platform created in a scientific-research unit



Source: own materials.

- **The activity of an innovation broker** — organizing cyclical meetings, discussions among partners, collecting proposals for the subjects of cooperation, regular contacts with members of the platform, initiating communication and intermediation in communication, eg. through contact with an industrial partner aimed at identifying his needs and later starting cooperation between appropriately matched sides (teams), building trust, highlighting the benefits from cooperation, starting network cooperation — within clusters, associations and other organizations gathering entrepreneurs.
- **Coordinating the process of building consortia and carrying out projects** — designing databases and filling them with data — containing information concerning the demand for technologies, proposals for subject projects and data about entities interested in starting cooperation with a scientific-research unit. Organization and supervision over the process of building scientific-industrial consortia, monitoring the activity of these consortia — especially their effects and recording statistics associated with the activity, which may serve the purpose of benchmarking among potential partners and internal motivation for other teams, as well as sharing information about the results of consortium members' works with the public.

- **Initiating the development of service offer** — disseminating information about the provision of services offered by a scientific-research unit, which is often the first step in contacts with clients. At the same time, service carried out in a professional way paves the road to developing further cooperation with companies.
- **Managing electronic tools supporting cooperation**, disseminating information about innovative solutions constituting the result of scientific research and development works at a scientific-research unit (among others: newsletter, Internet website), supporting the process of commercialization of R&D works.
- **Evaluating innovative solutions** — carrying out evaluations of innovative technological solutions depending on, among others, the choice of transfer mechanism (in case of external orders — supervision and coordination of works).

Tasks taken up within the framework of the platform are carried out in cooperation with organizational units of a scientific-research entity — both with research-scientific establishments and administrative units. In association with carrying out these tasks the platform also serves functions of the following character:

- supervisory (e.g. building consortia),
- administrative (e.g. electronic tools),
- integrating (e.g. cooperation broker),
- as well as executive (e.g. evaluating solutions).

Exemplification of the functioning of the platform generates benefits both for a scientific-research unit, the partners (members of the Platform), the economy and the society. Among the benefits achieved by scientific-research units there are in particular:

- promoting activity, disseminating information about conducted research and achieved results,
- monitoring the dissemination of results for managerial and supervisory needs,
- building a positive image of a scientific-research unit,

- developing the sphere of provision of innovative services,
- growth of interest in the offer of a unit,
- commercialization of innovative solutions.

Partners will obtain information concerning:

- the available innovative product and process solutions,
- technology development trends in areas within the scope of their activity and
- the opportunity to take joint, or coordinated actions resulting in the introduction of innovative solutions to the market.

As a result, the implementation of innovative solutions may lead to:

- expanding the product range and growth of sales,
- modernization of technology,
- growth of efficiency and reduction of costs, as well as
- gaining competitive edge on particular segments of the market.

The following can be recognized as generating benefits for the economy and the society:

- activation and integration of scientific circles and business,
- limiting the harmful impact of technological processes,
- creating new jobs, etc.

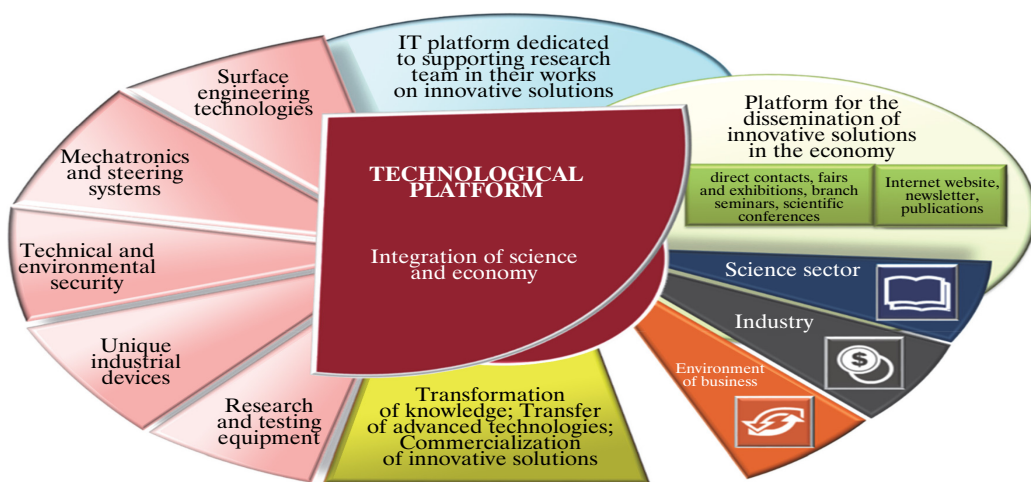
Tightening the cooperation between scientific-research units and business contributes to stimulating the transfer of new knowledge to business practice.

Concept and structure of the technology platform established at the Institute for Sustainable Technologies — National Research Institute

In order to strengthen the cooperation of the sector of science and business the Institute for Sustainable Technologies — National Research Institute in Radom (ITeE — PIB), as a result of carrying out a research project titled

"Platform for the dissemination of innovative solutions developed by science sector units in the area of sustainable development in the economy", under the Strategic Programme titled "Innovative systems of technical support for sustainable economic development" initiated in cooperation with BCC the establishment of a model network form of cooperation — technological platform (picture 3), within the scope of which the results of scientific research and development works in the area of advanced material technologies, modern mechatronic, steering and control systems, IT applications, systems supporting technical and ecological security, as well as research and testing equipment conducted at the Institute are presented.

Picture 3. The diagram of the technological platform created at the Institute of Sustainable Technologies
— National Research Institute, in cooperation with Business Center Club



Source: own materials.

On the basis of the technological platform established at a scientific-research unit activities associated with the dissemination of innovative product and process technologies are conducted along with the creation of effective structures and mechanisms of innovation commercialization and the assessment of the efficiency of dissemination activities. Evaluations of the results of R&D works are conducted. Analyses of the potential directions for the development of innovations resulting from the needs of

the industry, mainly regional industry and of the economic trends are carried out. IT tools facilitating the process of gathering, processing and using knowledge and the transfer of technology, facilitating communication between entities interested in innovations are being created (Mazurkiewicz, Poteralska, 2015).

Tasks conducted within the framework of the platform enable efficient coordination of the activities of its members, facilitate establishing business contacts, stimulate building partner relations, simplify the path of starting and implementing joint ventures on the science-business line in form of orders, projects and thus create opportunities and substantially reduce the length of the traditional road to success on the market.

Technological Platform of the Institute of Sustainable Technologies — National Research Institute is targeted at recipients from whole Poland, in particular to entrepreneurs, institutions from the environment of business and scientific-research units, as well as at foreign organizations.

The Platform has a formal structure — participants officially confirm their participation in the platform by signing the document titled "Declaration of the establishment of the platform for dissemination of innovative solutions in the economy". By now over 40 business entities have joined the structures of the platform. These are mainly companies, which constitute almost 75% of all members of the Platform, out of all companies 60% are representatives of the SME sector and 40% are big companies. The core of this group of participants is composed of companies with headquarters, or branches on the territory of Mazowsze.

The created model network structure is an open organization which accepts further partners sharing the goals of the platform's activity and recognizing the benefits that can be derived from cooperation within the platform.

Relationships occurring between the members of the network are both vertical (reflecting the classic chain of delivery), as well as horizontal (scientific-research units, companies from the environment of business).

Identifying and developing mutual relations of cooperation between a scientific-research unit and network participants and as a result also their suppliers, subcontractors, clients and service providers guarantees cooperation, guarantees boosting collective effectiveness and the growth of efficiency of implementation of innovative products together with recommendations of the directions of producing technologically advanced

solutions. For companies, especially companies from the SME sector, participating in a network form of organization stimulates the growth of innovativeness, boosts competitiveness, which on the macroeconomic level stimulates the development of entrepreneurship.

Initiatives taken up within the framework of the platform stimulate the intensification of actions taken at the Institute in the area of commercialization of research results (sale, provision of services, licensing, creating spin-off type entities) and thus lead to strengthening the position (brand) of the Institute for Sustainable Technologies — National Research Institute in the social, business and scientific environment. They guarantee, through mutually beneficial relations, tightening partnership, building a strong foundation for the development of knowledge, abilities, skills and competences of all network participants.

On of the forms of communication between science and business used by the Platform in its activity is holding cyclical seminars aimed at, apart from presenting the scope of scientific-research, project and implementation works of the Institute for Sustainable Technologies — National Research Institute, establishing and intensifying cooperation between representatives of the business sector and the Institute. By now 7 such meetings have been held. The meetings were attended by a total of about 170 representatives of the business sector from the whole country. Moreover, two science-business conferences titled "Inżynieria przyszłości" (engineering of the future) were held — in September 2014 and May 2015. The conferences were attended by over 300 participants². The main goals of the conference are integration of the scientific environment with the business environment and deepening cooperation between science and business, as well as promoting technical and systemic innovations suitable for application in practice, worked out by R&D sector units, or research centres and laboratories functioning within companies.

Thanks to activities conducted within the framework of the technological platform joint initiatives of scientific employees and entrepreneurs are created, projects with a high potential for implementation are created and developed. What follows is the intensification of direct orders from the industry carried out by the Institute.

Projects from the following areas, currently conducted at the Institute can serve as examples of such works:

1. Surface engineering, among others:
 - Coatings with increased heat resistance raising the durability of moulds for pressurized aluminium casting — project carried out for a company active in the aviation and automotive industry;
 - Technology of raising the durability of special tools — project conducted for a company active in the metal industry;
2. Mechatronics and optomechatronics, among others:
 - Systems of automatic optical inspection and qualitative selection — project carried out for a company active in the tobacco industry;
 - Hybrid video systems for monitoring technological processes in the glass industry;
3. Environment-friendly technologies, among others:
 - Optimization of water-sewage management (limiting the consumption of water and production of sewage) — project carried out for a company active in the chemical industry;
 - Technology for manufacturing environment-friendly plastic lubricants for the needs of the sugar industry;
4. Prototype and experimental production, among others:
 - Series of devices for testing the mechanical properties of furniture elements;
 - Technological devices for the efficient recuperation of processing liquid from metal shavings in bulk production of a company active in the metal industry.

An indirect effect of the functioning of the platform is that the Institute is carrying out industry's orders for evaluations, opinions on innovativeness, for conducting technical analyses. Thanks to high quality of services, access to specialized laboratory facilities, punctuality of conducted works, the number of companies using the services provided by the Institute is constantly growing.

Cooperation under the platform makes it possible to take up joint initiatives and innovative activity, using various unique skills, as well as creating specialist configurations of competences among the participants of the network, which substantially boosts the efficiency of connecting the worlds of science and business. An important aspect is raising the

engagement of companies in science and research, as well as jointly applying for co-financing of projects with external sources — regional, national and international.

Conclusions

The strength of innovative economies of the world is high engagement of the company sector in conducting research-development works, as well as cooperation on the science-business line on creation of innovative solutions both in the area of services and products. Companies view cooperation with the science sector as a source of growth of their innovativeness and competitiveness. The establishment of network forms of cooperation is aimed at creating, or intensifying the co-operative ties between companies and scientific-research units. Moreover, it plays an important role in creating innovative projects and implementation of the results of R&D works in economic practice. Participating in a cooperation network formed as a technological platform enables interaction between its members, guarantees growth of efficient communication both about the offer of a scientific-research unit and about the needs for technologies voiced by entrepreneurs. It creates opportunities for building scientific-industrial consortia carrying out particular research-implementation ventures, often applying for external funding.

What is an apparent problem in Poland is insufficient cooperation between the R&D sector and companies, which leads to lack of effective commercialization of the results of R&D works in the industry. This is a serious problem in Polish economy, which leads to situation in which it is one of the least innovative economies in the European Union. A potential remedy to this situation is the establishment of network forms of cooperation between the scientific and business environments, created in form of a technological platform — supporting the development of the system of economic innovativeness, by carrying out implementation projects taking into consideration economic trends and needs of the market (especially the SME sector), stimulating on the one hand more effective utilization of the scientific potential and on the other hand the development of entrepreneurship, which strengthens the competitive capacity of the Polish economy in the international dimension.

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¹ Dissemination is understood as a process of passing on appropriately constructed information concerning an innovative product. Dissemination is not limited to just informing about the existence of particular material results of R&D works. It requires defining the target market, formulating the proper message for a particular market segment, choosing the most efficient ways of reaching the groups of potential recipients identified in the process of segmentation, or efficient implementation of intended marketing activities. (Walasik, 2014).

² <http://www.future.engineering.itee.radom.pl/>

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