

ASSUMPTIONS FOR THE EFFECTIVE PROMOTION OF COOPERATION BETWEEN SCIENCE AND BUSINESS (ON THE BASE OF QUALITATIVE RESEARCH)

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Abstract:

Effective cooperation between science and business may provide benefits for the development of both groups. However, the mode of action of both sides is completely different and often negatively affects the scope and perception of this cooperation. Universities are generally managed bureaucratically which causes typical for such organizations problems with decision-making. On the other hand, companies require solutions dedicated to them in a very short time. Moreover, they are waiting for concrete solutions rarely understand and accept that innovative research requires not only resources, but also a lot of time. The paper presents results from qualitative research (FGI, 4 groups) made in June 2013 in Lublin Voivodeship (Poland) investigating the barriers to cooperation between scientists and business. The study shows stereotypes one group in regard to second one and identify experiences of their cooperation. The research allowed to observe levels of cooperation as well as to identify common issues that preclude or restrict it. The developed results allowed to propose a descriptive model of effective promotion for cooperation between science and business.

Keywords: cooperation model, science, business, education, barriers of cooperation, qualitative research

1. INTRODUCTION

Conditions and the development of a knowledge-based economy force today's organizations to meet numerous challenges related to the need of adapting to the changes and transformations occurring in the environment. The acquisition of a new technology and knowledge necessary to conduct a modern business becomes the basis for a contemporary enterprise (Lipczyński, 2013; Hewitt-Dundas, 2013). The gap between the innovative capacity and the intentions of a company is considered to be a major reason for the use of pro-innovation services by a company. The effective implementation of the new investments, however, requires the acquisition or completion of knowledge of this process, taking into account the character of the made changes. The managerial staff of business companies is aware that cooperation with the scientific sphere would allow to speed up the implementation of development objectives. The key to success is the commercialization of knowledge (PARP, 2013). The commercialization of knowledge involves a successful search for practical applications of scientific discoveries. An innovator can be both the author of an invention and the entrepreneur. What is more, they can also interact, e.g., set up a new company, whose aim will be commercialization of science. Thanks to the commercialization of science knowledge becomes more utilitarian and as a consequence entrepreneurs gain access to science. In this process, the main 'actors' can be distinguished (PARP, 2013):

- the institutions of science and research (research institutes, universities, research centres, R&D departments in enterprises, independent laboratories) forming the basis of new knowledge and ideas that creates supply, technological and organizational solutions;
- innovators (innovative entrepreneurs, small and medium-sized innovative enterprises) transforming the knowledge, ideas and concepts into new market products, technologies and services;
- innovation centres (technology parks, centres of technology transfer, incubators, academic incubators) supporting innovative processes through the various forms of assistance and innovation services;
- specialized financing innovation funds (seed capital funds, venture capital, business angels), offering special tools for financing risk arising from the nature of innovation processes;
- market consulting services providers, offering training and information services on a commercial basis to help in the implementation process of technology transfer and commercialization.

2. METHODOLOGY

The article presents the results of the research conducted by the author of this article and a professor Radosław Maćik from Maria Curie-Skłodowska University. The research was carried out in the framework of the project 'Innovational Project: New Model of comprehensive servicing the needs of innovative companies - INNO-BROKER' co-financed by the European Union under the European Social Fund. The study was conducted in June 2013 among representatives of the science and business of Lublin Voivodeship. It was divided in two stages. In the first stage, 4 FGIs were held with representatives of both science and business spheres, during which the experience of cooperation and the barriers that prevent from it were explored. In the second stage, the strategic workshop was held in which there were additionally involved persons representing the local government and business institutions. They were aimed at establishing a common position and effective cooperation model. There were 60 people in two stages effectively tested.

3. LUBLIN VOIVODESHIP - PRESENT STATUS

In the field of innovation, Lublin is a region which occupies an average position. When compared to other provinces, its situation rather deteriorates than improves. Although it is not the weakest in the country's scale. The level of cooperation between science and business environments is very low in spite of the potential it has (Departament Gospodarki i Innowacji 2013).

In addition, the research and development constitute an infinitesimal part of an innovation activity of business entities (expenditures do not exceed 10% of its total amount). While expenditures on innovation in companies in the whole region are concerned with the most part of investments in the fixed assets: construction projects and purchases of machinery and equipment. Expenditures on

innovation activities of industrial enterprises in Lublin region represent only 1/3 of the national average, and in the case of service companies - only 1/12 of this average.

There is need not only to promote the knowledge and technology transfer from science to industry but also to involve businesses and the local government in programming of research at universities, so that they were better adapted to the needs of the region (not rejecting the autonomous character of the universities and researches normally conducted there).

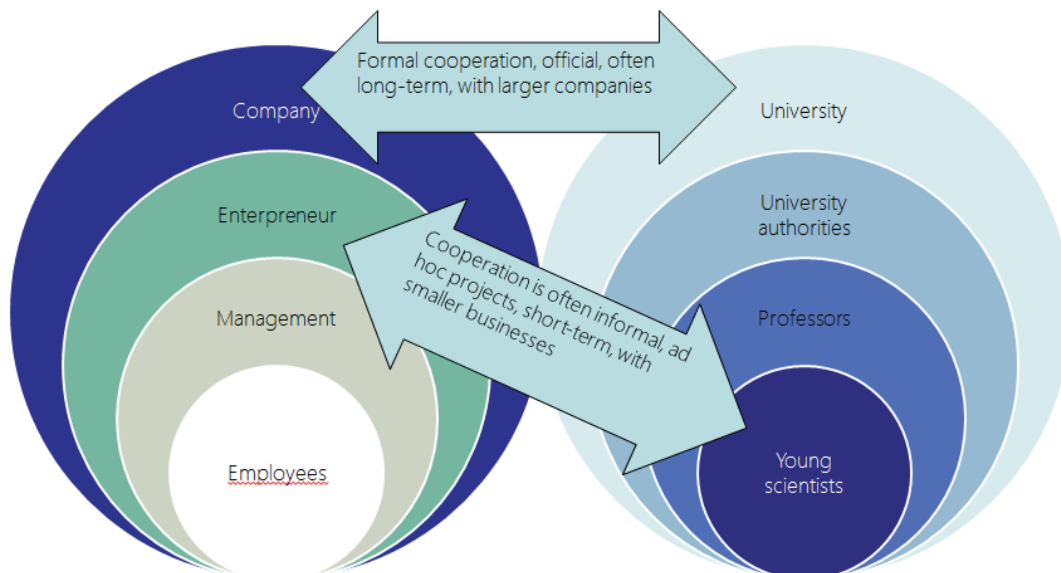
The current cooperation between science and business in many cases is carried out in cooperation where many obstacles, which determine further development, should be overcome. These barriers exist at the macro level (e.g., the general legal solutions, the state of the region's economy), as well as at the institutional level (universities and enterprises) and at the mentality level of people functioning in these entities.

4. MODELS OF COOPERATION IN LUBLIN VOIVODSHIP

Currently, the cooperation between science and business sector is in the first place very rare - due to many reasons described later, and secondly, its scope and the levels are not satisfactory.

Figure 1 shows schematically possible and typically implemented this cooperation levels.

Figure 1: Typically implemented levels of cooperation between science and business



Source: Own proposal which is based on focus group interviews (FGIs)

Despite the many possible levels of co-operation in the Lublin Voivodeship there can be distinguished bottom-up and top-down models of collaboration. The character of top-down or bottom-up model of cooperation is related here to the level at which the cooperation was started 'high' or 'low'.

In the top-down model, the process of establishing cooperation takes place on the way of official and usually long-term contracts, which can be triggered by both the company (usually large or medium) and a unit from the science sector. A characteristic feature of this model is a hierarchical management of such cooperation, which has a typical institutional character and it is usually aimed at gaining long term benefits. Substantial contacts are established at the high level of both organizations, delegated decision-making powers are only partially assigned to the lower part of the organizational structure, despite the fact that the actual co-operation is carried out on the lower levels. As a result of this fact cooperation has often excessively bureaucratic character (usually at the side of an university) and it is resistant to quick decisions.

This model in practice is often executed in large projects, where there may be a component of basic research. Developmental works are complex and require not only the use of sophisticated research

infrastructure, but also time to carry out the planned activities. Somehow assumed, this model is implemented in projects financed with public funds or from European Union assistance programs.

The advantage of such a model of cooperation is the long-term character and some kind of predictability. In contrast, the disadvantages embrace bureaucratization of cooperation (often forced by the formal requirements, under the terms of financing and project documents) and the difficulty of rapid response to unusual situations in the project.

The second model, based on 'bottom up' cooperation is concerned with establishing direct cooperation between a researcher and an entrepreneur or management, which is often based on personal contacts with both partners' collaboration environment. After establishing the contact, it can be formalized by a scientist who - quoting after one of the respondents - 'treads the path to the university administration', or this contact remains unofficial cooperation - outside the university, what is possible and relatively safe for a scientist in two situations:

- when their work is not, or in small extent, dependent on the use of specialized equipment and software (for instance, as is the case of social and economic sciences), but from the knowledge and skills are not necessarily obtained directly at the university,
- when they will be employed (sometimes even on the full time) by a trader in order to carry out research on the entrepreneur's needs and provide him with the necessary equipment.

In other situations, a serious conflict of interest arises, in which the employee is exposed to allegations of illegal use of equipment or use of other university resources in order to implement their project.

Bottom-up model seems to work when carrying out development work, relatively simple or repetitive tests/analyses for the firm. Often this collaboration has a character of an immediate resolution to the entrepreneur's problem, which is solved out on the basis of young scientist's experience and knowledge without involving significant research potential. This way is cheaper and more friendly for smaller companies, although in certain circumstances protects less the interests of both parties.

5. THE BARRIERS IN COOPERATION WITH SCIENTISTS AND ENTREPRENEURS

There are three levels of perception of cooperation that can be distinguished:

1. the lack of awareness of the need for cooperation,
2. awareness of the barriers to collaboration,
3. cooperation.

Firstly, not everyone is aware that such cooperation may exist. Both upon the one and the other side. Some scientists are not still aware that some solutions can be commercialized, as well as the business world is not aware that some of their problems can be solved out successfully by academics. However, gaining this awareness only does not lead to work right away. At the very beginning, the willingness and search for opportunities of possible cooperation start to exist. Nevertheless, barriers that significantly impede satisfaction of this collaboration appear later and very often effectively disturb in setting it up in general. Only strong motivation and determination in action, what is important - a strong will to cooperate and focus on benefits of this cooperation, result in the fact that people do not feel so badly barriers for this cooperation.

Achieving the stage two or three means that the focus is not only on local contacts, nationwide, but on an international scale. The interested sides look for the best solutions for themselves, so a geographical location of an entity (university, company) is not the most important here. Similarly, it works the other way - scientists wishing to commercialize - looking for the best partner. Sometimes it is dictated by the fact that some industries could not find scientist for themselves in the Lublin region.

Barriers against cooperation can be classified into several groups:

1. system - due to the characteristics of the environment, primarily legal,
2. market - resulting from the structure and state of the economy,
3. mentality - referring to the beliefs of people functioning in business and
4. science barriers directly relating to the way of acting by universities and enterprises in environment they have found themselves. These barriers will be analysed the above order.

5.1. Systemic barriers

Systemic barriers normally result from general environmental conditions, and mainly relate to the regulations and acquired from the past ways of acting in this environment. Universities as public entities, which are generally subjected to the tight regulation of their activities that are by their funding rather than the company. It should be noted also that there is a problem of evaluation such cooperation in terms of scientific unit of parametric evaluations done by a scientific unit and periodic evaluations of employees. As a result of this, researches' work is not payable. In addition, there are limitations stemming from the law and administrative procedures such as e.g., a process of receiving grants.

5.2. Market conditions - demand and supply, finance

The narrow space of cooperation in the region raises the impression of both: a lack of demand or supply for scientific solutions that the business sphere can be interested in, which can be interpreted as a structural mismatch between supply and demand. Perceived shortcomings of supply and demand, however, often appeared due to the lack of knowledge about the possible offer concerning opportunities of cooperation, but also a lack of awareness of needs other than solving current problems. In addition, a low technological level of many enterprises and a small average size and wealth of companies generate too little demand for solutions offered by the scientific sphere lead to finance capital and human resources drainage in the region.

Barriers for entrepreneurs reducing demand may also be financial. The business sphere recognizes expensiveness of scientific solutions. The costs of the proposed solutions often do not fit the market reality - often in terms of production cost competitiveness after the implementation, or in relation to the price indicated on the implementation of projects that are burdened with high margins of indirect costs.

5.3. Human limitations - mentality

The main problem seems to be the mutual perception. There are still present stereotypes according to which the scientist is described as a person keeping a secure job, which is often out of touch with reality. The entrepreneur is seen as a greedy person, who is focused only on his or her own profits, and who wants obtain them immediately, without understanding the character of research, which takes time and do not always guarantee success.

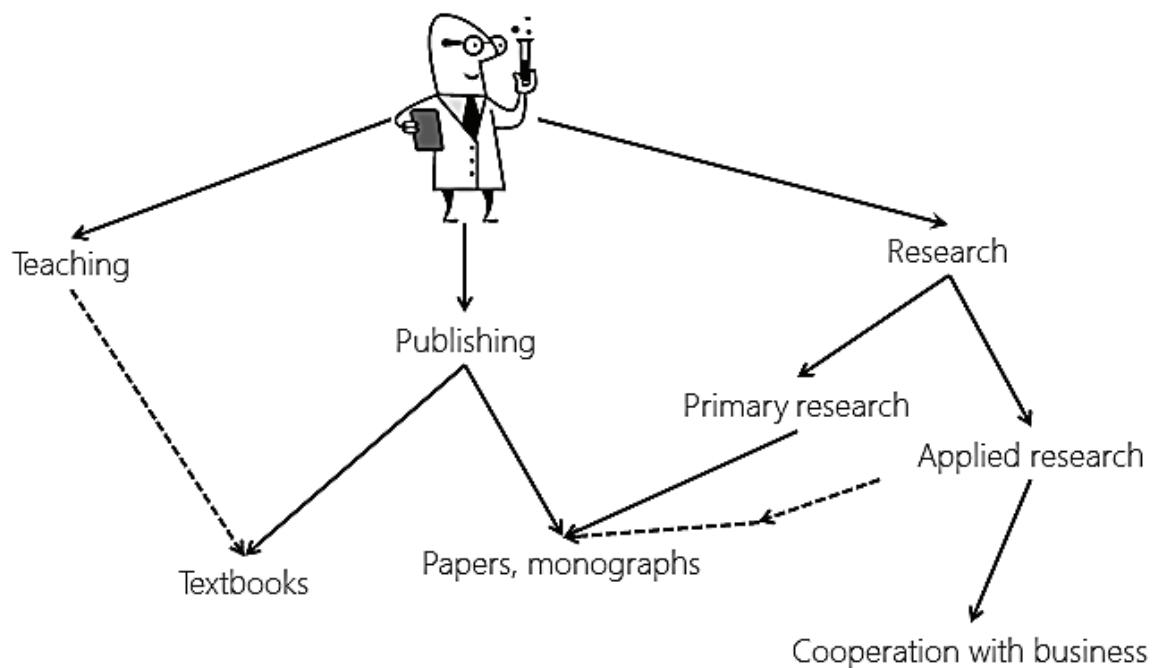
5.4. Barriers due to the nature of the institution

Universities and research institutes have strongly hierarchical environment and are generally managed bureaucratically. It results in typical for such organizations decision-making problems. Virtually each case has to go a long official way. The process of getting approval of documents often takes several days despite the absence of any formal obstacles. Adding to this the conformist attitude of many lower-ranking employees, it turns out that an effective survival strategy is not to hang out but carry out commissioned by supervisors' tasks and focus on teaching and research work strictly in the scope of basic research. This can create frustration and even more discourage to cooperation with the economic practice and industry.

At universities, the majority of academics occupy scientifically-didactic posts, which require to teach classes of various types, often at well above the nominal dimension of normal working hours (typically between 180 and 240 hours per year). As a result, the duration of the classes and preparation for them can take up to 70% of the researcher's nominal time. Nota bene universities rarely agree to reduce employee's time devoted for teaching, especially employees who are in charge of grants.

The remaining time should be devoted to conducting scientific research (including the so-called statutory research on the subjects and scope, which do not always coincide with the actual interests of the researcher who is obliged to prepare publications on the results of them) and to cooperation with the business sphere.

Figure 2: Areas of researcher activity



Source: Own elaboration

In many cases - otherwise desperately needed - but carried out on a small scale basic research not bring spectacular discoveries, but the employee is obliged to carry them out (where it is not possible to finance such projects from National Center for Science - NCN), despite the fact that they do not exhibit practical solutions, and more precisely - by definition - even they cannot applying for grants as a laborious and time-consuming process. Without research and publications, for which points are awarded (comparable size, depending on the discipline) - the way of scientific career is blocked. Low salaries are forcing researchers to seek additional sources of income, usually in the form of teaching at an additional full time (or civil law contracts), which a lead to a life on the road, a greater lack of time to research and publications, and an even greater lack of availability for entrepreneurs

The overlap of these tasks on may cause them a certain amount of time, making it less available for business.

6. BUSINESS AND SCIENTIFIC SPHERES COOPERATION - EXPECTATIONS AND NEEDS

Theoretically, both scientists and entrepreneurs are rarely recognized by the potential benefits of cooperation between the two communities, but only a few of them actually work or are seeking to participate.

Both entrepreneurs and academics lack a clear and transparent constructed offer that would be understandable for both parties. For those for whom cooperation was impossible due to ignorance - it would be difficult for them to start, because they do not know how to start looking, there is someone to whom they can turn for help.

In the course of the discussions emerged also other issues that require solution, if the cooperation of both communities to be effective for all.

After the university the problem is both:

- oversized structure that for someone from the world of science does not have to deal with is difficult to wade,
- websites that are not tailored to the needs of the business (the offer, if it exists, it is hard to find, and once it is - it is often written in a language that is inaccessible and incomprehensible

for entrepreneurs, usually is also available in the form of a “pdf” document which in the case of a large number of employees is bloated document, after which it is difficult to navigate),

- no real openness to commercialization (mainly upon the university’s side).

On the side of the business sphere we should seek:

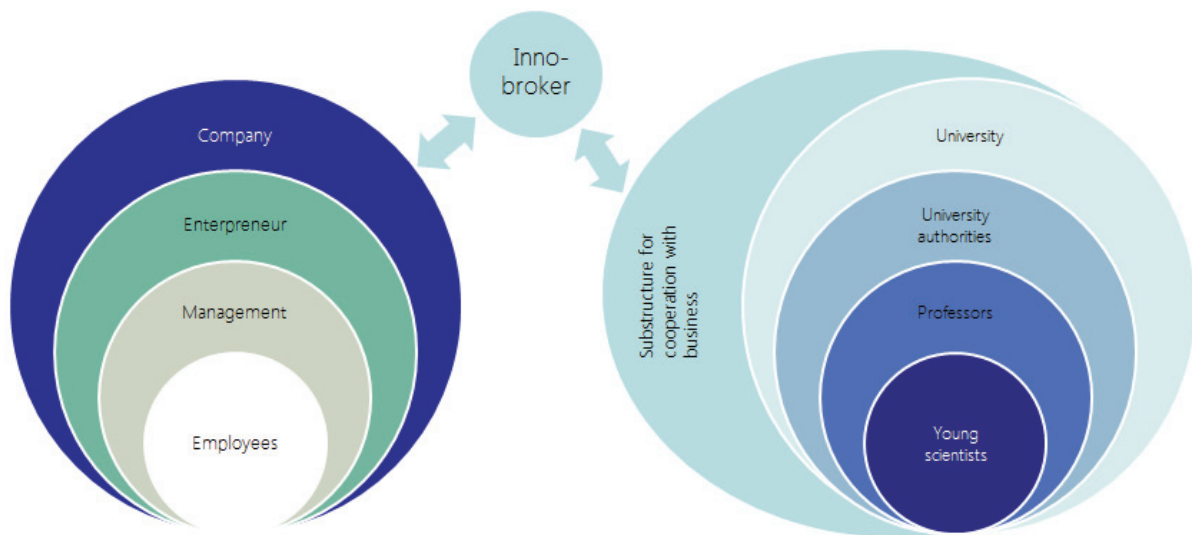
- openness to publications,
- planning collaboration with the science sphere before the problem starts to exist.

7. THE INNOBROKERAGE CONCEPT

The study shows a number of barriers that could prevent from the effective cooperation between science and business spheres. These barriers are so strong that the attempt to change the situation requires going beyond these entities.

As far as the project described above is concerned, there was an 'innobroker' model tested, which would be an external entity, and therefore not formally associated with any of the parties (Figure 3). The study helped to determine which personal characteristics would he or she have and how they should work in order to be able to effectively fulfil their role.

Figure 3: The innobrokerage model



Source: Own elaboration

The most interested in functioning of innobrokers were entrepreneurs who have experienced difficulties and barriers to collaboration, they mostly have seen benefits from their services. Also, a group of little conscious researchers might be interested in collaboration, but it would be required to approach them. These allegations were appear in the entire part dedicated to discussion about the innobroker.

In addition, despite noticing the need for an innobroker presence fears aroused the costs of its services (in discussions many times there emphasized an issue that innobroker’s services should be paid with EU projects’ funds or local government’s budget). The financial weakness of local businesses and the reluctance to use paid services for business has been confirmed.

Among proposed concepts of passive and active innobrokering model definitely two sides of the discussion preferred an active form, pointing out that the passive model (such as portal which associates web pages, waiting for the entrepreneur’s initiative and willingness to contact) will certainly be ineffective.

There have been proposals of re-setting up innobroker’s activity at web portal, which would be a kind of board with messages about possible cooperation. However, this concept has not been checked yet mainly because of the lack of interest at entrepreneurs side to publicize their problems and goals. In

addition, scientists do not want to spend their time to formulate their bids in such places providing that at the universities' web sites already contain such offers.

The researchers claimed that an active attitude of an innobroker, acting more as a coordinator than a typical agent would be appreciated. Although this does not include the proper coordination of existing projects, but rather a preparation for coordination phase of such cooperation.

According to respondents, there is also lack of a wider forum where issues on science-business cooperation could be discussed without its institutionalization in a more informal way, which could be more natural and step by step to change the beliefs of both sides.

Among the features, which innobroker should possess, there were strongly indicated interpersonal skills (in addition to the necessary technical knowledge in a particular area) conditioning success in establishing contacts and an appropriate maintenance of them. In the discussion, the idea that the strictly technical knowledge is not necessary for an innobroker was suggested. They rather need to have experience and knowledge of the market.

The interdisciplinary nature of the innobroker work promotes employment in his character people who have professional experience in cooperation between science and business, and those soft skills.

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