Advisory Functions of Selected Polish Business Institutions in the Innovation Process in Enterprises – Research Conclusions

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ABSTRACT
This paper contains an analysis of innovation processes in enterprises, from the perspective of demand for knowledge, which companies increasingly obtain from business environment. This requires a discernment of valuable partners in the environment, who will provide professional transfer of knowledge to the company. Therefore, knowledge has become a product, and Polish universities and specialized, commercial knowledge providers are competing for the customer on the knowledge market. While knowledge transfer to companies is a secondary activity for Polish universities, specialized, commercial knowledge suppliers are making an effort of acquiring as much orders as possible. Therefore a natural competition between these two types of entities arises. In this paper the Author examines possibilities of supporting innovation-oriented enterprises by Polish universities and commercial providers of knowledge and formulates terms and conditions which will make cooperation between these two groups of entities possible, so as to transform the competition into cooperation, beneficial for both sides, and support innovative processes in enterprises.

1. Introduction
Companies are pushed towards innovations because of fear of losing the market and losses, as well as willingness to carry out the desired, often ground-breaking changes, resulting in more favorable economic performance, increasing the company's value, reaching a higher competitive position. Regardless of the motivation to implement the innovative process, these activities are accompanied by above-average risk and uncertainty of the effect. This encourages companies to continuously learn and develop their competence in the management of innovation processes. Each innovation process is characterized by complexity and multi-stage actions, but effective innovation process is the one which final result is an innovation itself. The activities undertaken as part of the innovation process, and above all the quality, relevance, efficiency, directly project the outcome of the innovation process and, so to say, create it. Innovation can apply to both specific methods and implementation of innovative processes, as well as the effect of these measures, which can also be innovative.

Oslo Manual defines innovation as the implementation of a new or improved product or process, a new marketing method, or a new method of organization in business practices, workplace or in external relations. [19] The analysis of many other definitions cited in the literature, allows to select leading views on the essence of innovation. Most often it is seen as:
♦ various types of novelty introduced on the market [23] [1], each new idea or thing, qualitatively different from the existing known forms, [4]
♦ entrepreneurs' tool, which allows them to start a new business, giving the resources new opportunities to create wealth, [7]
♦ the process of learning, the creation of scientific and technical knowledge, diffusion and transformation into new or modified products, services, manufacturing and processing techniques [18], new ideas, approaches, methods, processes, structures and behaviors, attitudes and culture, technologies and capabilities and the knowledge used to produce new products and services, including organization management. [8]

Thus, the key attributes of innovation are: a novelty and basing on the knowledge that should be used to create a new product, service, idea, process or other product, qualitatively different from other known forms. The innovation process as an action aimed at creating of the novelty desired by the company, necessarily involves the need to use company's specific resources. These are being transformed during different phases of the innovation process: from idea to its commercialization and sharing it on the market. The characteristic thing is, that in the innovation-oriented enterprises the demand for intangible assets, especially knowledge, is

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increased, while the demand for traditional, material resources, such as property, is falling. The revolution of knowledge [13], as one can describe the economic and social changes of the late twentieth century, meant that currently the access to knowledge and the ability to use it effectively are a key success factors for many companies, determining their behaviors. The most innovative companies are looking to maximize the efficient use of their knowledge resources and to gain knowledge from the environment, treating it as a valuable inspiration to change and the basis for development of the business – an asset of particular value. Therefore, the demand for knowledge on the part of companies creates knowledge market, where there is a sale and purchase transaction or free of charge transfer. The supply of knowledge is represented, among others by universities and consulting companies, operating in an business related environment that can become a valuable advisor for innovatory companies in the innovation process. Although the Polish higher education does not have a well-established tradition of cooperation with the economy, a lot has changed in this area in recent years, inter alia through the use of European Union structural funds. They support, in a large extent, the development of science- business relationship, and often allow companies the usage of academic knowledge free of charge. However, consulting companies, which are oriented towards selling their knowledge to others on the basis of counseling or addressing specific R & D services, cope a lot better. Faced with the still dominant in many Polish universities bureaucratic system and low price competitiveness of academic R & D services - consulting companies are the major Polish academic rival, or at least that is how they are considered by the scientific community. These companies are prepared much better to compete for customers in the knowledge market, rather than academics, which priority is often teaching and basic research, and only later applied research. Financial considerations, including reduction of budget allocations meant that an increasing number of Polish universities nowadays bets for the development of knowledge, not only in terms of teaching, but also the application, hoping for the opportunity to offer their expertise to companies for commercial use. Knowledge thus becomes attractive product market which you can make money on and build a good relationship with customers, especially with companies that are active in terms of innovation.

The research problem of this paper is the analysis of planning, implementation and monitoring of innovation processes carried out by the companies, from the perspective of the need for knowledge that is a necessary impulse for taking such an undertakings and an important resource supporting them during the implementation phase. It is all about the role of business related areas in the innovation processes, especially from the point of view of the challenges facing the partners in the innovation processes: academic institutions and consulting companies. At this point, there is a conflict of interest - universities and consulting companies, representing supply on the knowledge market compete for the opportunity to cooperate with innovative companies because it gives them prestige and financial income. Currently the strategy of higher education development in Poland puts greater emphasis on the need of developing research - business cooperation, preferably on a commercial basis. Still, one can identify a number of barriers that are inhibiting this process. [10] [21] [17] [13] At the same time in 2014-2020 Poland will have even more EU funds for the development of innovation and concluding business consortia available. It is therefore necessary to set the parameters which are conducive to involvement of the scientific community to cooperation with companies in the field of implementation of innovative processes, and consider how commercial activity of business consulting firms can disrupt these relationships.

The aim of this study is to determine the location of universities and consulting companies, considered as business institutions, in the innovation processes taking place inside companies, and the analysis of the relations between universities and consulting enterprises considered as external advisors to companies implementing innovative processes. Based on carried out research the Author seeks to determine whether these relations should be based on competition for winning orders from enterprises or if a cooperation is possible in certain areas.

The Author puts forward a research hypothesis that the employees of Polish universities, despite much higher scientific potential, are losing with consulting companies the race for acquiring the orders from the market, as they are less prepared for that competition, in terms of marketing and organization.

To achieve the goal of the research work, the Author uses study surveys and empirical research. Study survey is primarily a critical analysis of the literature, and the empirical research is exploratory research, aimed at identifying the problem and understanding its essence. In this case the Author uses a questionnaire interview. The research, completed in 2012, was attended by 10 scientists from the Silesia region, and 10 representatives of consulting companies from the same area, who presented their views on various issues related to science - business cooperation in large, individual, personal interviews. The research was carried out within the project: An innovative model of cooperation between universities and enterprises, based on the new system of implementation of technology, as a project task: The research concerning the state of cooperation between science and business, conducted among researchers, entrepreneurs, students and experts on innovation, co-financed from the European Regional Development Fund under the Human Capital Programme 2007-2013. The findings have enriched the Author's own observations, resulting from three years' employment at the Centre for Innovation and Technology Transfer at the University of Bielsko-Biała, where she held the position of a leader and an expert in a number of projects on the science – business cooperation.
2. The demand for knowledge in terms of innovation processes within companies.

Numerous definitions of the innovation process are found in the literature. S. B. Lundstedt aptly characterized it as a creative activity, involving the creation, design and implementation of innovation. [16] It should be noted that modern, relatively long and difficult to determine life cycle of innovation, requires to determine the innovation process rather as a group of diverse and interdependent actions, carried out mostly in design mode.

They are characterized by:

- a clearly defined goal and focus on measurable effect in the form of marketed innovations,
- specified time horizon, performance space, and fixed budget,
- complexity, multiple phases, and interdependence of these phases during the implementation of the innovation process,
- uncertainty and risk,
- non-routine nature, uniqueness,
- interdisciplinarity.

M. Dolińska points out that innovation processes nowadays are referred to as a non-linear, interactive, taking into account the impact of customers on the development of innovation. Increasingly, they are also the processes carried out in the network consisting of the market, the realm of research and development, implementation, production, marketing and sale of innovation and its diffusion in time. Web-based nature of these processes is inherently connected with the mutual transfer of knowledge between network participants, as well as common learning and management of knowledge accumulated by entities co-operating within the network. [6]

The implementation of innovation processes by the company, is mainly in a highly competitive market. Not every project of this type is likely to be successful. One of the reasons for failure may be a shortage of knowledge concerning both the very essence of innovation and how to implement the innovation process. In addition to the individual, inner ability to create new solutions, the ability to absorb and use knowledge from the outside is becoming increasingly important for innovative companies. Own knowledge, including ideas and concepts of workers are presently rarely sufficient incentive for innovation. Companies which are change-oriented and able to use it, are not limiting themselves to self-production of knowledge, considered as an inspiration for continuous improvement or implementation of innovative processes. Only some companies, usually the largest, independently decide to implement innovative processes based on their innovation potential (such as knowledge workers, R & D base, the full knowledge of the market, etc.). Another reason for the self-realization of innovation processes in companies is a unique and low availability of a given kind of knowledge. [20] If there is a need to use the external sources of knowledge, the company, most small and medium-sized companies can choose from a number of possibilities. Companies’ business partners in the innovation processes may be other enterprises such as suppliers, customers or other collaborators such as banks financing investments or insurance companies, etc. Increasingly, such activities also involve research units, including universities and other entities specializing in knowledge transfer processes, such as commercial laboratories participating in certain types of R & R. This is mainly due to the increasing demand for knowledge, for effective innovation process is inextricably linked with the learning process.

An interesting model of chain links in the innovation process has been presented by S.J. Kline and N. Rosenberg. [12] A key feature of the model is the central chain of innovation (basic track), which includes:

- potential market,
- invention,
- detailed design, subject to testing,
- work draft and production,
- product launch, distribution, and marketing.

The model is characterized by a series of links such as feedback flows relating to innovation within the company and occurring between the various stages of the innovation process, knowledge and the R & D. It is important that in this approach the company is not obliged to independently carry out R & D, but it can also include into it, among others, universities or specialized consulting companies, providing R & D services. This gives the company an opportunity to reduce the costs and duration of research. It is of great importance for many companies, primarily small, that do not have the human and financial potential to independently conduct research processes.
Explanation of the model:
C - central chain of innovation, f - feedback loops, F - return information of particular importance; K → R - connection between knowledge and research, and feedback (if the issue is resolved at node K, the link 3 to R is not activated because research feedback, link 4, is problematic – therefore dashed line), D - Direct link to and from research from problems in invention and design, I – support of scientific research by instruments, machines, tools and procedures of technology, S - support of research in sciences underlying product area to gain information directly and by monitoring outside work. The information obtained may be used at any point in the cycle. [3]

Thanks to the feedback occurring between various stages of the innovation process (e.g., final shape of the innovations introduced to the market depends on the quality of testing, but also the expectations of the market of the innovation proposed to customers, determine the shape of future testing of product or service in order for it to fulfill the expectations of future customers), implementation of this model gives the company the opportunity to get involved in any stage of it. In addition to the above-described basic paths in the innovation process, one can distinguish a link between inventions and research transformed into innovations. It should be noted that the directions of innovative companies determine areas of research, and also shape the future needs of customers. This is reflected in the next link between market demand and research. Knowledge, as a key resource creating innovation and a catalyst of any R & D activities of a company, capable of transforming an innovative idea into a final result, has a strategic position in this model. Knowledge is required in the innovation process at any stage of its implementation. In Klein and Rosenberg model feedback loops between knowledge and each element of the central chain of innovation occur.[6]

J. Guinet aptly defines innovation, as a result of the accumulation of specific knowledge and information useful for company’s activities. [9] This accumulation is progressing during successive phases of the innovation process, which in terms of companies’ demand for knowledge has been presented in Table 1.

Table 1. The stages of innovation process in the enterprise and the demand for knowledge and its sources

<table>
<thead>
<tr>
<th>Characteristics of the phase of the innovation process [14]</th>
<th>Demand characteristics of the knowledge</th>
<th>Available sources of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Innovation process initiation:</td>
<td>1. Knowledge of the future positioning area of innovation, eg: the industry, market, social, geographical and legal.</td>
<td>1. Own and external codified knowledge, for example:</td>
</tr>
<tr>
<td>- diagnosis of a problem, opportunity, threat, selection and evaluation of ideas</td>
<td>2. Knowledge of the market, among others, about the expectations and the needs of potential recipients of</td>
<td>- the results of market research,</td>
</tr>
<tr>
<td>- selection of the best solution.</td>
<td></td>
<td>- reports, studies, forecasts,</td>
</tr>
<tr>
<td>2. Planning the innovation process:</td>
<td></td>
<td>- professional press,</td>
</tr>
<tr>
<td>- determination of the needs, objectives, results of the innovation</td>
<td></td>
<td>- booklets, catalogues,</td>
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<tr>
<td></td>
<td></td>
<td>- the results of earlier research in a given field,</td>
</tr>
</tbody>
</table>
Despite the undeniable impact of knowledge on the quality and the results of innovation processes, it should be noted that the success of such activities is also dependent on other attributes that are assigned primarily to companies’ personnel. These are: creativity, willingness to learn, entrepreneurship, openness to change. Thanks to these attributes, enterprise workers, assisted by external experts, are able to transform the knowledge resources available into knowledge useful for the company, followed by a novel idea, prototype, invention, and finally innovation, which finds its customers on the market. Specific innovative processes managers are knowledge workers, consciously and effectively using their knowledge, competence and experience for the development of the company which employs them. [5] These are all people working or cooperating with the company, having appropriate education and qualifications, as well as professional specialization that enables them to use their knowledge for the benefit of the company. Knowledge workers are people focused on innovation, genuinely involved in the processes of knowledge creation, knowledge distribution and its application. [2] Innovative company through knowledge workers skilfully uses both its own expertise and knowledge and that coming from the environment, among others: universities and consulting companies offering R & D services.

3. A characteristic of selected entities of the business environment transferring the knowledge to pro-innovative companies.

Knowledge is a flywheel of innovation development. As mentioned above, companies are becoming more and more aware of the inadequacy of its own sources of knowledge and are opening in this regard, cooperation with the environment. In general, the literature is using a division of the environment to that which is closer of the company, otherwise known as micro-environment or operating environment, and a general environment, known as macro-environment. The operating environment contains, among other things: system creation, diffusion and exploitation of knowledge and learning system, which include, among others:

- commercial entities specializing in technological and industrial services, implementation and commercialization of new technologies, among others: consulting companies and the ones offering R & D services, firms supporting enterprises in innovative processes, companies that are being able to perceive the need for innovation, finding solution, building a prototype and testing it,
- public and commercial institutions operating in the sphere of science and technology, among others: universities, academic and research institutes, etc., involved in the creation of new knowledge, inventions, innovations,
- other institutions and organizations supporting innovative processes, for example: scientific and technological parks, training and counselling centres.

The macro-environment can stand out among others: educational and training system, which include commercial and public institutions, for example, all levels of education, vocational training entities, as well as

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>proces -vision of a final shape of desired innovation -the balance of innovative potential of a company and its environment -development of plans: resources, processes, costs, deadlines, risk and quality.</td>
<td>innovation, of the activities of competitors, etc. 3. Knowledge of the availability and cost-effectiveness of using all sources of information useful in the innovation process. 4. Knowledge concerning the methodology for the implementation of innovative processes in the company, including among others, financing, patenting, commercialization, diffusion of innovation. 5. Knowledge that allows one to assess the innovation process according to the criterion of efficiency, profitability of achieved result, and innovation impact at an increase of enterprise value.</td>
<td>- patent and standardization literature, - patents, licenses, trademarks, -know-how for example: other companies’, R &amp; D centres, universities, consulting firms, - Internet. 2. Own and external knowledge resources, inseparably connected with people, resulting from talents, abilities and experience: - the owners of the company, - employees, - clients, customers, « - competitors, - suppliers, - external advisors, representing the universities (scientific staff, students)and consulting companies offering R &amp; D services (commercial experts).</td>
</tr>
<tr>
<td>3. Implementation of the innovation process: - innovation design, - innovation testing, - correction of prototype, - commercialization and implementation.</td>
<td></td>
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<tr>
<td>4. Disseminating of innovation: - directing the effect of the innovation process (innovation) for market activity of the enterprise - diffusion of innovation through market and non-market channels.</td>
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</table>
education and training programmes, improving the qualifications of personnel responsible for the implementation of innovative processes within companies. [20]

Business environment are those entities, institutions or organizations, whose task is to promote the development of entrepreneurship in all relevant aspects. They are both public institutions (such as regional development agencies, regional and local authorities, universities, research institutes), as well as commercial entities (e.g. training, consulting companies, banks and guarantee funds, insurers, and promotion-advertising agencies, companies raising subsidies, etc.). Part of these institutions and entities, specializes in commercial or free-of-charge transfer of knowledge to companies which are implementing innovative processes. Academic environment plays a special role in these operations, i.e. scientists working with entrepreneurs through the Alma Mater, scientists working on behalf of consulting or research companies, involved by pro-innovative firms (e.g. through commission of R & D service) and scientists who undertake an individual cooperation based on civil law agreements.

There are two major configurations of cooperation between science and businesses implementing innovative processes. The first option assumes that the company is the leader of the innovation process, and scientists have only a complementary role and support the transfer of knowledge - regardless of whether they operate under the banner of their Alma Mater, the consulting company or on its own account. These forms of cooperation include: [22]

- Technology incubators, often working in conjunction with the environment and scientific research institutions, as separate centres, combining the facilities they offer with services to support the development of small businesses e.g. providing R & D services in a laboratory that belongs to the incubator. The tasks of technology incubators are mainly: development of new forms of cooperation of the scientific community and local businesses and the transfer and commercialization of technology;
- Business incubators aimed at comprehensive advice to aspiring entrepreneurs (start-up), giving them a material base for doing business (e.g. premises, access to office equipment), access to R & D base, legal, patent, technology counselling or help in raising funds for the development of innovative projects;
- Regional innovation networks, that connect to national, European and global networks, aiming at sectoral or regional cooperation of companies and collaboration with academic institutions and other entities in the innovation processes;
- Clusters and technology groups, bringing together companies and related institutions. This form of cooperation is based on the simultaneous cooperation and competition of enterprises grouped in the cluster, involving, among others various entities of the business environment seen as providers of knowledge necessary for cluster participants to implement innovation processes.

In second possible option, participation of scientific units is strongly emphasized. An innovative idea, modern technology or knowledge, which is beginning innovative processes inside the company is derived in this case from academia. In this way, the support of innovation processes in the companies may include: [24]

- University's technology transfer centre, which activities in Poland are regulated by the Law on higher education Bill. [15] The purpose of the centre is to sell or free transfer of results of research and development works to the market. Its activity is usually not profit, but can significantly stimulate innovation in local businesses, resulting in the implementation of new technologies and a general increase in innovation and competitiveness of the economy. Typical assignments include:
  - promotion of the scientific potential of universities, the development of networks of contacts with companies,
  - analysis of the demand for knowledge, including identification of the needs of innovative economic entities,
  - development of R & D services offer, the preparation of individual tenders, customer acquisition and the development of cooperation and creation of loyalty programs,
  - the popularization, promotion and development of technological entrepreneurship and academic entrepreneurship,
  - developing student internships and scientific programs for companies interested in cooperation with the university.
- Academic incubators of entrepreneurship, operating mainly in research community and supporting spin-off and spin-out type companies, founded by academic staff and students. Most are located at universities and are oriented to support the academic enterprise, educational and promotional activities in this area, the commercialization of new products and technologies. By locating a future business in the incubator, as a rule, one has access to university labs and testing equipment, databases and library resources, technology and patent counseling.
- Scientific parks, managed by professionals, mostly coming from the academic environment or having a good orientation in this area, aimed at promoting a culture of innovation and an offer of scientific research institutes, as well as associating partnerships between innovatively active companies and research units,
which perform an advisory, related to the transfer of knowledge or technology role in the process of the
development of these companies.

In the remainder of this paper a comparative analysis and evaluation of two key partners in innovation
processes in enterprises has been made:
- universities, together with their subsidiaries (including the innovation and technology transfer centres,
sciences parks, business incubators),
- commercial entities offering on the market various types of advisory, consulting, expert or R & D
services.

4. Cooperation of companies implementing innovative processes with universities and commercial
entities offering knowledge - conclusions from the study.

Among the above-mentioned entities and institutions, particularly important part in the process of
transferring knowledge into innovation-oriented enterprises play universities, which are increasingly active in
this field through technology transfer centres. [15] The second major provider of knowledge are commercial
entities, mainly consulting companies and other specializing in expertise and all types of R & D services offered
for the companies. The Author presented below a multi-criteria comparative analysis of business support in the
process of innovation by both types of above-mentioned entities, based on own observations and conclusions.

As referred to in point 1. research from the year 2012, aimed at researchers and representatives of
companies consulting from Silesia region, the author made an attempt to solve the research problem
concerning determination of conditions for engaging the scientific community into cooperation with
enterprises which implement innovative processes and defining the possibility of cooperation of these
research centres with consulting, advisory and expertise oriented companies transferring knowledge to
enterprises on a commercial basis. The Author put forward the hypothesis that Polish researchers, although by
far, having higher scientific potential, are losing with consulting companies the race for acquiring orders from
the economy, because they are less prepared for such rivalry in organizational terms as well as marketing, and
incentive. This hypothesis is confirmed by the results of the comparative analysis contained in Table 2, which
also revealed other areas of competitive advantage of consulting, advisory and research companies over
universities in terms of knowledge transfer services to businesses. Given different approaches of universities
and consulting firms to providing knowledge transfer to enterprises, but also the theoretical possibility of
complementarity of their potentials - the intention of the Author was to determine whether on the market
knowledge both universities and these companies are focused solely on competition or is cooperation possible
in certain areas. In a study aimed at scientists and representatives of consulting, and research companies from
Silesia region, implemented in the form of personal interviews, the Author obtained opinions that are
presented in Table 3.

Table 2. Comparative analysis of support enterprises in innovative processes by the university’s centre for
technology transfer and commercial companies offering R & D, expert, consulting services

<table>
<thead>
<tr>
<th>The Criterion</th>
<th>University's technology transfer Centre</th>
<th>Commercial company offering R &amp; D, expert, consulting services</th>
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<tbody>
<tr>
<td>Place of services related to the transfer of knowledge in the business entity</td>
<td>Additional activities, placed in third place after teaching and basic research.</td>
<td>Main activity, bringing resources for company’s maintenance and development.</td>
</tr>
<tr>
<td>The width of the range of services related to the transfer of knowledge</td>
<td>Range of closely related to the directions of training and specialization of hired scientific and academic cadre, developed together with the expansion of education offer and raising new faculty.</td>
<td>Generally an assortment is suited to the needs of business branches supported by the company, and expanded in accordance with demand, most flexibly adapted to diversify clients’ activities.</td>
</tr>
<tr>
<td>The ability to provide free services related to knowledge transfer</td>
<td>Ample supply of free of charge services related to the transfer of knowledge to companies, due to the availability of funds on advantageous terms (mostly 100%, 90% or 85% of the co-funding) for example, for the purchase of laboratory equipment, remuneration of researchers. The formula of using EU funds often forces free transfer of project results to its beneficiaries.</td>
<td>Much worse possibilities in this respect, in view of the legal status of the company, that for example. on the development of R &amp; D services can obtain a grant in the amount of 60%, 50% or 40%, what makes the free transfer of knowledge to the customers unprofitable. For this reason, consultancies are losing some of the market for the benefit of university, offering free access to certain areas of expertise.</td>
</tr>
<tr>
<td>The Criterion</td>
<td>University’s technology transfer Centre</td>
<td>Commercial company offering R &amp; D, expert, consulting services.</td>
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</tr>
<tr>
<td>Period of availability of services related to the transfer of knowledge</td>
<td>Due to the work cycle of the university (summer semester winter semester, 3-month break in order to use of a 36-day leave by faculty) there is no complete, year-round availability of knowledge transfer services.</td>
<td>Full, year round availability of knowledge transfer services, forced by the economic calculation and flexibility in relation to the needs of customers.</td>
</tr>
<tr>
<td>The response time to client’s needs</td>
<td>Formalized, often bureaucratic structure of the forces, as a general rule, a long period of waiting for the conclusion of the agreement for the implementation of knowledge transfer services, and then increases the time to implement it, since scientists are also, at the same time, engaged in didactics and academic life.</td>
<td>Quick response to customer needs, short path to the conclusion of the agreement, as a rule, a reasonable delivery time of knowledge transfer services, only extended by the terms of execution for example, the availability of experts, studies requirements, etc.</td>
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<tr>
<td>The price level of services related to the transfer of knowledge</td>
<td>Services with low price competitiveness due to the way the price it is calculated, taking into account the many intermediaries on different levels for example. General university mark-up of 20% of the price, faculty mark-up of 20% of the price. For this reason, the analogous knowledge transfer service carried out by the university and the company is much cheaper in the latter case.</td>
<td>As a rule, very competitive price level due to the way of calculating costs for example. hiring of knowledge transfer services contractors on the civil law contracts rather than full time employment with all mark-ups, as it is in case of university scientific cadre, leasing of R &amp; D hardware, etc.</td>
</tr>
<tr>
<td>Marketing support of services related to the transfer of knowledge</td>
<td>Focus on the recruitment of students. Rather poor marketing support and insufficient promotion of knowledge earned by the university as a marketable product. Polish university technology transfer centres are currently learning marketing activities on the knowledge market.</td>
<td>Mostly very extensive marketing support of services related to the transfer of knowledge for example. leaflets, folders, offers dedicated to customers in specific industries, systematic market research, attendance at trade fairs, exhibitions, etc.</td>
</tr>
<tr>
<td>The quality of the resources necessary to provide services associated with the transfer of knowledge</td>
<td>High quality of faculty resources, poor quality of R &amp; D infrastructure (for example. outdated laboratories, in which at the same time, teaching and R &amp; D services are conducted). This situation is changing favourably, however, thanks to retrofitting the university with EU grants. Lack of financial resources on a stand-alone development of this potential.</td>
<td>As a general rule, good quality of resources necessary to provide services related to the transfer of knowledge: hired employees – experts or experts acquired as external advisors for example. out of College, own or rented/leased R &amp; D base, higher than in the case of the university, own budget for development.</td>
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<tr>
<td>Possibilities of protection of intellectual property</td>
<td>Polish universities build intellectual property protection systems, but their familiarity among the academic cadre is not yet universal, what is a derivative of low inclination to participate in the processes of knowledge transfer.</td>
<td>Intellectual property protection becomes a priority in business activities of a company, which main source of revenue is the sale of knowledge in many forms. Knowledge is a value to be protected and a source of profits.</td>
</tr>
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<td>Continuation of table 2 of page 8</td>
<td></td>
<td>Source: own elaboration based on the results of research</td>
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<tr>
<td>The ability to implement services related to the transfer of knowledge in cooperative networks</td>
<td>A large number of international cooperation agreements is formalising the joint R &amp; D projects that could be done on behalf of enterprises. High availability of EU funds for international cooperation towards the transfer of knowledge to enterprises.</td>
<td>Cooperation networks are only set up in a situation where company obtains the benefits of cooperation with partners for example, cooperation with a prestigious institution of higher education may rise the value of the knowledge transfer service provided to companies.</td>
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</table>
The research methodology adopted included opinions of scientists, and have omitted the formal position of institutions in terms of cooperation with consulting and research companies, since formally in Poland scientists have freedom of action in this regard. [15] Generally, scientists perform knowledge transfer services to companies through university. But financially advantageous for them, is to individually take up this type of service or work as subcontractors for consulting companies, where there is always a need for specialists and experts. However, this raises concerns about the negative impact on further development of scientific career at the university and, in practice, inhibits involvement in the transfer of knowledge to companies. From the point of view of Polish strategic objectives of innovation policy and higher education policy – the priority is to

Table 3. The opinions and views of scientists and representatives of the companies providing R & D, consulting and expert services on services related to the transfer of knowledge to companies

<table>
<thead>
<tr>
<th>Subject statements</th>
<th>The opinions and views of scientists employed in higher education</th>
<th>The opinions and views of the representatives of commercial companies, offering R &amp; D, consulting and expert services.</th>
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<tbody>
<tr>
<td>Sense of personal value on knowledge transfer services market</td>
<td>Work on behalf of companies is evaluated in the hierarchy of academic activity less than basic research or teaching. The respondents had difficulties in assessing their value on the knowledge transfer services market.</td>
<td>Subjects focus at work mainly on providing knowledge transfer services for companies. The level of remuneration and the number of orders is a determinant of personal value in the knowledge market.</td>
</tr>
<tr>
<td>Current contact with the entity that acquires orders for knowledge transfer services</td>
<td>Only sporadic contact with the unit acquiring such orders, rather waiting for offers than active soliciting for them. The prestige of the orders is important, but there is no direct leverage on an academic career.</td>
<td>Active contact with the unit currently that is acquiring orders, what often determines the possibility of earnings, and prestige orders implemented add value on the market knowledge.</td>
</tr>
<tr>
<td>Knowledge of business practices</td>
<td>As a general rule, poor knowledge of business practices, due to the concentration on teaching and academic activities. Only sporadic contact with companies.</td>
<td>High knowledge of business practices related to continuing servicing of orders from companies in specific industries.</td>
</tr>
<tr>
<td>The evaluation of scientific potential of employers</td>
<td>High scientific potential of employer.</td>
<td>Medium scientific potential of employer.</td>
</tr>
<tr>
<td>Access to sources of knowledge</td>
<td>High access to sources of knowledge. Scientific conferences, joint research programmes, exchange of experience.</td>
<td>Average access to sources of knowledge, only those knowledge sources that serve the purpose of servicing the customer of the company are collected.</td>
</tr>
<tr>
<td>Evaluation of the effectiveness of usage of R &amp; D base for the purpose of knowledge transfer to companies</td>
<td>Insufficient efficiency of use, due to the need of providing this base for the purpose of teaching, breaks between semesters, formal restrictions e.g. ownership of another faculty.</td>
<td>High efficiency, since investment in R &amp; D equipment must pay back in serviced orders. In some cases, the acquisition of equipment shall be replaced by lease or leasing.</td>
</tr>
<tr>
<td>The motivation to engage in knowledge transfer-related services</td>
<td>Rather, low motivation, because it is not highly rated in the current model of academic careers. Implementation of R &amp; D services through the principal place of work is not financially advantageous for a scientist (high mark-ups on wages).</td>
<td>Average and high motivation (depending on the current incentive system in the company), resulting from the nature of employment and specialization in the field of counselling, consulting, R &amp; D services and personal career aspirations.</td>
</tr>
<tr>
<td>The possibility of personal involvement in knowledge transfer services to businesses</td>
<td>Inability to fully engage in this type of service, because of teaching and the organizational duties at the university.</td>
<td>Full engagement in knowledge transfer services to enterprises - time job and the company agreed with the employer.</td>
</tr>
<tr>
<td>How to engage in knowledge transfer services to businesses?</td>
<td>Frequently through Alma Mater; although this is less cost-effective than working on their own account or for a consulting company. However, the fear of being a competition for their own university prevails.</td>
<td>Full-time or civil law based employment in business consulting, for one or more companies of this kind. Casual work at the university for reasons of prestige and because of scientific ambitions.</td>
</tr>
</tbody>
</table>

Source: own elaboration based on the results of research.
implement as much as possible knowledge transfer services to enterprises with the involvement of universities, but as to the forms of engagement – in such activities – there is a fairly broad freedom [26], [25]. Given the, already diagnosed, advantage of consulting companies on the knowledge transfer market for innovation-oriented companies, in the last part of the paper the Author has formulated recommendations for the creation of conditions for cooperation between these entities with universities, replacing at least in part, the competition in this field of activity.

5. Conclusion

Knowledge market has still untapped potential for both the entities that provide knowledge, as well as those that should raise the demand for knowledge, including companies implementing innovative processes. As mentioned above, some companies, especially the biggest ones, base the development of innovation only on their own, internal resources of knowledge, using for this purpose their own R & D base, exclusive employment of scientists, long-term research programs conducted on their own. Most companies feel the need for outside expertise, but that is usually the demand revealed only occasionally, for example in connection with on-going innovation processes. Nevertheless, this opens up the field to develop their co-operation with business environment, including universities and consulting or research companies, providing knowledge transfer services to businesses.

Regarding the research issue raised in the paper, the Author concludes that at every stage of the innovation process is necessary to use certain stock of knowledge, which may be at a disposal of the company itself, or the firm may seek to acquire the knowledge of the environment. This problem is shown in detail in Table 1. While the company intends to reach out for external knowledge resources, it improves its relationships with business environment, where it finds partners ready to transfer its expertise to the company for a fee or free of charge. If the company has the necessary determination, and in most cases also has sufficient funds for this purpose, it can successfully expand their knowledge resources with the support of entities of business environment. The only requirement is familiarity of the offer and the ability to make the acquired knowledge resources useful for the company.

Widely discussed issues of cooperation barriers between science and business, inhibiting the development of innovative enterprises, in many cases, have their origin in the lack of understanding of the interests, expectations and needs of each of the parties of the process of knowledge transfer. In Table 2 on the basis of selected criteria, possibilities of obtaining support from university technology transfer centers and commercial companies providing expert, consulting, R & D services, by innovation-oriented enterprises were characterized. As one can see, commercial companies specialized in this area, are much better prepared to participate in the innovation processes in technical, organizational and marketing terms. They are able to listen to customer needs and are much more flexible when it comes to the execution of orders. For universities, transfer of knowledge to businesses is still a secondary activity. The advantage of the university is higher quality potential in the form of scientific staff, extensive international contacts and, often high recognisability of brand. Extensive range of options is also opened for universities by making use of Structural Funds, in particular the European Social Fund and European Regional Development Fund. In 2007-2013, in the European Union joint projects of research centres and enterprises on innovation were supported by a wide stream of grants. Some companies, however, question the meaning of the use of EU support, rightly arguing that in many cases a grant for the R & D project, shared by the university and the company, forces a wide dissemination of its results, with an open, equal access to all potentially interested parties. It is not in the interests of companies involved in this kind of a project, which hopes that it will have exclusive rights for the results of such studies. Analysis of Table 2 and Table 3 leads to a conclusion that many universities still need to improve on organizational, technical, and marketing issues in order to become an equal competitor to specialized commercial providers of knowledge to innovative companies. The most important recommended actions are:

- employment of professional marketers in centres of the technology transfer, who will be able to convert the knowledge possessed by the university into an attractive product market,
- selecting from among the staff of the university academic researchers who have a predisposition and genuinely want to engage in cooperation with business, relieving them from teaching,
- establishing effective incentive systems for those researchers, who are involved into cooperation with enterprises, taking into account both financial and non-financial motivators, as well as appreciation of the achievements in this field in the scientific career path,
- change in the calculation of value of R & D services by universities, towards marketization of their prices
- creation of a separate path of formalization of orders from the companies, without many intermediate levels, which will reduce the time to conclude the contract and accelerate its implementation,
- promotion of all activities of the university technology transfer centre amongst companies, education of firms regarding benefits of innovation development and the role of knowledge in these processes.
Analysis of the data in Table 2 clearly shows that colleges and universities, because of the priority set towards education, will not align with the consulting, advisory or research specialized companies in number of completed knowledge transfer services. This matter is resolved by a different formula of their activities and limited possibilities to use scientific potential, resulting, among others, of the nature of academic work.

Referring to the goal of this paper – one must therefore answer to the following question, whether, having regard to the above-described differences in the approach to provision of services of transfer of knowledge, mutual relations between universities and consulting companies as external advisors to firms implementing innovative processes must be based on competition, or is cooperation possible in certain areas. The research and empirical studies have led the Author to conclusion that both parties can benefit from the cooperation, should they respect the following terms:

- academic staff employed at universities will be able to freely engage in knowledge transfer services to companies through specialized consulting, advisory or research firms – officially, with the knowledge and consent of the university, basing on the assumption, that the staff will provide a specific commission income to the university technology transfer centre (this solution will be much more cost-effective from fiscal point of view for both scientists and universities, and this way it will also be possible to avoid the bureaucratic process of formalization of the agreement on the knowledge transfer service through college, because it will be done through a consulting company),
- universities will develop a pricing for renting their R & D infrastructure, such as laboratory base, for specialized commercial providers of knowledge, thus improving the efficiency of usage of their infrastructure,
- universities shall make an effort so that the academic staff can see the creation of knowledge, not only in terms of scientific value but also as a market product that can bring profit,
- specialized, commercial providers of knowledge to the business will open for cooperation with academic institutions to a greater extent, knowing that higher education institutions are not adequate competition for them in the market of knowledge transfer; thus they will increase their access to knowledge, enrich the range of knowledge transfer services they can provide and will acquire valuable faculty experts, advisers, associates,
- both universities, as well as specialized, commercial knowledge providers should increasingly engage in cooperation, for example, joint participation in clusters, where each party brings personalised added value: academic staff has a wide access to sources of knowledge; representatives of consulting, advisory and research firms have excellent orientation in economic practice problems that can be used to make an attractive offer of knowledge transfer services for companies; businesses that interact with these entities in networks and clusters, can accelerate the implementation of innovation processes and increase their quality.

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