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INDUSTRIES AND SECTORS: ISSUES AND POLICIES

**A TECHNOLOGY PARK AS AN
INSTITUTION THAT SUPPORTS
TRANSFER OF INNOVATION AND
KNOWLEDGE TO THE SME SECTOR
COMPANIES**

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Key words: Technology park, innovation, the SME sector companies.

Abstract: Application of advanced technologies in small and medium-sized enterprises allows them to gain a competitive advantage on the market. New technologies are developed by research laboratories, R&D (research and development) laboratories of companies, as well as by public scientific centers. The key issue is cooperation between the academic world and entrepreneurs, which should be aimed mainly at transfer of innovation. The function of technology transfer is played, among other institutions, by technology parks. The objective of this article is to present some of the problems associated with taking advantage of the potential of technology parks for entrepreneurs in the area of research and development.

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Multidimensionality of the term “Technology park”

The technology park concept is related to the 19th century definition of industrial districts, provided by professor Alfred Marshall, a British economist. The fact of concentrating enterprises and business services within a closed area results in “synergy effects”, which, in association with R&D activity and the possibility of financing risks (venture capital) may lead to emergence of an innovative environment. The modern network-based business requires a dynamical environment, which generates innovation capabilities (Matusiak, 2009). The first technology park in the world is considered today to be the Bohanson Research Park in Menlo Park (USA), established in 1948 (USA). However, the most famous until today is the Silicon Valley, that is, Stanford Research Park at Stanford University, established in 1951.

Technology parks are one of the institutional forms of supporting competitiveness of small and medium-sized enterprises (Wach, 2005). The primary aim of a technology park is transfer of knowledge and innovation from institutions that develop technology to enterprises.

There are many definitions that describe the concept of a technology park, also known as a science park.¹ For instance, the International Association of Science Parks provides that it is “an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and

provides other value-added services together with high quality space and facilities” (Marciniec, 2007, p.48). Another definition is provided by the American Association of University Related Research Parks (AURRP). It is worth noting that the number of technology parks in the United States is so great that there are some differences in definitions of the issue, although their core features include (Marciniec, 2007, p.49):

- Having land and buildings established (or planned) for use by private and public research facilities, enterprise in hi-tech and science and technology related activities and supporting services;
- Initiated or have formal link and co-operative arrangement with university or any higher education institution;
- Aims to promote joint research and technology transfer between university and industry in order to support the growth of new venture enterprises and promote economic development;
- Assist in technical and management skills transfer between university and the park tenant. According to the definition of the European Commission, a technology park is a development undertaking in the vicinity of one or more universities, as well as research centers, or within a territory, which has convenient and operating communication links with these institutions.

Originally, in Poland, a technology park was defined as an „organized industrial complex, initiated and subsidized from public funds, which implements policy in the field of: supporting young innovative companies, focused on development of new products and methods of production in technologically advanced sectors; optimization of conditions of transfer of technology and commercialization of research results from scientific institutions to business practice” (Bogdanienko, 1998, p.82).

¹ According to the International Association of Science Parks a technology park is also a “technopolis” or a “science and technology park”

Afterwards, in the Polish legislation on investment financing, the technology park concept was described as follows: “a set of isolated land plots with the technical infrastructure, established to enable transfer of knowledge and technology between scientific entities and entrepreneurs, offering those entrepreneurs, who use state-of-the-art technologies, consulting services on establishment and development of enterprises, transfer of technology and turning of scientific research and development works into technological innovations, as well as enabling these entrepreneurs to engage in business activity by using the real estate property and technical infrastructure on the basis of agreements” (PARP, 2005, p.45). An objective of a technology park is to: support creation and development of those enterprises, which operate on the basis of scientific achievements,

facilitating transfer of technology from local research and academic centers to enterprises and organizations operating in the park or outside it, ensuring the appropriate land resources to enable cooperation between academic institutions and innovative companies (Wach, 2005).

The organizational structure of a technology park includes four elements: the park infrastructure, the management center, the technological potential, which is the core of the park, and a group of small and medium-sized innovative enterprises, which specialize in quick adaptation of state-of-the-art technologies. It is worth nothing that apart from SMEs, laboratories of large business entities operate in technology parks as well (Wach, 2005).

TABLE 1. USERS OF POLISH TECHNOLOGY PARKS IN 2009

Resident type	Number of entities	Employment
Small technology companies	95	261
Other SMEs	380	8 211
Foreign companies	63	5 468
Science and research institutions	17	1 194
Other institutions	28	1 436
Total	583	17 070
Entities that have left the park	52	110

Source: Matusiak, 2009, p.35.

Summing up, it can be stated that technology parks that emerge in various parts of the world are becoming a synonym for „economy of knowledge”, combining within a single area (Matusiak, 2004, pp. 335-337):

- science and research institutions that offer new technological solutions and innovative companies, searching for new development opportunities;
- a rich business environment in terms of financing, consulting, trainings and support of development of innovative companies,
- financial institutions of high risk (venture capital);
- high quality of the infrastructure and advantages of the environment (a pleasant place to live and spend free time);
- a high potential of entrepreneurship and a business climate, which attracts creative persons from other regions;
- governmental, regional and local programs to support development of entrepreneurship, transfer of technology and development of new technological companies.

Development of technology parks in Poland

The first technology park in Poland was established by Adam Mickiewicz University Foundation in 1995 in Poznań - it was the Poznań Science and Technology Park. At present, it consists of several independent companies, including the Chemical Technology Incubator, the

Innovation Support Center, Poznań Radiocarbon Laboratory, UniMarket. There are 46 technology parks in Poland. 20 of these are characterized by the most dynamic growth - they occupy the area of 1.3 thousand hectares, including almost 550 thousand hectares of developed area. In total, they consist of 523 institutions and 18 research and development units. The most popular is Wrocław Technology Park, consisting of 85 entities and one scientific institution. Further in the classification, there are: Pomorski Science and Technology Park with 68 companies and 2 scientific institutions, Krakow Technology Park (58 and 3, respectively) and Poznan Science and Technology Park (51 companies and 3 scientific institutions) (Smyrgała, 2010).

Technology parks in Poland can be divided according to their level of advancement. There are three categories:

Group I includes 23 parks characterized by advanced organization, implementing the full scope of their statutory activity, including rendering access to land and auxiliary services for companies;

Group II includes 7 initiatives focused on preparation and adaptation works or undergoing transformation from traditional industrial parks; most of these should commence operation in the coming year;

Group III includes 16 undertakings at the stage of design and preparation of organizational basis (the entity or team engaged in the park preparation activities has been established).

Opportunities and barriers for development of technology parks in Poland using Pomorze Zachodnie region as an example

Research on the impact of the business environment institutions, including technology parks, on development of intangible resources, has been conducted by surveying 158 companies of the SME sector, selected randomly in accordance with the objective of the survey. Among these, 134 questionnaires were classified as eligible for assessment. Slightly more than one half of all respondents examined were service companies (57%). 55% of all companies operated on local and regional markets. Others offered their services or products on domestic and foreign markets. The research was conducted in form of a survey. Each of the respondents filled out a questionnaire, consisting of multiple choice questions. The research project was implemented in 2008 within the framework of own research entitled *Identification of determinants of development of knowledge and innovation as an opportunity or threat to development of SME sector companies – a critical analysis of urban-rural conditions (Zachodniopomorskie province)*. The broad-range focus was examination of SME entrepreneurs with regard to ability of obtaining access to innovation via business environment institutions. It was assumed that innovation was a derivative of the properly modified and used knowledge.

Analysis of responses showed that only 29% of enterprises took advantage of support offered by the business environment institutions. Among these, only 8% of respondents had the professional knowledge on activity of technology parks. It is worth noting, however, that a large group of respondents knew about these institutions and were aware of the possibility of obtaining their support in establishing and conducting business activity.

Nevertheless, unfortunately, even those entrepreneurs, who were aware of the possibility of obtaining support from these institutions, addressed them rarely due to insufficient information in this regard. Respondents pointed out that a serious barrier hindering cooperation was lack of communication platforms, which could serve as a source of knowledge on the forms of support offered by technology parks. It was postulated that management of data of this type should be entrusted to a single state institution, which would coordinate and bring together all activities.

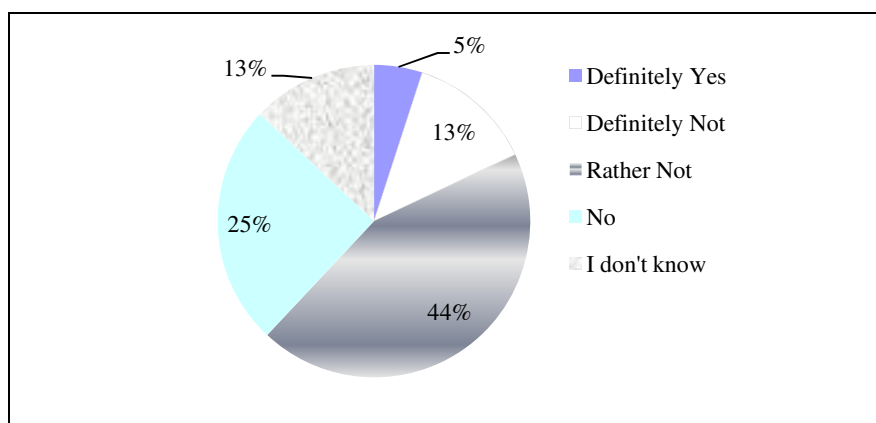
As for their view of impact of technology park on development of companies, including innovations in the region, the answers of respondents varied greatly. They expressed their belief that technology parks should play a significant role in development of regional companies to provide them with access to knowledge and innovation (45%). However, asked to specify the role of institutions under concern in the transfer of innovation and the mode of such transfer, which would contribute to making the region a territory characterized by substantial innovation potential, the entrepreneurs pointed to: increased significance of advice in the field of knowledge and innovation, which could be obtained for their business activity, acquisition of specific product or process innovations for the enterprise, the sphere of R&D becoming more open to cooperation with business entities. Moreover, entrepreneurs decided that if they could, they would eagerly locate their companies in the park due to more profitable conditions of operation, including low rent, access to modern devices and machines, possibility of gaining experience through cooperation with similar companies.

TABLE 2 OPPORTUNITIES AND THREATS ASSOCIATED WITH COOPERATION OF A COMPANY WITH A TECHNOLOGY PARK

Opportunities	%	Threats	%
Ability to implement technological solutions	34	Lack of innovation policy of the state	24
Access to state-of-the-art knowledge and innovation	16	Bad condition of Polish economy and science	15
Increased competitiveness of the company	12	Underdeveloped sector of advanced technologies	12
Establishing of cooperation in clubs of entrepreneurs	13	Conservatism of academic communities towards new activities	10
Greater company prestige	6	No basis for promotion of innovation in the SME sector	9
Acquiring of new clients and/or markets	5	Insufficiently developed structure of commercialization of results of R&D works	6
Higher quality of functioning of the company	5	Desirable investor profile	6
Ability to reduce costs at the company and to increase performance	3	Lack of land for production facilities	5
Acquiring / developing export opportunities	2	High level of investment expenditures required	5
Other	2	Lack of infrastructure and buildings	3
Refusal to answer	2	Lack of financial resources	2
		Lack of financial institutions among founders	0
		Other	3
		Refusal to answer	0

Source: Own analysis on the basis of research results.

FIGURE 1. DO THE TECHNOLOGY PARKS IN THE ZACHODNIOPOMORSKI REGION PROVIDE ACCESS TO KNOWLEDGE AND INNOVATION?



Source: Own analysis on the basis of research results.

Unfortunately, 15% of respondents believed that technology parks had little impact on development of entrepreneurship, because their activity lacked the professional and comprehensive preparation, and 5% of respondents stated that institutions of this kind were not sufficiently promoted in the local communities and an average entrepreneur knew too little about them (2% of all respondents did not know how to answer this question).

Further research was focused on systematization of opportunities and threats associated with taking advantage of support offered by technology parks by entrepreneurs of the SME sector, presented in Table 2.

Analyzing Table 2, it can be said that among the main advantages, which should result from support offered by technology parks, entrepreneurs listed such aspects as: ability to implement hi-tech solutions, access to state-of-the-art knowledge and innovations, more effective operation on the regional market, higher quality of functioning of the company and contribution to its increased competitiveness.

Afterwards, the entrepreneurs asked whether technology parks in the Zachodniopomorski region provided access to knowledge and innovation. The distribution of answers to this question was presented in Figure 1. Justifying their selection, persons, who marked answers "no" or "rather not", pointed once again to lack of generally accessible information on services rendered with regard to access to knowledge or innovation, offered by a technopolis. At the same time, however, it turned out that some of the respondents were very much interested in getting engaged in such activity of technology parks in the future.

Research results and recommendations

As presented by reference books, but practice as well, the contribution of business environment institutions to economic development, including technology parks, is becoming increasingly significant in Poland. Entrepreneur awareness of the essence and scope of activities of these institutions is increasing, as well as their willingness to take advantage of the services they offer. Poland is a country, which only recently began

forming institutions with such a sphere of activity. Lack of experience and evolutionary processes, make it difficult for both these ventures and entrepreneurs to find themselves in this rapidly changing reality, and there are certain dangers involved. However, it is necessary to bear in mind the advantages at the same time.

As Matusiak (2009) presents it in his study, there exists a number of threats to the development of technology parks in Poland, including:

1. an emphasis on technical infrastructure at the cost of services, which support enterprise and the transfer of technology, associated with the risk of transforming them into industrial parks and business zones which "look nice" but do not serve the purpose they are meant to;
2. lack of potential entrepreneurs, projects to commercialize and innovative business ideas;
3. lack of restructuring of the R&D sector and a scientific community closed off from active business and entrepreneurial enterprises;
4. the political climate in the country, preservation of priorities for defensive structural politics, protecting the remnants of post-socialist economic structures;
5. problems with local and regional partnerships, problems with securing local input and choosing an attractive location;
6. excessive emphasis on grants - hastily designed concepts tailored to contests offering grants, without giving any thought to what purpose the adapted structures are to serve, and how the functions of the technology park are to be implemented;
7. pushing through initiatives in peripheral locations, which lack the scientific and research potential and other resources necessary for the development of technological entrepreneurship.

Due to the above, it should be stated that in the near future, according to one of the development scenarios, development of technology parks may slow down and be partially replaced by exclusively industrial or business activity. This may be due to limitations associated with cooperation with academic communities, as well as active transfer of technology. Unfortunately, investment

expenditures for incubation activities are also being cut down due to their low profitability and risks associated with their implementation. The second scenario, on the other hand, refers to the threat of “overscientization”, associated with revaluation of the park on the basis of universities and investing in highly specialized „technological competencies”.

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