

EXPERIENCES REGARDING SCIENTIFIC AND TECHNOLOGICAL PARKS ACROSS THE WORLD - THE CASE OF ROMANIA

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Abstract: *The economic literature regarding projects such as industrial parks or science and technology parks (STPs) is abundant and shows a diversity of approaches and practical experiences. This article makes a short inquiry through some recent papers presenting the various aspects that make the specificity of each country and then focuses on the Romanian experiences. Based on some information received from two of the Romanian STPs, the authors make observations and suggestions regarding their situation and the implication of public authorities.*

Key words: science and technology parks; economic development; public authority implication

JEL Classification Codes: L16, M21, O32.

1. INTRODUCTION

The importance of research for human development is undeniable and visible along the centuries. Looking for new ways of bringing research closer to economic activities is a trend for more than fifty, first in developed countries and now in developing countries too. Projects such as business incubation units or scientific parks can be found almost in each economy of the world. The effects of such projects in economy can't be seen in a few years but they can act from the beginning as "poles" of attraction for researchers, innovative firms and research institutions in their search for performance. Countries such as USA, Japan, France or Great Britain host thousands of scientific and technological parks, many of them with tens of years of experience.

Technological and scientific parks are defined in various ways, their practical diversity being almost as wide as their definitions. For some authors their definitions are differentiated, for others they can be defined as a unit.

The first category of authors agree on some basic features such as their dimension as a real estate, activities for technology transfer and/or development and partnership between academic institutions, government and private sector (Phillips, 2003). Then, other characteristics are added by each author, focusing on their role as instruments for innovation development. But the authors see the "technologic" / "scientific" attributes as synonyms. The authors of this article prefer to differentiate the two types of parks, as presented in the first section.

The second part of the article is focused on analyzing Romanian scientific and technological parks based on the current legislation. Romania has been a transition economy struggling with problems emerging from structural economic and social changes, but also a country which succeeded in the attempt of becoming a member of the EU and, in the last two years, in stabilizing the economy and obtaining one of the biggest GDP growth rate in the European Union.

The last section of the article presents two of the Romanian scientific and technological parks, TECHNOPOLIS and MINATECH. The conclusions of the article are based on their analysis and on the public information available for the other parks.

2. SCIENTIFIC AND TECHNOLOGICAL PARKS IN ECONOMIC LITERATURE

Although many authors consider that “scientific” and “technological” parks are referring to the same thing¹, this article makes a difference between them.

Technological parks are mainly characterized by:

- They are real estate, business and research projects, hosting enterprises and research centers, but also education institutions such as universities. Their main vocation consists in applied research activities, production of high tech goods and services for firms but also traditional production with a strong potential for development. (Wackermann, 1992)
- The promoters of a technological park do not ignore the urban insertion of the project but this is not a goal.
- Such a park does not necessarily involve a formalized relation between the project and its locators, and academic institutions, located in the park or outside. These relations, if exist, are mostly informal, fact which does not affect their efficiency. (Lacave, 1995)

Scientific parks are (Popescu, 2009):

- Real estate, business and research projects initiated by universities and/or research institutions, sometimes inside university campuses. Their development depends on hosting firms with strong research abilities and on associating with university research labs or other research units. The clients of scientific parks should be: big firms conducting large research or high tech projects, small firms able to assimilate high tech technologies or other types of firms (such as software firms) looking to improve their image and become attractive for the qualified workforce they need, national research institutions, universities or private research institutes.
- Aimed to incite the transfer of technology towards the located firms and to support the development of knowledge based activities.

Both technological and scientific parks are assembling on a single area all different types of facilities: offices, laboratories, production buildings and installations. Many of them also host a business incubator.

The originality of a scientific park over a technological one resides in the existence of formalized and operational relations with at least a university or an important research center.

Although there are differences to consider, in Romania (who’s case is analyzed in this article) all the parks existing until now are treated as “scientific and technologic” because the law makes no separation between them. For the rest of the article they will be called “scientific and technological parks” – STPs.

The notion of STP should be connected to the notion of “industrial symbiosis”, because such a park is (theoretically) mostly a symbiotic body than a real estate complex. Industrial symbiosis concept is applicable to other types of parks, too, but it emphasizes the necessity to take advantage of all the synergies provided by geographical and/or virtually induced proximity of different types of activities (research, education, production). (Zhang and all, 2015)

Debates are being held on whether they should be seen as major tools for the development of a region or a country. Ideally, STPs are expected to create conditions for the creation and growth of new technology-based firms, for assisting them increase their chances of survival,

¹ Some opinions make no difference not only between “scientific” and “technologic” parks, but also between those and “technopolis” or “technopoles”. This article is based on the fact that that the terms are not interchangeable.

generate high value-added jobs, and boost economic growth of the host region. That is why, in theory, STPs are supposed to provide assistance for alleviating the three gaps (funding, research, and trust/information) that occur in the early stages of new technology-based firms. They should provide an important resource network, including physical infrastructure, managerial support, shared research and secretarial resources, and access to networks of finance and business acumen. (Sofouli and Vonortas, 2006)

Studies conducted both in developed and developing countries (Phillips, 2003), (Sofouli and Vonortas, 2006) show that STPs are often implemented based on providing investment incentive packages and sufficient infrastructure, emulating the old industrial estate or compound model. As proven, many of these are not true STPs in the sense that they are not integrated into the national or regional host economy with strong collaborative efforts in research and development and technology transfer. However, the generation of STPs which has been emerging over the last three decades focuses on sophisticated cutting-edge infrastructure technologies (particularly telecommunications-based, including Internet usage and electronic data interchange) combined with a supportive business environment for knowledge-based industries. Yet, the effects of this new approach should be more obvious in the years to come.

The literature on STPs refer mainly to developed countries (such as USA, Japan, France, Great Britain, Sweden or Australia), some newly industrializing countries (such as Brazil, China, and India), and only to a few small and medium-sized countries (Greece or Taiwan). The countries in the latter category have, in their particular circumstances, followed international developments in an effort to remain actively engaged in the global knowledge economy. Romania can be included in this last category.

3. SCIENTIFIC AND TECHNOLOGICAL PARKS IN ROMANIA

Romanian experience in the field of projects such as industrial parks and STPs begun after 1990, when Romania chose to change its political and economic structures, passing from a centralized economy towards a capitalist one. Old industrial sites, many of them deserted over a few years or in a desperate need of a change, were transformed with the help of central and local authorities in industrial parks, but as isolated initiatives. At the end of the 90s, private capital became interested to invest in industrial parks and at the beginning of 2000 these types of parks were regulated by law. In the present there are more than 50 industrial parks and only 4 projects of STPs (a 5th one is about to be put in place).

The main juridical document that regulates STPs at national level is the Romanian *Government Ordinance no. 14 from 24 of January 2002*. According to this document, a STP is “*an area where are conducted activities of educational nature, research, technological transfer of research results and their valorization through economic activities.*” Its goals are both to use the results of research activities and to apply high technologies in economy and to increase the participation of universities and research institutions to the economic and social development, through science and technology.

A STP is being constituted based on a Contract of Association which can be signed by: a university and/or a research institution on one hand, and a firm, a national company, a public administration, a professional entity, a person, on the other hand. This association is named “consortium”. The STP is managed by an “administrator”.

The document mentions thirteen economic objectives of a STP, some of them being:

- The technologic transfer of research results towards interested firms;
- The attraction of private investments in high education and research;
- The creation of new workplaces in the field of high technologies;

- The stimulation of innovation and scientific potential of academics, researchers and students;
- The stimulation of private firms to participate in the development and valorization of research and innovation, by producing high tech goods and services;
- The development of scientific, technologic and economic potential at regional level.

The central institution that regulates the activity of a STP is the Ministry of Education and Research. The Consortium acts as a supervising authority and the Administrator is the executive body of the STP.

The document mentions that the STP, its locators and employees are entitled to beneficiate of incentives, reductions, stimulating programs and other types of aids from central and local authorities or from private sources.

4. EXPERIENCES OF STPs IN ROMANIA

In order to better understand how STPs work in reality in Romania it is necessary to analyze some examples. Two STPs agreed to answer a short questionnaire regarding their characteristics, others then those presented on their web sites.

In Romania are fully functional four STPs: STP IASI- TEHNOPOLIS, located in the town of Iasi, STP FOR MICRO AND NANO TECHNOLOGIES BUCHAREST – MINATECH-RO, from Bucharest, STP TIMISOARA - TIM SCIENCE PARK, from Timisoara, and STP GALATI – GALATI SOFTWARE PARK, from Galati. Another park is being put in place at Cluj Napoca, TETAPOLIS.

The first two are going to be presented below.

A. STP IASI- TEHNOPOLIS

STP TechnopolIS Iasi was constituted in July 2003, received the title of STP in December 2004 and became operational in June 2005. It was created with the purpose of using the results of scientific research, of applying advanced technologies in economic activities and of increasing the participation on high education institutions to the process of economic and social development. The TechnopolIS Contract of Association was signed by Iasi County Council, Iasi Local Council (both as funding members) and the University „Al.I.Cuza” from Iasi, the Technic University „Gh.Asachi” from Iasi, the University of Agricultural Sciences and Veterinary Medicine „Ion Ionescu de la Brad” from Iasi and the University of Medicine and Pharmacy „Gr.T.Popa” from Iasi.

Iasi County Council participated with 38.64% of the capital, Iasi Local Council with 41.36% and the other members (as partners) participated with 5% of the capital each. In this case, the capital is 100% of public nature.

TechnopolIS beneficiated of supporting funds through the National Program of Support for Innovation and Technological Transfer Infrastructure - INFRATECH².

The STP aims to develop a limited number of domains of research and production, in two stages:

- In the first stage, informational technologies and audio-video industry.

² INFRATECH was a national program initiated by the Research and Education Ministry between 2004 and 2007 as a supporting instrument of innovation and technological transfer infrastructure (STPs, business and technological incubators – Sub-program 1, technological transfer and technological information centers, industry related offices – Sub-program 2). Its goals were to develop and efficiently use the innovative and scientific potential of researchers, university teachers and students, to reunite all the factors involved in innovation and technological transfer in order to improve technological performances of Romanian firms, to attract investments in order to apply the results of research.

- In the second stage, bio-technologies and food industry.

In 2015 the main fields of activity for the located firms are IT and audio-video production and services.

In the present, TechnopolIS has an area of 83188.23 square meters and hosts 27 firms (starting from 4 firms in the first year and 7 in the second). Since 2007 it also includes a business incubator on an area of 778.54 square meters and the number of incubated firms was 31 so far.

The STP offers general services for all the firms located on its area, such as reception, security and video surveillance, phone and Internet access, cleaning services, but also specialized services for incubated firms (consulting in different areas of competence). Different types of facilities are at the disposal of the locators – conference rooms, exhibitor spaces, parking lots, laboratories.

B. MINATECH – RO

The Science and Technology Park for Micro and Nanotechnologies MINATECH-RO was set-up (initially) by a consortium including the National Institute for R&D in Microtechnologies (IMT), Politehnica University of Bucharest (PUB) and S.C. ROMES S.A. In the end, the STP was established only in IMT and, in a smaller extent, in PUB, both of the partners contributing with spaces, human resources and financing. But the main financing source was received through a project of the National Program of Support for Innovation and Technological Transfer Infrastructure – INFRA TECH. The capital is entirely public.

The authorization for the STP (title of park) was released in April 2004 and the activity of the consortium was officially inaugurated in May 2004. In 2015 the total area of the STP is of 1070 square meters.

The main objective of the STP was to facilitate the access of SMEs to micro and nano technologies, which can be applied both to modern and traditional industries. The STP intended to propose a large variety of activities to its locators, such as instruction, information, technical consultancy and brokerage, all through the Center for Micro-engineering Technology Transfer, autonomous unit within the IMT (which disposed of its own facilities and of those of the EURO PRACTICE European service system).

As presented on the website, the activities of MINATECH-RO are mostly focused on *business incubation* and they consist of:

- Technological transfer: realization of prototypes, demonstrators or experimental models; small scale/pilot production after realizing the prototype;
- Technological services, micro-physical characterization, simulation and computer aided design;
- Learning/training by preparation of courses and stages (with practical training) in the microsystems, micro- and nanotechnologies and micro-engineering domains;
- Assistance and consultancy activities for SMEs and small innovative enterprises: information in micro-engineering, microsystems, micro- and nanotechnologies, access to databases, documentation, etc.
- Facilitating the access of Romanian innovative SMEs to European networks and partnerships; dissemination of information (organizing conferences, workshops, editing publications, etc.).

As the essential function of MINATECH-RO is incubation, the park provides not only standard conditions (room for offices, telephones, internet, secretary services), but also the possibility to use equipment requiring special working conditions, characteristic for chemistry laboratories or laboratories in the semiconductor industry: cleanliness, air conditioning, stove aspiration (for chemical substances), neutralization of waste products (for environment protection), deionized water, nitrogen, protection from explosion. This equipment can be

installed in spaces rented to companies or in common spaces. Technical assistance can be provided for all the equipment, together with consultancy for the R&D activities of the companies and the rental of certain equipment.

The firms hosted in the present activate in domains like electronics, research, engineering consultancy and health industry. An interesting fact for this STP is that it is a *mixt STP*, meaning that it is hosting both physically and virtually. In 2015 there are 5 firms hosted physically and 11 hosted virtually.

C. The other Romanian STPs

For the STPs that did not answer to our information request, STP TIMISOARA - TIM SCIENCE PARK and STP GALATI – GALATI SOFTWARE PARK we can analyze only the information from their websites.

TIM Science Park has numerous founding members (15): a research institute for electrochemistry, a foundation, a university, a commerce chamber, six firms and five individuals. The main domains of activity are chemistry, electrochemistry and environmental safety, physics, computing, automatic systems, economics and marketing.

The STP received its authorization in 2004 and benefited of financing through INFRATECH National Program. The main services are: technical and juridical consultancy, project drawing, studies, evaluation, analysis, expert reports, accountancy, audit, publicity, personnel training, publishing house etc.

Galati Software Park is constituted as an initiative of the consortium formed by Galati County Council, Galati Local Council, “Dunarea de Jos” University and Navrom – Business Center. The Research and Education Ministry gave the title of STP in 2002 (the first STP title in the country).

General facilities are: renovated offices with IT infrastructure (router, file server firewall, file server Internet, advanced digital phone line), promotion activities, reception and secretarial services, cleaning and security services. Other services may be marketing and management consultancy, accountancy, juridical and fiscal consultancy, training, networking etc.

5. CONCLUSIONS

The number of STPs in Romania is very small compared to the number of industrial parks (over 50) but not very different from the number of similar projects in other medium-sized developing European countries (Greece, Croatia, Hungary or even Poland). It is not a surprising fact considering the importance of public funds allocations for research activities in Romania (under 0.5% of the GDP) and the very small interest of private investors for this sector. All the four Romanian STPs are public and their main founders are local authorities, public universities or research institutions.

The STPs vary from small to large projects but the public information on their sites does not allow making a more thorough analysis. Not even on the number of their tenants. The information available does not indicate that cooperation between research institutions and production tenants of the STPs is otherwise than intentional. Even more, the location on such a project is attractive more for facilities and specialized services rather than the synergies it can induce.

A more detailed inquiry is necessary starting with an empirical analysis of the tenants, their activity and the links they develop inside and outside the park. The short history of STPs in Romania may be an explanation for the lack of information and availability to offer it to interested parties, but the subject should not remain unexploited. The authors of this article

intend to go further with the research and analyze the degree of interconnectivity of the tenants inside a STP.

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