

XX IASP WORLD CONFERENCE ON SCIENCE AND TECHNOLOGY PARKS
June 1-4, 2003 - Lisbon, Portugal

**SCIENCE/TECHNOLOGY PARK EXPERIENCES IN EAST EUROPEAN TRANSITION
SOCIETIES: A GENERALISATION ATTEMPT**

RAIVO TAMKIVI, Managing Director

Tallinn Technical University Innovation Centre Foundation
19 Akadeemia Rd, 12618 Tallinn, Estonia
Tel.: +372- 620 2013 • Fax: + 372- 620 2020
E-mail: raivot@edu.ttu.ee
Internet: <http://www.tuic.ee>

ABSTRACT

The paper presents a review of the characteristic features and lessons of the science/technology park (STP) experience in Central and Eastern Europe during its decade-long political, economic and social transition period. After giving the basic data for 14 countries, the IASP updated definition of a STP is used to outline and analyse the following STP development aspects for the region: legislation, organisation and management; awareness and motivation; mission, goals and tasks; stimulation of knowledge and technology transfer, support for innovative businesses, services and facilities.

1. INTRODUCTION

The nations inhabiting the belt from the Baltic's to the Balkans have been accumulating historically unique experience of reshaping a rigidly centralised society into a democratic and market-driven one. While the oldest Science/Technology Parks (hereinafter – STP) in these countries are just entering their second decade, it seems appropriate to try to consider some general features and learn lessons from the STP development under the quite specific conditions.

The recently elaborated STP definition of IASP¹ says that

STP is an organisation managed by specialized professionals whose main aim is to increase the wealth of its community by promoting the culture of innovation and competitiveness of its associated businesses and knowledge-based institutions. To reach these goals a STP

- **stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies, and markets;**
- **facilitates creation and growth of innovation-based companies through incubation and spin-off processes;**
- **provides other value-added services as well as high quality space and facilities.**

In the present paper this definition will, via some of its key statements, be used as a guideline to characterise the features of the STP development in the countries, which (somewhat arbitrarily) will henceforth be termed as Central and Eastern Europe (CEE). The generalisations attempted below should, of course, be taken with a certain caution since the nations compressed into this term remain very different in many aspects: history, geography, economic resources, cultural background, different starting points due to the various degrees of former integration into Soviet bloc (“republics” of the USSR vs. quasi-independent “people’s democracies”), etc.

The paper is based on the author’s personal experience gained in during his work in Estonia² and with organisations such as IASP, SPICE Group³ and BASTIC⁴, as well as from visits to CEE countries. In preparation of the present paper, comments and opinions from several CEE colleagues⁵ have also been of much help, and are herewith greatly appreciated.

2. GENERAL DATA

The basic background data and numbers of STPs and business incubators in 14 CEE countries are collected in the following Table. Indications about innovation support structures in Albania, Moldova, and Serbia & Montenegro were not found, the corresponding structures (or at least STPs) have most probably not been developed in these countries yet.

Table.

Country	Population (millions)	GDP 2001 per capita (USD)	Year:	STPs in action	STPs under preparation	Business Incubators
Ukraine	49.9	1,000	2002:	2	5	18
Poland	38.7	4,300	2003:	4	3	44
Romania	22.5	1,800	2003:	-	4	12
Belarus	10.3	2,700	2003:	2	1	5
Czech Republic	10.3	5,500	2003:	7	3	14
Hungary	10.0	5,100	2001:	2	?	25
Bulgaria	8.2	1,700	2002:	-	?	7
Slovakia	5.4	3,800	2002:	-	2	6
Croatia	4.4	2,600	2001:	1	?	7
Lithuania	3.7	3,100	2003:	2	2	6
Slovenia	2.0	9,600	2003:	4	-	2
Latvia	2.4	2,900	2003:	1	2	5
FYR Macedonia	2.0	1,700	2001:	-	-	5
Estonia	1.4	3,800	2003:	2	1	5

Sources: Internet, SPICA Directory⁶, personal communications⁵.

It should be noted that various sources on GDP in CEE give surprisingly scattered figures, even if the probable methodological differences are taken into account. Without going into discussion of the possible reasons for that: it should be kept in mind that the corresponding data in the Table are rather indicative. As for the numbers of STPs and incubators, the latest available data belong to somewhat different years (4th column of the Table). Moreover, the data are certainly influenced by the inconsistency in using and understanding of the respective terms, which however is by no means an exclusive privilege of the CEE countries.

In the following Chapters (Ch.3-7) the key excerpts of the IASP definition are used as titles under which the corresponding STP development trends in CEE countries are outlined.

3. "...ORGANISATION MANAGED BY SPECIALIZED PROFESSIONALS..."

Despite the existing differences of the economic levels and their dynamics, in none of the CEE countries the private sector has become strong (and thus far-sighted) enough to play a really significant role in STP development. Therefore the legal and organisational forms of STPs correspond to the views and interests of their core founders – various public bodies: state agencies, regional authorities, municipalities, universities and/or other R&D institutions. The typical STP management entity is a sort of not-for-profit organisation – foundation, public joint stock company, association, subordinated public institution, etc. (according to the legislation of a particular country) that often tries to attract some minority stakeholders from private sector as well.

This approach, of course, is not specific: the initiative and heavy involvement of the public sector is internationally acknowledged and applied as a good and quite typical practice, especially in early stages of STP development. However, the organisational and legal forms used in CEE countries (and often complemented by a certain inherited bureaucratic rigidity) generally do not attract or motivate investments from both domestic and international private capital sources, and in many cases even make these legally and/or economically insensible. As a result, the achieved contributions from private sector usually represent just sponsorships, rather than real long-term commitments.

Quite often the STP initiators and managers from CEE complain about the lack of relevant regulative acts on the national level. These complaints are fully justified in the case of absence of any general governmental concept or programme concerning support strategies for innovation, enterprise, technology transfer, applied R&D etc. At the same time, certain caution should be taken with respect to introduction of really strong and high-level legislative acts (such as laws) in too early stages of innovation support system development without enough field-testing, or as a result of a bit one-sided

lobbying. There seem to exist some examples (Hungary, Ukraine) where such acts have created unnecessary regulations and restrictions from the viewpoint of further STP development flexibility.

The STP managers in CEE countries remarkably often have personal R&D background and an advanced scientific degree, mostly in exact sciences or engineering. The share of former civil servants seems to be much lower in the case of STP (but more dominant in the case of general business incubators). The STP or incubator managers with private business experience are rare yet. These features of the staff characteristics have obviously a lot to do with the following circumstances.

- The STP and technology incubation initiatives have typically come out from R&D institutions (Academies of Sciences, universities), which during the cold war period had been quite high-level and extensively developed, and relatively well equipped and manned.
- The people with outstanding entrepreneurial capacities have been (and still are) much more motivated to be engaged in the businesses that, at least in the transition period, offer much quicker and higher return with the considerably lower risks.

Whatever the sources and initial motives could have been, a thin layer of active and mostly self-trained STP managers has been formed in CEE countries during last 10 years. In the most enthusiastic (and by now the most successful) cases the initial lack of local sources of know-how and experience has been largely compensated via international networking (IASP, SPICE Group and its predecessor – Innovation Centres in CEE Workgroup, EBN, etc.). Another important factor has been the directed transfer of knowledge and skills through the historically established and/or geographical links, like Finland → Estonia, Scandinavia → Baltic states, U.S. → Poland, Germany → Visegrad countries, Germany → Lithuania, Poland and Germany → Ukraine etc. It should be noted that the advantages of international networking have become especially clear in the cases when the whole societies are more open, like in the countries in final pre-accession stages towards EU.

During recent years the innovation support management training programmes have been launched also on national level in the bigger CEE countries, where the business incubation and STP associations are typically the coordinators of these, like e.g. PBICA in Poland or UBICA in Ukraine.

4. “...INCREASE THE WEALTH OF ITS COMMUNITY BY PROMOTING THE CULTURE OF INNOVATION AND COMPETITIVENESS...”

The transition process from state-owned and centrally regulated economy to the market-driven one was in all CEE countries started by quite painful political, legislative, etc. restructuring of the whole society, and by extensive privatisation. The extent of these changes already accomplished, as well as the degree of the corresponding economic success still significantly varies from country to country.

By now the limits of the success that can be achieved by purely “organisational” means have been at least partially revealed, especially in the countries where the reforms have been most radical and certain increase of average wealth has indeed been gained: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia. At least in these countries it has become evident that the impulse gained via rapid liberalisation of macroeconomic environment, as well as via development of predominantly the financial, transit, trade, tourism, etc. sectors is close to exhaustion.

Thus, to ensure further and sustainable economic growth, the main attention of these CEE societies must now be shifted from the structural reforms towards increase of the competitiveness of the sectors where the real value-adding takes place. This need inevitably brings to the matters of stimulation of entrepreneurship, innovation, technology development and transfer, modernisation of industries, etc., as well as to the recognition of importance of STPs as well-proven tools to support these processes.

In consistence with this general background, the first attempts (e.g. in Czechoslovakia, Hungary and Baltic states) to establish STPs in early 1990ies were based on enthusiasm and good faith of single persons or institutions, rather than on the necessarily wide understanding, consent and support of essential decision-makers: the societies just had far more existential problems to deal with. As a result,

these initiatives gave rise to a very slow and stepwise development of particular STPs, often accompanied by drawbacks or even complete failures.

By now the situation has significantly changed: in a number of CEE countries (e.g. Czech Republic, Estonia, Latvia, Lithuania, Poland) the need, as well as some public resources for development of STPs as important tools have been foreseen by various national innovation and enterprise support programmes⁷. Also, the increase of general public awareness and interest among the local business communities is noticeable. As one can see from the Table above (Ch.2), the number of STPs in CEE is due to be almost doubled in the nearest future. These undoubtedly positive trends can, however, be somewhat hindered by the obstacles that can be summarized as follows.

In many CEE cases one can see serious difficulties in reaching common understanding of the real mission and goals of a STP. Often it is not recognised that STPs are targeted namely to enterprise development (although preferably related to R&D and technology applications), and not to research and technology development as such. On the other hand, sometimes STP is primarily regarded as a tool for property and infrastructure development, and the core essence of these structures – extensive set of value-adding “soft” services – is neglected or strongly underestimated.

These two extremes, together with the fresh popularity of the term, have brought the label “technology park” onto wide variety of entities: from an university department to a business park-type real estate project. Such unreasonable extension of the meaning of “STP” is dangerous not just because of creation of the uncomfortable terminological mess but, more importantly, it can (and does) bring along distortion of necessary focus in the activities of all interested parties, as well as confusion of the role and proportions of public support mechanisms.

Even if the mission and goals of a CEE STP has been fixed right, another set of problems often arises, connected with too high expectations of the public sector representatives involved in the project. The most typical of these excessive wishes by the public stakeholders says that the STP should be fully developed in 3-4 years and then become by itself a macroeconomic actor, a massive provider of new jobs, and a major source of R&D orders for the local university.

Such an overestimation of the inherent capacities of a STP and its realistic time schedule is not too rarely based on superficial impressions received from advanced European, North American or Far East STPs without in-depth knowledge of their actual development (and especially investment) history. One thing that seems difficult to avoid in CEE countries is the tendency to ease the founders’ dissatisfaction and to try to improve the situation via carrying out a number of various general studies, as well as construction of additional hierarchical structures in and around the STP.

5. “...FLOW OF KNOWLEDGE AND TECHNOLOGY AMONGST UNIVERSITIES, R&D INSTITUTIONS, COMPANIES, AND MARKETS...”

The STP development in CEE has been affected by a quite unique controversy that was most profound in early 1990ies: while the GDP and other major economic indicators in these countries were (and still are, cf. the Table above) significantly smaller than in developed Western countries, both quantitative and qualitative indicators of higher education and scientific research in CEE have been in many fields at least comparable to those in Western Europe. Under these circumstances it is not surprising that the academic push has been strongly dominating over the market pull in the attempts to commercialise the R&D results. Also, the academic initiatives to create STPs have frequently been motivated rather by the need to continue to employ redundant researchers, than to support the growth-oriented enterprise development. All these features, together with the shortage of awareness and adequate knowledge about the opportunities and threats of the business world, have demanded a lot of special efforts to set up the balanced division of roles between the academic, business and administrative actors within STPs of CEE countries.

Another characteristic feature of the former (and in many cases – the present) R&D system in the CEE countries has been the existence of a network of (to a large extent - applied) research institutes, separated from the universities and subordinated to a special centralised umbrella organisation – Academy of Sciences. These institutes often possess the most updated R&D equipment and remarkably high brain potential. During the transition period, several of these strong entities have given rise to successful STPs or technology incubators, e.g. in Ukraine, Latvia, Slovakia, Slovenia. On the other hand, the temptation to achieve a “noble” and recognised status by just renaming themselves “STPs” can sometimes be noticed.

An important task for the innovation support managers in CEE countries is to develop more comprehensive understanding of the role of universities and other R&D institutions within the STP structure. It has been the widespread belief that the main function and value offered by the researchers and engineers is to invent and develop new products/services which afterwards will be commercialised on site (in the “home” STP) via know-how/technology transfer to the existing companies or via creation of new spin-off businesses. It is taking much time and efforts to clarify that such a linear course of the events is rather an exception (although a lucky and desirable one) than a rule in the multitude of possible innovation processes, and that the more typical contribution from the universities and other R&D institutions is to serve as a pool of

- knowledge that enables the whole STP community to utilise and commercialise the results gained from the international R&D and technology transfer networks;
- highly-qualified people to amplify the development of knowledge-based enterprises.

It should be noted that the successful inclusion of a number of CEE STPs and incubators in the international R&D and technology exchange has been supported by several EU initiatives, e.g. the Innovation Relay Centres’ network.

A quite disturbing set of problems in CEE countries is connected with the low level of patenting and other IPR protection procedures. While the legislative mechanisms seem to be mostly in place by now, the practical implementation of these is strongly inhibited. The main reasons for that are the lack of

- the corresponding awareness and experience among inventors,
- own financial resources to carry out the necessary procedures at the international level,
- the respective public promotion and support system.

6. “...CREATION AND GROWTH OF INNOVATION-BASED COMPANIES...”

Some organisational and academic factors that are shaping this important function of STPs in CEE countries have already been indicated above (see Ch.3-5)

Here it should be emphasized that perhaps the most important one among such factors – weakness of general entrepreneurial culture – is truly common for all CEE countries, largely due to the obvious historical circumstances. However, it is also true that different countries have shown somewhat different speed and success in overcoming this basic weakness, which makes it worthwhile to learn and exchange the respective experiences much more than it has been done so far.

The crucial background factor for the stimulation of innovative businesses by a STP is the existence and availability of the relevant public sector support, designed and offered for innovation and entrepreneurship at the national and regional levels. The corresponding picture in CEE is very variable⁸ but, naturally, certain correlation can be noticed between the overall economic level and the development of such public support instruments in a country. Even in quite well-developed cases (Poland, Lithuania, Hungary, etc.) the respective public funds are usually not targeted specifically to knowledge- or technology-based enterprises, but to wider scales of entities – most often to start-up companies and/or SMEs in general, or to industries on the regional basis. In addition to the national resources, the contribution from various EU programmes has been increasing in all CEE countries during recent years, there are also some examples of launching the financial support instruments by municipalities (e.g. in Tallinn, Estonia).

It should be noted that the evergreen dilemma – whether the public sector financing should be directed to the innovative business projects/companies themselves or to the specific innovation support structures (incl. STPs and incubators) who offer the necessary facilitated services – has not been unambiguously solved in the CEE countries yet. Also, no successful CEE examples can be given of how to solve the universal contradictions between the newly generated bureaucratic structures of the public support agencies (which become complicated and rigid with a surprising speed) and the actual need of maximum flexibility in the innovation and technology transfer matters.

A growingly serious problem, hindering successful development of innovative businesses in all CEE countries, is the sharp deficit of private venture and seed capital, especially for the small technology-based businesses in their early stages. The available private investment sources (both foreign and domestic) are still operating in the sectors of much lower risk with higher and quicker return rates. As the international (e.g. Scandinavian) experience shows, here the necessary extra motivation for private capital can be achieved via establishing certain supporting public venture and seed investment instruments, and the similar developments in several CEE countries can be noticed. It should not be excluded that the national/regional STP and business incubation associations can also play a role in this process.

7. “...VALUE-ADDED SERVICES AS WELL AS HIGH QUALITY SPACE AND FACILITIES...”

Generally, the STPs and business incubators in CEE have tried to build up their system of both value-adding “soft” and infrastructure services similarly to the international practices, some non-essential differences that can be followed are obviously connected with the different dominating sources of experience for the Northern and Southern CEE countries. Thus there are not too many characteristic features to underline in this field.

The need and difficulties to keep the balance between “hard” and “soft” services are often connected with the more general problems to determine the real mission and tasks of a STP (see Ch.4 above). As for the physical infrastructure, the ideas about “virtual STPs”, “STPs without walls”, etc. have not become popular among the relevant CEE actors, and the concept of STP (and incubator) as an entity with a physical location (and with a synergy gained from it) still firmly holds.

The relatively poor overall economic conditions in the countries, as well as generally non-sufficient external support resources, makes the adequate pricing for STP services a quite tricky matter, especially in the case of incubation companies/projects. The choices in this respect are largely connected with the above-mentioned dilemma (Ch.6), where and to what extent the existing (modest) public support should be directed? Correspondingly, a very wide and interesting variety of pricing models can be found in CEE STPs and business incubators.

And last not least, the world-widely actual problems of sustainable development of STPs and incubators have a very practical historical aspect in the case of CEE countries. Namely, the intensive inflow of various international aid money in early 1990ies was often used

- according to the wishes and ideas of the donors, just copying the models approved in much more developed societies,
- without real foresight and analysis of the future development potential, especially from the viewpoint of self-sustainability after the external financing is spent.

This resulted in a number of failures, especially in the case of small business incubators. The experience of some centres in Poland seems to show a possible way out of this danger, via creation of a special revolving fund on the basis of external donation. Anyway, it can be predicted that the questions of sustainability will remain in the focus of the STP development in CEE countries for a long time.

8. CONCLUSIONS

During historically short period – ca 10 years – a quite respectable number, almost 30 science/technology parks have been launched, survived, and developing in 10 Central and Eastern European countries. This process took place in the environment enriched with many drastic political, economic and social changes, and under severe deficit of resources. A number of lessons have been learned and skills acquired, both from successes and failures. These can be of interest and serve as the source of experience for STP developers and other innovation support managers, as well as for the relevant public and academic actors in

- developing countries from other parts of the world (e.g. Latin America, Central Asia, North Africa, etc.),
- highly developed countries, especially in the periods of economic recession or under other unfavourable circumstances.

In the course of preparation of this paper, it also became evident that there is much room to intensify the information exchange and tighten the cooperation among the STPs in the CEE countries themselves.

REFERENCES

¹ <http://www.iasp.ws>

² See, e.g.: Raivo Tamkivi (2001). Innovation and technology transfer support system – lessons learned in Estonia. In: NATO Science Series 4: Science & Technology Policy – Vol. 27, pp. 256-269.

³ <http://www.spice-net.de>

⁴ Janis Stabulnieks (2001). The role of BASTIC - the Baltic Association of Science/Technology Parks and Innovation Centres – in setting up the National Innovation System. In: Proceedings of the Conference “Baltic Dynamics’2001”, Riga, Latvia.

⁵ Private communications (2003) with: BIC Bratislava (Slovakia), Gennadi Gaiko (Belarus), Jacek Gulinski and Krzysztof Zasiadly (Poland), Pranas Milius (Lithuania), Ioan Piturescu (Romania), Erik Potocar (Slovenia), Janis Stabulnieks (Latvia).

⁶ SPICA Directory (2001). Science Park and Innovation Centre Associations. Published by SPICE Group in cooperation with IASP. Weidler Buchverlag Berlin, Germany, 497 pp.

⁷ National R&D Strategy “Knowledge-Based Estonia” (2001, available at <http://www.mkm.ee>) or the Latvian National Concept of Innovation (2002, available at <http://www.innovation.lv>) could serve as examples of such documents.

⁸ Perhaps the most advanced and fully developed national innovation and enterprise support body in CEE is the Enterprise Estonia Foundation (<http://www.eas.ee>) with its sub-structure of Agencies of Technology, Regional Development, Export, Investment, etc..