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# ROLE OF SCIENCE AND TECHNOLOGY PARKS IN ENTREPRENEURSHIP DEVELOPMENT – THE CASE OF VARAŽDIN COUNTY

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## Abstract

*The paper discusses the role of science and technology parks as generators of entrepreneurship development. Science and technology parks represent infrastructure in which it is easier for small enterprises to overcome difficulties inherent in the initial start-up period. They enable small enterprises to focus on their core activities and undisturbedly develop their products and services to the commercialization level. In the paper a review of the recent research on the science park phenomenon is given, in which the advantages and disadvantages perceived over the last twenty years are recapitulated. In addition, an overview of the technology park development and evolution as well as its role in entrepreneurship development in recent Croatian history is presented on the case of Varaždin County.*

**Key words:** *science parks, technology parks, business incubators, entrepreneurial infrastructure, entrepreneurship development, research and development*

## 1. INTRODUCTION

Science and technology parks (hereinafter S&T parks) have long been existing in modern society. First parks have come into existence in 1950s in USA, and have spread around the globe in various dynamics. Nowadays there are many forms of institutions that are trying to connect science, technology, research and business into successful practice therefore there are different definitions describing these facilities. A recognized association gathering large number of existing S&T parks (349 members worldwide) International Association of Science parks (IASP), which was founded in 1984, gives following definition: "A Science Park is an organisation managed by specialised 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." (IASP, 2002)

IASP further emphasises the fact that there are several differently named institutions such as "Science parks", "Technology parks", "Research parks" and similar expressions, which can all be considered as the same kind of organisation when incorporating certain main characteristics. But this definitely includes all sorts of formal and operational connections with higher education institutions, contemporary-technology-based industries and technology transfer from research institutions to business entities which participate on miscellaneous markets.

The United Kingdom Science Park Association (UKSPA) defines Science parks as a business support and technology transfer initiative that animates and supports the start up and incubation of businesses based on knowledge, led by innovation and high growth. These organisations provide supportive environment for business development in the near of knowledge centres where their interconnections benefit both, business subjects as well as those research institutions.

In continuation we have to point out another type of entrepreneurship infrastructure that can be examined in the context of S&T parks - these are technology based business incubators. For example, Bergek and Norrmann (2007) in their business incubation research stated that even though some researchers (e.g. Lindelöf and Löfsten, 2004; see also in Zhang, 2004; Phan et al. 2005; Dettwiler et al., 2005) treat incubators as a synonym for science and technology parks (sometimes including



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programmes such as regional technology clusters, which in practice often function as the technoparks), they consider incubator as organisations dedicated to the support of emerging ventures while science and technology parks are generally designed for the support of more mature firms. The emphasis lies on the opportunities for knowledge transfer and experience sharing between the tenants of business incubators, what closely connects technology incubators with above mentioned definitions of science and technology parks.

In this paper we shall discuss these organisations in broader view, so distinction between the two kinds of programmes will not be considered, respectively both types of organisations will be considered under the term S&T park. Our general interest lies in finding of key success factors of such facilities (being parts of entrepreneurial infrastructure) hosting and servicing high technology firms, no matter whether they deal with start-ups, or with already established businesses.

S&T parks in Republic of Croatia represent relatively newer phenomenon. Main reason for that was the socialist political system before Croatia become independent in 1991. In consideration of non-existent private enterprises sector, with the exception of small handcraft workshops, there was no interest of supporting this kind of entrepreneurial activities on the state level. After independence establishment Croatia prioritised issues of resolving war consequences, so the systematic approach towards foundation of institutional entrepreneurship started yet in the beginning of the new millennium. Today there are six S&T parks in Croatia, one new is in the process of formation and there are more than twenty business incubators. More thorough review of the parks will be given in continuation. One of them, Technology park Varaždin, shall be closely described, so that we can identify characteristics of these organisations in practice, and to give directions for future research with aim to improve Croatian practice, and finally, to contribute to satisfactory prosperity of the economy as a whole.

## **2. S&T PARKS OPERATING ISSUES**

### ***2.1. Role of S&T parks in the modern economy***

As already mentioned, successful economic development today relies on the timely transfer of scientific achievements into the practical usage. Certain number of works deals with the key role of science for the development of modern society. Even though it has been underestimated for the long time, recent development of post-industrial economies has grown out of stronger cooperation between science and industry. Science parks become places where “science should meet with industry”. In this field Marciniak (2007) stresses obvious connections between innovation policy and global development. Science parks have therefore been recognized as a considerable element of the "science-technology-economy chain" which has managed to achieve stable position in highly developed countries.

All the performed basic and advanced researches should be transferred into practice through the activities of development as the other important pillar of R&D processes. Results of these processes shouldn't be left in the sphere of theoretical cognition, but should be embedded into practically usable products and services, that would solve extant problems in a new and more efficient way. Innovativeness in this contemporary global economy is the question of survival for small and medium sized enterprises (SMEs). Implementation of technological innovations is an imperative in knowledge-based society dominated by information and communication technologies, and it seeks for different educational outputs in comparison to the previous industrial economy needs. This is why the universities should take bigger part in technological growth, what could be reached in several ways, e.g. through technology transfer centres as the specialised units for closer cooperation with the market. Another way for successful technology transfer from science into practice can be realised through universities' engagement in science park projects.

Researches of technology transfer have identified an important linkage between establishment of university technology transfer offices (UTTO), strategies of technology transfer and the increase in number of new enterprises. Markman et al. (2005) showed that UTTOs play a key role in economic



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development. These offices were in past mostly formed as a non-profit organisation, which wasn't that much connected with new enterprise creation, while newer structuring of UTTOs as a for-profit structured organisation results in strong positive correlation in new business creation. One of the main reasons for more toward-profit orientation of UTTOs in the USA is the fact that technology commercialisation becomes ever more important source of profit for many research institutions, since governmental budget support per institution declines due to strong competition between them.

When considering S&T parks, apart from the connections with universities, another relevant factor for their success and contribution to the sustainable development is the supportive local authority which enables incorporating described technology transfer into local/regional economy. A crucial factor for regional development is gathering together politicians, businessmen and scientists to create the opportunity and build a holistic and prosperous regional strategy. "So, the main task of science parks is the creation of new, and supporting the already-existing, local enterprises with innovative characteristics. Secondly, science parks provide an appropriate infrastructure for foreign and domestic investments ... for developing and innovative firms" (Marciniec, 2007). Fink Babič (2006) accentuates social character of innovative actions which seeks for closer cooperation and knowledge sharing on regional level, in order to obtain regional economic competitiveness in new global economy. This is in line with another study's findings (Hebbert and alt., 2006) on the importance of strong links between science park tenants for their innovativeness. Firms within S&T parks need a variety of network ties, ranging from loose connections to identify new opportunities, to strong bindings built on trust and cooperation to help the innovation process. In such an environment S&T Parks, incubators and other supportive programmes for new technologies become important factors for faster growth and development of innovative enterprises. These business units induce significant job creation and are usually successful even after taking off from such a supportive facility. Therefore, states should incite innovation processes through S&T parks and incubators for innovation can firm product quality and ensure its profitability, thus enabling sustainable economic growth.

As the part of more global perspective in International Handbook of industrial policy Annerstedt (2006) analyses science parks and high-technology clusters. In this chapter he raises a critical voice on the fact that among many hundreds of S&T parks around the world, most of them do not achieve goals they once set in the process of forming the park. Instead of full realisation of fruitful connection of science and the market through entrepreneurial and innovation processes, they primarily serve as local hubs for attracting foreign investment or advancing of local technological infrastructure, as well as the raisers of the property value in their surroundings. Of course, certain facilities deserve to be called science parks and they are truly incorporated in local or even global science-innovation-market systems as a part of national policies, while others are only "well disguised real estate projects branded and effectively marketed as science parks" (Annerstedt, 2006).

## ***2.2. Reflections on the S&T park success factors***

Sun et alt. (2007) explored comprehensive range of literature based on case studies to extract factors that critically affect success of science parks, which was supplemented with some more cases from Hong-Kong experience. Their findings categorize success determinants into three categories. Environment-related factors consider societal and economic conditions in park's surrounding, where it is extremely important to establish supportive policies, as well as to build positive viewpoint in community value system. Second group comprehends Incubator-related elements such as network advantages, connections (or even strategic alliances) with universities, and as a critical factor here is funding available for the park members. Third group was called incubate-related factors regarding tenants of the science parks and their particularities, where success lies heavily on the incubated company side and their relationship with the incubator. In this group of determinants they have shown how important is entrepreneur's experience and especially his openness to the educational services offered by the park management.

One of the main values firms get from S&T park is the easier access to the useful resources combined with lower costs. By resources here are considered not only the physical resources in the form of office facilities, utility services and other specialised services for "young" businesses, but what can be



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taken as even more important – access to intellectual capital and accumulated knowledge. Closely located tenants of S&T parks are enabled to fast and easily transmit new knowledge, sometimes through services organised by S&T park management and on the other hand through knowledge spillovers. Knowledge spillover can be described as the situation where knowledge created by one person (or group) is used by others without compensation, or when compensation is less than the value of the knowledge (Jaffe, 1996). Notion of Knowledge spillover especially regards to the dispersion of tacit knowledge that cannot be protected by intellectual property rights. They commonly occur when employees change their jobs and start working for another employer, or even start their own business. Knowledge in the form of experience, particularly about successful and unsuccessful approaches and mechanisms, development and use of new technologies, will tend to spread in spite of inventors' wish to hold these themselves, thus retaining some sort of competitive advantage.

Another considerable characteristic of institutionally supported innovation environments is that they gradually evolve and become deeply built in the regional economy. Through many interactions on local level S&T park tenants establish firm links based on repeated and predictable code of conduct therefore developing trustworthiness. Trust can be built based on the technical skills and competencies, or even on the basis of social connections with broader community. This way S&T parks become part of integrated networks formed on the national level such as the National Innovation System – NIS (compare to Hobohm, 2004). NIS tries to incorporate all the knowledge of innovative actors in national economy that was either created by searching or learning, either by interactions between institutions, competitors, providers or customers. New national or regional policies on trade, industry or direct foreign investment strongly increase attractiveness of such entrepreneurial infrastructure. Proximity mitigates limitations in communications and lowers transaction costs, and at the same time eases acquisition of "location-specific know-how". S&T park can be observed as a part of regional innovation networks, and these were thoroughly examined by Melkas and Harmaakorpi (2008). Such networks usually establish set of rules for data, information and knowledge circulation and participants stick to these rules applying their own tactics how to best utilise available knowledge resources. As the process progresses, creative interactions between participants change their point of view, new information create new knowledge which then incorporates into existing tactics resulting in new and improved ones. It is a matter of collective learning, which happens in order to increase participants' capabilities. In this process the quality of flows is as important as the quality of the transferred data, information and knowledge because even if we construct perfect knowledge management bad knowledge will destroy our efforts. This is where universities, technology transfer centres and S&T parks can offer their expertise.

### ***2.3. S&T parks as the host for the Spin-offs***

Here we emphasise one more important factor in favour of S&T parks' formation is tenants' specialisation in given activities within the same technology based industry. In the second half of 20<sup>th</sup> century previously very big companies started to outsource part of their innovation activities to small or medium-sized subjects who become particularly refined in performing these creative, sometimes very delicate tasks. Firms in S&T parks are often start-ups established by former employees of such big companies, or sometimes they are even spin-offs, which is why they have a good understanding of these issues and are an excellent choice for offering big companies outsourcing deal in innovation activities. According to the Davenport et al. (2002), a spin-off (or a spin-out) can be defined as "a company formed through the transfer of technology from an R&D company, which is completely independent of the parent company, and involves the transfer of human capital".

These companies are more commonly formed for the commercialisation of a new technology than as a kind of divestiture from the activities that are no longer in the companies' strategic focus. Through these processes there is a major benefit for spin-offs in transfer of tacit knowledge, which enables them in effective usage of taken technology. In cases where this knowledge is hard to use without the simultaneous transfer of the human capital that was involved in creating it, spin-off is a much better choice than licensing the technology usage and giving the outer firms to further develop the involved technology. S&T parks are then very stimulative environment for the formation of the network-based



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regional economy, where such an organisation of activities allows every participant evolves particular skills, and altogether they can reach time and cost reduction in developing new technology applications and encourage reciprocal innovation (Annerstedt, 2006).

Creation of new enterprises in S&T park context requires certain material and immaterial resource engagement. Here we emphasize the corporate and university technology based spin-offs who operate differently if the companies do business in science park environment, or when they are out of such facilities. Dettwiler et al. (2005) suggest that there are five categories of resources that enhance the founding of new small businesses. These include services provided, adaptable financing opportunities, goals and structure, resources and support, as well as the creation of supportive entrepreneurial environment. Outcomes of the new businesses creation can then be measured through businesses survival and growth, programme growth and sustainability, and programme's impact on the neighbouring communities. Their research of the two groups of firms has shown that on-park enterprises have better support for formal and informal networks so they generally develop more, and show better performance than the off-park enterprises.

### **3. ENTREPRENEURIAL INFRASTRUCTURE IN CROATIA**

#### ***3.1. Entrepreneurial surrounding framework***

If we want to offer an encompassing view on the S&T parks in Croatia, we have to put the theme in a broader context. Yet in 2000 European Union leaders agreed upon making EU the most competitive and dynamic knowledge-driven economy by 2010 (Europa glossary). After crossing half of this way EU Commission communicated a document about innovation strategy for EU countries in order to achieve goals of Lisbon agenda (European Commission, 2006). This document stresses the need to make business environment more innovation-friendly as a core concern, because our future depends on innovation. An emphasis is on the importance of transferring knowledge investments into marketable products and services. As one of the actions (Action 4) they set the establishment of science parks around universities, with formation of available financing resources for the support of research spin-offs, to bridge cultural gap between research institutions and business. Another significant step is to link universities with local communities to achieve innovation increase on local and regional levels. Common problems in finding sufficient financing for innovative actions is helped through financing schemes of 7th Framework Programme on R&D (FP7), as well as through new Competitiveness and Innovation Programme (CIP) which supports entrepreneurship and innovation, especially including innovations in energy, eco-innovation and ICT.

In year 2000 European Commission also issued European Charter for Small Enterprises (European Commission, 2000). Within the aspirations from the Lisbon agenda, small enterprises were recognised as the backbone of the European economy. Their contribution to growth of jobs and business ideas creation is of great importance for the European economy, because it leads towards social and local integration in Europe. The task of the Charter was to encourage the spirit of innovation and entrepreneurship, and to help building of a regulatory, fiscal and administrative framework supportive for small businesses. The charter established 10 directions for actions: (1) Education and training for entrepreneurship which should start from an early age. (2) Cheaper and faster starting of business by removing mostly administrative barriers. (3) Better legislation and regulation mainly through the simplification. (4) Availability of skills for entrepreneurs who want to develop themselves in a lifelong learning process. (5) Improving online access to connect small businesses with public administration. (6) More opportunities for small enterprises on the united European Market. (7) Taxation system which encourages innovations and rewards success and financial matters as facilitated access to needed financial resources. (e.g. structural funds, initiatives by the European Investment Bank). (8) Strengthen the technological capacity of small enterprises. (9) Successful e-business models and top-class small business support. (10) Developing stronger, more effective representation of small enterprises' interests at EU and national levels.



Target of every economy is the achievement of satisfactory level of competitiveness, which is the economy's long-term ability to respond to requests of international markets, and therewith realise sustainable growth and development in a long run. According to the National Competitiveness Council (NCC) report (NCC Report, 2007) Croatia is at the moment in the second stage of developmental competitiveness (so called - investment driven phase)<sup>1</sup>. Main sources of Croatia's competitiveness are macroeconomic stability, infrastructural investments and sophisticated products and services based on the imported technologies, development and design. The principle of the transition to the latter stage is shown on the following picture:

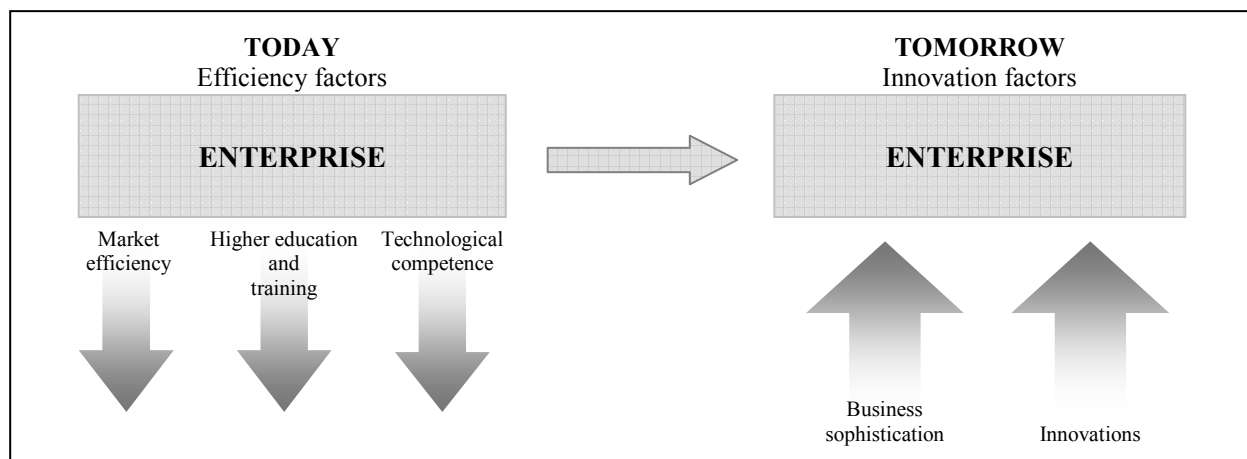


Figure 1: Competitiveness factors for the transition (source: NCC Report, 2006, 15)

Problems that Croatian economy faces today are lying in the fields of market efficiency, higher education and readiness to acquire new technologies. To be able to enter the third stage of developmental competitiveness (so called - innovation-driven phase), first we have to solve the questions of investment and business processes efficiency, and the question of labour quality. Only when we overcome these obstacles, the enterprises will be able to invest more in innovations and business sophistication. The Croatia strongly directed toward world economy can be built only by innovative entrepreneurship in the appropriate institutional framework.

Entrepreneurship has been widely recognised as a driver of economic growth and development. Development and growth of SMEs is being seen as an engine of economic restructuring in South East Europe because SMEs contribute to growth and employment over the proportion of its share in number of all enterprises. Čondić Jurkić and Bilas (2005) point out that fostering entrepreneurship by building supportive environment for new firms is crucial for successful economic transition, but they also emphasise the importance of R&D for productivity of enterprises. It has been shown that "technology neighbours" increase firms' R&D productivity. Building of favourable competitive entrepreneurship climate in transition economies faces certain major obstacles that appear as non-existent or non-transparent policies and regulation, corruption, lack of know-how or hard access to financial sources.

### 3.2. Croatian entrepreneurial infrastructure connected with Research and Development

In accordance with mentioned EU policies and cognitions, Croatian government is trying to help building entrepreneurial infrastructure which will lead us to realisation of utmost economic goal – economic development and prosperity of Croatian inhabitants. The involved partners in these actions are Croatian Ministry of economy, labour and entrepreneurship and National Competitiveness Council who together conduct the national strategies for the increase of Croatian capacities to be able to

<sup>1</sup> More on the developmental competitiveness phases you can see in Senjur. M. (2003): Big and small enterprises, Restructuring and development /in Slovenian/, Integralni management i razvoj podjetja (ur. Belak), MER Evrocenter, Maribor, pp. 207-224

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compete in global conditions. In the field of Research and development (R&D) and increasing innovation capacity of the economy main associate is the Ministry of science, education and sport (MSES), with its directorates and other Agencies (Republic of Croatia, 2007). Some of them are National Science Council (NSC), National Science Foundation (NSF), National Council for Higher Education (NCHE) etc. that have been founded since Parliament in 2001 adopted strategic document "Croatia in 21<sup>st</sup> Century". This document initiated creation of Croatian innovation system through the activities of fostering science and industry cooperation, revitalisation of industrial R&D and supporting commercialisation of research findings.

All the stated steps on the strategic level have to be further worked out for putting the strategy into practice. For this purpose in December 2006 the MSES drafted a national Action Plan 2007-2010 for the implementation of the Science and Technology Policy (Action plan, 2006). This plan firstly names all the problems it is addressed at, and states all the concrete measures that will be applied to solve mentioned insufficiencies of the system. In next part it determines indicators that will be used for measuring achievement of set goals. These indicators are based on EU trends and innovation scales, OECD Science and technology indicators, and World Bank indicators. A basic step of this Action Plan was MSES establishing Croatian Innovation System Council (CISC), as a coordination body in charge of strengthening the national innovation system and the related infrastructure. This body will comprehend all the actions performed by different subjects in order to ensure optimal operating of the system as a whole.

Here we present in short characteristics of the SMEs and the framework in which they operate in Croatia regarding the actions recommended in the European charter. In the mutual relationship of the Croatia and EU, Croatia is taken as a part of Western Balkan countries<sup>2</sup> (WBC) which include EU candidates or potential candidates in this geographical region. WBCs have accepted the Charter in the 2003, and since then have been implementing recommended actions. European Commission and Organisation for Economic cooperation and Development (2007) have together issued a report on the up-to-date achievements in implementation of actions from the Charter. Results are presented comparatively for all the countries according to the specific action, and in detail for every country. Success is measured on the scale from 1 to 5, where 5 would be completely implemented action. Croatia was evaluated as best in six out of ten actions, and Croatian overall average grade was also the highest compared to other WBCs. Below we present Croatia's performance in each of the Charter's ten dimensions:

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<sup>2</sup> Western Balkan includes: Albania, Bosnia and Herzegovina, United Nations Interim Administration Mission in Kosovo, FYR Macedonia, Montenegro and Croatia



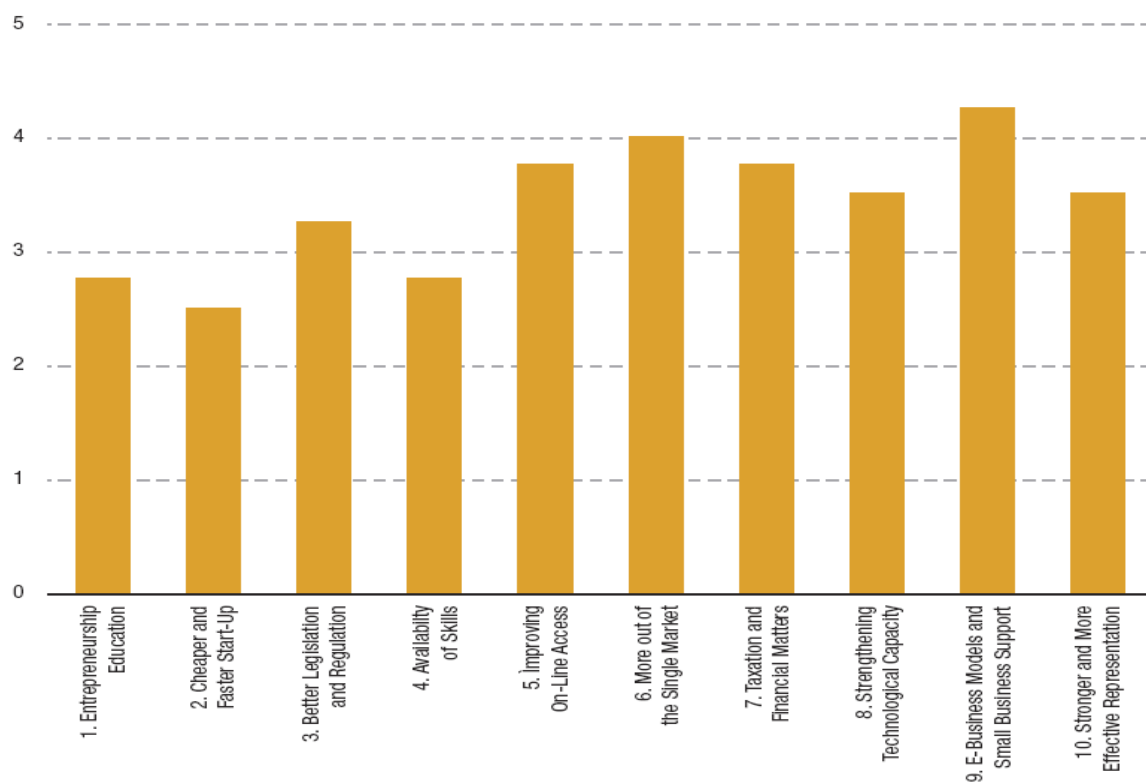


Figure 2: Croatia's performance in each of the Charter's ten dimensions. (EC, OECD, 2007, 172)

According to their analysis, Croatia has shown especially good results in four actions. The first one of them is improved electronic access to public services (action 5) through the hitro.hr service. It enables starting of the new enterprise or handcraft over the internet with diminished need for physically going to the public administration offices. This service is also connected with the possibility to submit tax reports online. Good results are also in using the opportunities of single European market (action 6) through strong NCC activities, with particular regard to the export incentives programme. 9<sup>th</sup> action shows successful implementation of quality e-business models. Recent years have also brought strengthening of effective SME representative networks on the state and European level, as well as the creation of public and private advisory networks (part of 10<sup>th</sup> action). In their report (EC, OECD, 2007, 173) among other actions more effort should be focused on the 3<sup>rd</sup> action for the improvement of legislation and regulations, and the 4<sup>th</sup> action for insufficient number of trainers for entrepreneurial skills. According to our annotations, it would be very useful for Croatia to apply more dynamic approach in 1<sup>st</sup> action (entrepreneurial education from the earliest age), and especially in 7<sup>th</sup> action, in the somewhat difficult access to financing, because banking system, in spite of all the efforts towards facilitated access, still isn't willing to finance entrepreneurs-beginners.

### 3.3. Science and technology parks and technology incubators in Croatia

A few years ago Grupe and Kušić (2005) performed an analysis of Croatian entrepreneurship chances and future perspectives connected with innovation on the case of Technology park Zagreb. They started with presumption that capital and technology transfers are of great importance for achieving of competitive advantages in research-intensive goods, thus Croatia should orient toward knowledge intensive production. According to their research, a present characteristic of Croatian National innovation system is that Croatian firms are very eager to adopt new technologies, but much rather through licensing agreement with foreigners, than through their own technology research and development. One of the reasons for this situation is the educational structure of Croatian workers, which is unfavourable due to the significantly lower share of people with higher education than the EU average. On the other hand, greater numbers of young people finishing secondary school makes a favourable basis for increasing the share of highly-educated people. A considerable obstacle for fully

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developing entrepreneurial potentials is the insufficient knowledge on starting and running a new business, as well as the entrepreneur as a career choice isn't among the popular ones.

In continuation we bring present state of entrepreneurial infrastructure and S&T parks in Croatia, and the perspectives of their development. At this moment there is no up-to-date overall record on the number of business incubators and S&T parks, so the data was collected from a few web portals (BICRO, business navigator, BIOS). So far there have been 25 business incubators opened and six technology parks, while one new is in the establishment process. But, respectively our object of interest are S&T parks and technology based incubators, so it is important to point out that most of these organisations aren't of that kind. In fact, according to the available information, all these business incubators were formed for the new business support regardless of the high technology component in their business, so they mostly incubate small service firms. Therefore, scope of this paper will focus on technology parks and technology transfer centres who also offer incubation services. They are: Technology park Zagreb, Technology park Varaždin, Technology transfer centre – CTT Zagreb, Technology centre Split, Technology and innovations centre Rijeka, Research and development centre of mariculture in Ston, Technology and development centre in Osijek, and BIOCentre for the biotechnology firms incubation, as a BICRO's new project in a preparation stage. They altogether make present framework for over 100 technology-based innovative enterprises, mainly in the ICT industry, while newly established BIOCentre joins Mariculture centre in Ston in the biotechnology field.

The oldest among them is Technology park Zagreb, which was founded in 1994, within the Končar concern, and in the 1998 the ownership was transferred to the City of Zagreb. Its tenants are doing business mainly in the electronics, telecommunications and information industries. Although some previous researches (quoted in Grupe and Kušić, 2005, CEPOR, 2003) of the innovation climate in Croatia showed that business sector has no interest for the research, development and innovations, research of the Technology park Zagreb's tenants, who are all dealing with high technology (Grupe and Kušić, 2005), revealed considerable orientation toward innovation. At the moment there are 19 enterprises in the park, while over 20 of them have already finished their incubation within the park since its beginning and left the park's premises. These firms still contact the other that are yet in the park, and cooperate together with them. Conditions for entrants are high technology industry, electronics and informatics; development of products, technologies or services; they should be export oriented; they should have big potential for growth and development, and priority is given to the firms of awarded innovators, younger entrepreneurs and women entrepreneurs.

#### **4. CROATIAN CASE OF S&T PARK - TECHNOLOGY PARK D.O.O. VARAŽDIN**

Technology park Varaždin was founded in 2003 as a project initiated by the Varaždin County, The city of Varaždin, Croatian chamber of commerce, Polytechnic in Varaždin and Electronic-engineering high school Varaždin. At the time of establishment they envisaged the project to develop in two phases, the first being the foundation of Impulse Centre at the Electronic-engineering high school, which offered them spaces and laboratories without compensation, and in latter stage Technology park Varaždin was constituted. In the beginning there were 6 firms in the Impulse Centre. Second phase was enabled when the City of Varaždin allotted former factory premises to the Technology park, and the tenants of the park were allowed to use Polytechnic's laboratories without the compensation. The management and associates have been working on voluntary basis at that time. At the end of 2007, the city of Varaždin transformed the park in the Private Limited company with three owners – The city of Varaždin, Polytechnic Varaždin, and the Faculty of organization and informatics Varaždin (as the part of University of Zagreb), each being the owner of the one third of the park. This has also established the formal precondition to bond innovative technology-based enterprises with scientific institutions, since they are the sources of scientific cognitions, which can assure the formation of competitive advantage for the enterprises willing to exploit these cognitions. Starting organisation of the Impulse Centre is still operating at the Electronic-engineering high school, but it is directed towards incubation of the firms based on the high school knowledge. There is a good cooperative atmosphere between the two organisations.



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In the Technology park phase enterprises rent office and production space in the park for which rent doesn't have to be paid for the first operational year, the rent in the next few years is only the portion of market prices (30%, 60%, and 90%), while in the fifth year of on-park operating rent reaches the full market price. Overheads have to be paid from the beginning of the on-park operations (at the moment it is 2 €/m<sup>2</sup>). Beside these services park tenants have broadband internet access, and cheaper telephone services due to the contract between the Technology park Varaždin and the local provider. All the common spaces, office and multimedia equipment are at disposal of the park tenants without compensation, and they can also use library and laboratories in the Polytechnic Varaždin after expressing the need and previous arrangement with the Polytechnic. Accounting and legal services were also arranged by the park management so enterprises in the park pay only 70% of usual market prices for these. This can be connected with the situation in the Technology park Zagreb (Grupe, Kušić, 2005), where the tenants as one of the paucities in the park set out the absence of the legal advisor who would help them with legal issues (such as choosing a legal form for starting of a business, or in the intellectual property rights issues). Providing of this service through agreement on the park level was a way of closing the gap of insufficient legal knowledge in Technology park Varaždin. During the incubation phase park management assigns each incubatee a leader who is responsible for helping incubatee's progress. Some of the activities organised for park tenants include help in human relations issues, networking with other similar enterprises or with R&D and educational institutions, help in tenants' applications for available domestic and foreign funds, and organising of marketing for them. Marketing is of extreme importance in the process of turning technological project into a marketable product/service.

Incubation process alone can last up to five years, when it enters post-incubation phase. At latest after these five years the enterprise together with the park management analyses its capabilities to survive independently in market conditions. If it cannot survive independently, management helps entrepreneur to create business restructuring plan. If they conclude that it will be able to bear market environment, management can help them to obtain their own business premises under favourable conditions due to its good connections in local economy. When we consider all the mentioned benefits of synergy effects of park tenants' co-operation with already "grown-up" enterprises that have already left the incubation process, park management tries to stay in touch with former tenants and to establish working together with them on the new projects.

When Technology park started operating in 2003, there were only six on-park enterprises. Today there are 23 of them. Two firms have in the meantime finished incubation process, while three more are to finish the process in the near future. Survival rate for the park tenants is at high levels, according to the information obtained from the park management, it is over 90%, i.e. more than 90% of the park tenants have survived and today still operates.

Technology park Varaždin activities have been associated in the regional programmes, because the members of the park management are at the same time employees of the Development Agency North (DAN). Among other DAN's activities, they have developed wider plan on the development of Croatian Northern region. It is conceived to establish new technology parks and business incubators in Croatian towns: Koprivnica, Bjelovar, Virovitica, based on the Technology park Varaždin model. They will be focused on the high technology that will be possible to implement in the local economy. Parallel with these processes they have already started studies in local Polytechnics, which will create human resources component necessary to successfully work within the industry chosen to be the economic driver of the region. In Varaždin was followed long and strong tradition of the Faculty of Organization and informatics in ICT connected industry, with additional Polytechnics programmes in multimedia and design, logistics, production engineering, construction), in Bjelovar they have opened study of mechatronics, Koprivnica will maintain long tradition in food biotechnology (Podravka) and in Virovitica they planned to open modern study of wood industry.

Head manager of the Technology park Varaždin is the person with long experience in S&T park management, who previously cooperated with numerous such institutions abroad. Structure and the dynamics of the economic development of Varaždin County indeed outlines the presence of the Technology park Varaždin activities.



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## 5. CONCLUDING REMARKS

This paper presented some recent researches on the S&T park's features, and their role in the entrepreneurship development. Relevant literature on the S&T parks perceives the importance of the location for the S&T park's success - firstly in the sense of the closeness between the park's tenants which results in knowledge spillovers, and increased usability of scientific notions in practice. Situating the S&T park closely to research and scientific institutions is also of significance for the formation of functional bonds with the R&D society. Beside these characteristics directly connected to S&T park, it is really pertinent for a country to build a supportive institutional environment where S&T parks can function without obstacles, and which will be able to incorporate S&T park's success into its neighbourhood, to effectuate in positive impact on the local, national and wider regional economy.

It is evident that S&T parks in Croatia still make a new phenomenon, so until now they haven't been the object of bigger systematic researches. Thus, we consider this work as the outset for further research, which will enable us to document the Croatian S&T park development from its beginnings.

It has to be concluded, that regarding the developed countries' experiences, Croatia has recognised the importance of establishing the appropriate institutional framework for S&T parks, but the entrepreneurs should now utilise open opportunities. As one of the progressive Croatian S&T parks we have presented the case of Technology park Varaždin. Its involvement into regional processes and plans for further development of Varaždin County and wider northern region represents an interesting system of inciting environment for entrepreneurial activity. Organisational model and the operating of the Technology park Varaždin, especially within the development agency, seems to be purposeful, and with theoretical and practical implications recommendable for wider implementation in the region, even across the Croatian borders.

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