

THE TECHNOLOGY PARK – A NEW SPATIAL FORM OF INDUSTRY AT MAJOR INFRASTRUCTURE CORRIDORS IN SERBIA

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In this paper, technology parks as new spatial forms of industry and instruments of multilateral development are considered along with possibilities for establishing them at major transportation corridors in Serbia. The experiences of some developed countries and domestic practices in using these instruments of spatial and economic policy are portrayed. It is stressed that establishing and using these spatial planning instruments is of great importance for our country given the imminent macroeconomic reforms, privatisation, open economy, economic restructuring, internationalisation and trade exchange, in which direct foreign investments play an increasing role.

INTRODUCTORY REMARKS

The development of technology, internationalisation of production, global trade exchange, direct foreign investments, and the introduction of sustainability criteria changed previous knowledge about planning economic activities, and location, developmental and environmental factors in the allocation of economic activities. Entering into the new millennium and the era of the technologically highly developed society, establishing “new” location and developmental factors, and the trend of spatial de-aggregation and/or the reintegration of production and services incited the emergence of new forms/models of spatial investment (research parks, industrial parks, technology parks, corridors, free trade zones, high-tech production zones and complexes, etc.). These location forms are materialized conglomerates of the developmental and spatial dimension in the process of internationalisation of production and trade exchange, but also models of the urban, regional, and technological development of particular highly developed countries. In this context, new spatial forms of industrial location do not only play a pivotal role in economic and territorial development on the national, regional, or urban

level, but also lead the way in societal and urban change. New spatial forms of industrial location as strategic development models and instruments for reducing regional disparities require open mechanisms in attracting direct foreign investments. The national government (creating pertinent conditions and incentives), scientific and research and development institutions, multinational companies (by means of direct foreign investments), and the local/domestic economy play an essential role in their genesis. A special role is given to the Agency for Economic Development, Corporation for Development and Construction, Foundation for Applied Research and Technology and the transfer of technologies created by ‘spin-off’ companies, which are crucial for the national economy as “generators of regional employment” with expansion effects in international economic flows.

THE TECHNOLOGY PARK – AN INSTRUMENT OF INDUSTRIAL SPATIAL PLANNING POLICY

Spatial planning should enable territorial direction of market pressures upon space in accordance with socially acceptable goals. It should also suggest an expert platform for

defining strategic decisions in the political-governance arena and the managerial pool. The spatial organization of economic activities (small and medium enterprises) is actually a mode of the state’s intervention of redistribution as part of a strategy of production and spatial management. In order to incite the processes of spatial development, apart from the new spatial forms of industrial locations (mainly high-tech industrial agglomerations, especially technology parks) as instruments of spatial planning policy, entrepreneurial zones and zones of simplified/facilitated planning are used. From the point of view of spatial development, the industrial policy encompasses instruments and measures for industrial dislocation, favouring attractive locations and restricting development on certain other locations. Establishing technology parks is one of major multilateral instruments.

Location factors play a pivotal role in the establishment of technology parks. Top location factors of the high-tech industry are: well-trained professional staff, institutions of scientific research and development, universities, the market, major regional infrastructure and urban innovative infrastructure (urban and

location economy, production flows, urban services, infrastructure, quality of life, aesthetic urban qualities, etc.). The research of location factors and high-tech industry is very extensive and points to certain theoretical divergences (Markusen A., Hall P., 1986.) Some theorists (Scott, Storper, 1986) refute the Markusen theory on the unique high-tech industry location factors, emphasizing the well-trained professional staff and agglomeration economies. Saxenian (1993) supports the view that the agglomeration of high technology (in developed centres and less developed areas) incites the synergy factors and shows many spatial and infrastructure attributes. The location factors of the high-tech industry depend on the branch, enterprise size, and the area in question, but generally the rank of priority location factors would be as follows:

- Labour cost and quality (professional and educational structure)
- The role of university centres, R&D institutions and scientific personnel
- Presence of basic infrastructure for industrial development, including (attractive and good quality) housing and urban services
- Presence of local businesses and services as entrepreneurial nuclei appropriate for including in the technology park project and essential for industrial development based on high and medium technologies
- Favourable local entrepreneurial climate and legislative framework
- Favourable transportation access to international airways (vicinity of an airport) and to major roads and rail corridors
- Role of the state and the local government in financing private high-tech industrial enterprises (a stimulating investment and loan policy, fiscal deductions, the construction of basic infrastructure, etc.)
- Identification of main objectives of local high-tech industrial development, etc.

The development of high-tech industrial enterprises shows a tendency towards spatial concentration.¹ The process of agglomeration

of high-tech and semiconductor producers in technology parks implies a balance between location demands of particular enterprises and location conditions. (Haug P., 1986). In the process of branch and spatial diversification of industrial structure in the technology park key factors are knowledge, experience and skills of the professional staff, transfer and relocation flexibility of highly educated staff, favourable conditions – economies of enterprise agglomeration tailored to reduce communication and transaction costs, the costs of developing new products and technological processes, costs of inter-company cooperation, technology transfer, transfer of licenses, combining production technologies, software development, etc.

In creating the urban spatial concept of the technology park, i.e. its content, spatial organization, land use for particular activities, functional and organizational scheme, communications, environmental protection, etc., it is necessary to: a) identify main objectives of global and high-tech industrial development and allocation; b) define institutional, macro-economic and other conditions and the role of the state, the local government and the enterprises in the realization of the prospective project; c) define the preliminary development concept for small enterprises – the potential structure of production and programme (based on high-tech or medium level of technology), location demands of particular enterprises, contents, buildings, and infrastructure; d) consider multi-variant urban or spatial solutions for the technology park (in practice, several approaches are used, predominantly the modular allotment system with continuous/successive activation dynamics, the “initial nuclei” model with contents and enterprises dispersed or grouped according to a particular criterion, or the “hybrid approach”); e) plan the conditions and measures for environmental protection (upon sustainability principles and criteria, precautionary principles, the application of quality standards ISO 9000 for products, environmental standards ISO 14.000, and principles of industrial ecology).

The starting point in urban spatial planning of new industrial location forms is to determine

the goals and standards of the planned construction and functional zone, to determine whether the size, quality and equipment of the buildings, infrastructure, and location are adequate for particular land uses (production, R&D, services, business, recreation, distribution, communication, storage, free spaces, protection zones, etc.), to determine environmental quality, etc.

The potential structure of industrial activities in the new spatial form of industrial location (technology park) should, based on the evaluation of comparative location advantages, enable a greater role of particular spatial wholes as bearers of development in the regional surrounding, serving as nodal points in the spatial organization of production, services, and residential uses. A preliminary insight into the role of new industrial forms points to their extraterritorial and export importance, their substantial effect upon the national economy, and also their role as a node of production, assortment, service, development, distribution, and transit. Tatsuno S. (1986) points to the relatively low impact of the vertical integration process and economic agglomeration activities (production, services, exchange) on the local environment, to be found within industrial technology parks and other forms of high-tech industrial locations. This is due to the export and extraterritorial character of these activities (a relatively low scope of employment, potential jeopardizing of the environmental and urban quality, eventual loss of stimulating developmental effects upon the local economy, etc.) The expected developmental effects of technology parks rest in the socio-economic sphere (the impacts upon the process of generating global development through small and medium enterprises, changes in the areas economic structure, employment, market, development of services, etc. and urban spatial structures (developmental and location factors – better use of natural and built resources, criteria for choosing and evaluating the location, high urban standards of construction, etc.)

From the spatial planning point of view, it is relevant to research the location and developmental factors that determine the macro and micro location of the new industrial form (technology park) – urban and regional

¹ According to SIC (Standard Industrial Classification), “high-tech” holds a high percentage of the overall R&D investment (more than 10%), develops new products and technological innovations, and predominantly employs R&D and scientific profes-

sional staff (more than 10%). According to the SIC, 23 out of 34 branches of industry are high-tech.

infrastructure, R&D institutions, scientific and highly qualified professional staff, the market, agglomeration and location economies of urban centres, urban equipment, quality of life, social and large regional infrastructure, attractive physical space and urban aesthetics, favourable legal and business climate, etc. The new spatial form of industrial location (technology park) is a fundamental element in the spatial structure of industry in the state, region, or city, as well as in multi-modal industrial corridors, which influence the transformation of urban and spatial structures in the environment. Therefore, the incorporation of this form of industrial location into the existing and planned spatial structure of a city or a region demands optimal solutions for spatial relations of key environmental elements together with the intra-zoning organization and the park's equipment. This implies a choice of location for the new spatial form of technologically highly developed industry, that is, according to the experiences of developed countries, placed in attractive physical spaces between a big city, university, scientific, R&D nuclei, and the airport (fast communications – motorways, rails). Identifying potential locations for the position of the new spatial form of industry in multi-modal infrastructure corridor centres in Serbia requires *ex ante* research on location factors for technologically highly developed industries and defining the criteria for evaluating and choosing the industry's location, the criteria for directing the industry's allocation, and criteria for assessing developmental priorities.

THE POSSIBILITIES FOR DEVELOPMENT AND SPATIAL ORGANIZATION OF TECHNOLOGY PARKS ALONG MAIN INFRASTRUCTURE CORRIDORS IN SERBIA

The basic rationale for establishing new spatial forms of technologically highly developed industry (technology parks, industrial parks, high-tech agglomerations), as the model of regional, economic, technological, and urban development, is intensifying the dynamics of industrial development and levelling up regional development disparities, to be followed by an increase in employment and the standard of living. The development of technology parks along Serbia's main infrastructure corridors involves promotion and support for small and

medium size enterprises, application and development of high and medium technologies (high-tech companies), increase of employment and the standard of living, introduction of new products based on new technologies, new materials, environmentally safe products, restructuring of production in tune with market conditions, resources and constraints, entrepreneurial development, increase of business rationality and efficiency, increase of innovative capability together with a more complete use of resources, attractive locations and environmental protection measures. The general objective of developing industrial enterprises in the technology park is economically profitable high-tech production with environmentally safe products, as well as a decrease in the amount of pollutants in the air, water and soil, decrease of waste disposal, a more efficient use of (non) renewable resources, and an overall efficient spatial organization. Industrial development in the technology park entails the acceptance of environmental policy, sustainable forms of behaviour in production and consumption, and prevention and control of the effects of industrial projects.

The basis for researching the spatial organization of industry along main infrastructure corridors in Serbia, as belts of urban concentration and intensive development, is to be found in strategic development documents of the Republic of Serbia, such as: The Spatial Plan of the Republic of Serbia, Economic Development Strategy of Serbia until 2010, spatial plans of main infrastructure corridors in Serbia (sections Belgrade-Niš, Niš-Bujanovac/Preševo/Macedonian border, Belgrade-Šid/Croatian border, etc.), spatial plans of areas within the gravitation zone of these corridors, etc.

The propositions of the Spatial Plan of the Republic of Serbia (1996) provide for the possibility of establishing new spatial forms of technologically highly developed industry (technology/science parks, industrial parks, high-tech agglomerations), free zones along infrastructure corridors ("belts of intensive development"), with the aim to incite industrial development and decrease regional disparities in Serbia. The primary goals of establishing such spatial industrial forms are spreading innovation and encouraging the economic development of insufficiently developed regions,

promoting new production based on the use of high technology and available developmental and location potentials of the area. The development of industrial technologies of high and/or medium complexity in "new" location forms of industry along the main infrastructure corridors ("belts of intensive development") is envisioned for the following cities: Belgrade, Niš, Novi Sad, Kragujevac, Subotica, Pančevo, and Kruševac. Further development of existing free zones, as "new" location forms of industry and other activities is planned (in Belgrade, Pančevo, Smederevo, Kovin, Novi Sad, Šabac, Lapovo, Niš, Prahovo), along with the creation of new zones (in Subotica, Zrenjanin, Vranje, Ćuprija-Paraćin, etc.)

The area along main infrastructure corridors is very attractive for establishing free trade zones. The roots of such attractiveness lay in the possibilities for the enterprises within the zone to internalise external effects due to the position along motorways, the market, urban economies, as well as favourable/privileged business conditions. For example, four free zones (Belgrade, Smederevo, Lapovo, and Niš) have been established along the main corridor from Belgrade to Niš, and more zones – in Jagodina, Paraćin/Ćuprija and Aleksinac are about to get the permission to start off. A surplus is noticeable in the location arrangement of the free zones (in terms of their number, contents, predictions for economic activity and employment), and also a duality of location (Niš-Aleksinac, Jagodina-Paraćin/Ćuprija). The presence of free zones along the corridor is part of the effect of economic agglomeration in this area. At the same time, economic activity in the zones is free of taxes or under subsidy in respect to import and income taxes, enabling free circulation and transfer of money. Furthermore, a certain level of infrastructure is provided for (transportation links, power, water and telecommunications). Low quality labour is employed within the zones and most of the inputs are imported (except for power and water). Their role is vastly overestimated, as in the case of the Lapovo free trade zone, where the document on economic feasibility predicts the employment of 10,000 workers, which is more than the number of inhabitants in this community (9,480 in the 1991 census).

The "Industrial Development Strategy of Serbia

until 2020² is in the making in the Republic of Serbia. According to the key concept of the sector involved in this strategy, it remains unclear how the territorial development of industrial investments is going to be directed. The Activity Program (until 2004) of the Ministry of Science and Technology lists as one of the priorities the establishing of technology (science) parks in Belgrade (in the Zvezdara area, next to the Institute "Mihajlo Pupin") and Niš (conversion of military premises), i.e. in the pan-European Corridor X. Planning the future science-technology parks in Belgrade and Niš, as instruments of the spatial planning policy, is an example of the endeavour to coordinate cooperation in planning investments into high-tech on the national, regional, and local level.

Two corridors pass through Serbia and Serbia and Montenegro, as the central country of South-eastern Europe. One is Corridor VII – the Danube corridor; the other is a third of the Corridor X (Austria, Slovenia, Croatia, S&M, Macedonia, Greece, and Bulgaria), which represents the country's main traffic route. The priority in renewing physical capital along the corridor is regional infrastructure and its linking to trans-European corridors, and also economic/industrial development (especially along the Belgrade-Niš section). The area of the main infrastructure corridor from Belgrade to Niš encompasses the territory of the Danube, Šumadija, Morava, Rasina, and Nišava districts, and the City of Belgrade. Approximately 2.4 million people live in this area. The economic structure of the area is characterized by diversity and specialization of activities. Despite the agrarian structure of the area, industrial activity has been dominating economic development in a considerable part of the region (Spatial Plan of the Motorway Area, Section Belgrade-Niš, 2001). Because of the rapid decrease in economic activity (especially industry) during the last decade, the dominant part of the GDP is contributed by tertiary activities (42.3%). Industry and construction make for 33.8%, and agriculture for 23.9% of the GDP.

² Coordinated by the Ministry of Science and Technology, with the participation of numerous university departments, institutes, and other organizations.

The construction and reconstruction of the large transport infrastructure in the Trans-European "Corridor X" in the section between Belgrade and Niš plays an integrating role in Serbia's socio-economic and regional development. It enables regional economic linking of Central Serbia to the entire territory of the Republic and the European surrounding. Within this main corridor, the cities of Belgrade and Niš are nodal points, emanating, generating, and transmitting economic flows, flows of goods, transportation and transit. Concentration of population, labour, funding, and infrastructure in their gravitation areas, as well as an array of service functions, initiate those flows. In these areas around 20-30% of Serbia's economic and industrial potentials are located (and around 60% of highly qualified professionals, scientific, and R&D institutions). In addition to the immense polarization of labour and industrial capacities in Serbia, there is a global inefficiency of production, coupled with a slowing down of the basic indicators of macroeconomic development due to the absence of technical progress.

The trajectory of "Corridor X" corresponds to the Velika Morava belt of intensive development, which extends over central parts of Serbia, from Belgrade, through Niš, to the border with Macedonia. The metropolitan area of Belgrade (with 1.6 million inhabitants) and the macro-regional centre Niš dominate this belt. The location and development potentials of this belt are substantial, especially in the lower parts of the Južna Morava and Velika Morava basins. There are some constraints to positioning different forms of industrial structure in this zone. Certain constraints for the location of industrial plants come from problems with water supply, wastewater processing, pollution of water flows, and urban environmental pollution. However, this area also has noteworthy advantages in comparison with the Danube-Sava belt: the presence of urban-industrial centres of a complex structure, such as Niš, Smederevo, Jagodina, Čuprija, Paraćin (Kragujevac and Kruševac in the larger surrounding), etc, with technologically well developed industry, scientific and R&D institutions, labour force and industrial tradition, built production plants and infrastructure.

The strategy of the territorial development of

industry in Serbia (including main infrastructure corridors) is determined by overall socio-economic conditions and assumptions that:

- a) The process of restructuring the economic system and economic environment will continue, there will be a transition towards market economy, changes in property, market, macroeconomic, production, and other policies and programs;
- b) The country and economy will be opened to all forms and models of direct foreign investment;
- c) An appropriate market-planning mechanism will be established to secure building lots for locating economic contents/investments
- d) Transparent approaches and regional concepts for spatial development, use, improvement and protection will be introduced based on "sustainable" development principles, the use of eco-management and quality standards
- e) "New" demands and changes in former regional policy of spatial development will be accepted ("New" factors and conditions of development are: economic reconstruction, transition towards market economy, privatisation, plurality of interests in the context of pluralism and democracy, deregulation of some elements of policy and decision making, globalisation of production, economy and trade, introduction of direct foreign investments, an increased role of technical progress in regional industrial development, etc.)
- f) There will be a need to adjust regional plans/projects with European strategic and structural initiatives, planning documents, propositions, standards – for example, establishing technology parks, enterprises, economic restructuring, construction of infrastructure, protection of the environment, human development, etc.

The development and spatial organization of industry in the technology parks in cities along the main infrastructure corridors in Serbia should be based on: (i) general and specific objectives of development and basic strategic guidelines of industrial development (the development of hi-tech and "classical" sectors); (ii) perceived problems of existing spatial structure in this sector; (iii) new location factors of industry (especially hi-tech industry); (iv) new spatial/location forms of

industry (hi-tech agglomerations, technology, industrial and science parks, free trade zones, etc.); (v) location and developmental potentials and constraints of particular areas for the location of industry; (vi) determined criteria for the territorial allocation of investments into this sector and principles of sustainable development, with proposed planning responses, propositions, and modes of activating particular locations.

Future spatial organization of the technology park (the allocation of industrial and other small and medium size enterprises and other contents) should be based on the acceptance of spatial constraints (keeping the quality agricultural land, existing industrial complexes, infrastructure and other contents, appropriate land quality for construction, etc.), the existing spatial structure of production capacities and criteria for directing industrial allocation.

CRITERIA FOR DIRECTING INDUSTRIAL ALLOCATION

Directing the allocation of future small and/or medium size companies in the technology park should be based on the following criteria:

- The acceptance of positive trends in the existing allocation of industry and other economic activities and the need to complete particular industrial resources and zones in order to save space and assure positive external economies
- High level of infrastructure, completing information networks, existing and planned level of construction and spatial organization
- Territorial optimisation of production factors (especially technical progress)
- Regional and internal efficiency and the degree of meeting different needs and interests;
- Coordinating the spatial and structural characteristics of location factors, i.e. coordinating actual local demands of industry with characteristics of the terrain in the planned park
- The criterion of environmental protection and sustainable development (at the level of the park and particular companies);
- Territorial coordination of company activities with the aim of using built resources and decreasing the costs of exploiting the location
- Compatibility of planned programs/companies on the location

- Applying the criteria of eco-efficiency (economic, production, energy, ecological efficiency) in using the site and natural resources when planning new production plants;
- Developing and applying technologies that are more efficient in using resources:
- Coordinating contents of the technology park zone with ecological/spatial conditions of the local environment, and also applying the principle of sustainable industrial development, facultative instruments, standards of product quality and ecological compliance (standards ISO 9.000, ISO 14.000, etc.)
- Preventing the allocation of environmentally risky and detrimental plants or processes;
- Criteria of environmental and ecological safety in case of accidents, natural catastrophes, etc.

Gradual structural production changes, the application of technological innovations, as well as the activation of local resources and the possibilities for prospective international and domestic shareholders should create conditions for upgrading economic activities. This implies quality road and rail transport on the national, regional and local level, fast access to the airport, power networks, providing potable and industrial-grade water, channelling and processing industrial wastewaters, adequate storage of industrial waste, completing infrastructure equipment, etc.

Strategic solutions for the territorial organization of future production and other activities are among complementary methods of planning regulation and rational use of available spatial resources. The basic approaches to urban planning solutions for the technology park ("modular", initial nuclei", or combined) can achieve positive effects in spatial organization, more efficient use of resources, construction of public infrastructure, functioning of service agencies and environmental protection. This requires spatial segregation according to the level of public/infrastructure equipment, availability, and defining location, ecological and other conditions at the level of the building lot and the level of the block/zone.

Techno-economic characteristics of particular sectors are of great importance for locating industry in the park, since they are related to different forms of "environmental" pressure

upon space: 1) exploitation of land (the territory of the site), 2) energy use, 3) water use, 4) wastewater emission, 5) traffic flows, 6) emission of pollutants, 7) consumption of (non) renewable raw materials.

The spatial organization of the technology park includes:

- Rational and efficient allocation of new plants /enterprises according to the location demands of particular groups of production/services or groups of enterprises and according to the location conditions and spatial constraints in the zone, segments/components, or "initial nuclei";
- Selectiveness in locating particular production enterprises, especially on account of ecological reasons
- Optimal and functional organization, design, use, and protection of the area
- Eco-efficiency (in the use of material inputs – raw materials, energy sources, supplies, water, land/location, freight transportation, waste disposal, etc.)
- Compatibility of planned programmes as located in the park

POTENTIAL INDUSTRIAL STRUCTURE IN TECHNOLOGY PARKS (INTERNATIONAL AND DOMESTIC EXPERIENCES)

According to foreign experience, the potential programmes of the technology park are chosen based on strategic decisions and available location factors. The European Union aids the development of participant countries through the Directorate for Regional Policy, structural funds, the Directorate for the Environment, INTERREG programmes (2000-2006), the PHARE programme, integral projects of urban and economic/environmental development. In Spain, projects in the field of economic development have been initiated – technology park in Barcelona, programmes of development restructuring and urban economy in Madrid, and industrial zone development in Parla. In France, the project of renewing the central zone of Lyon, as a science-technology and R&D centre has been activated. In Italy, programmes for developing technology-science and industrial parks are used as the model of regional, economic, technological, and urban development directed so as to decrease regional disparities between the less deve-

loped South and the more developed North. High-tech spatial forms have been constituted – technopolis in Bari, the science park in Trieste, etc.

The Italian government established the Public Agency for the Economic Development of Southern Italy, which, together with the Research Centre (SCATA), helped create the first science and technology park in Bari in 1984. The University of Southern Italy, University of Bari, banks, and partner consultants founded the Research Centre. The aim of creating the technopolis is spreading innovation and stimulating economic development in the economically underdeveloped South, but also a harmonious coordination of foreign and domestic investments into industrial development based on the use of high technologies. The strategic site of the technopolis, covering an area of 20 ha, is in the small town of Valenzano, some 10 km from Bari. Three sectors are present within the park: a research centre with scientific laboratories (robotics, micro-electronics, CAD-CAM, etc.), a centre for professional training and international schools, and the service sector (sport and recreation, home economics, finance, etc.). Some 40 companies are located in the park, and 100 more are in the process of beginning production. Strategic planning of the EU and Italy, using the instrument of technology parks, stimulates the growth of the regional and the local economy through the growth of the service and production sectors based on high technologies.

The science park in Trieste is a multi-sector and technology centre, covering an area of 55 ha, with 60,000 square metres of built space. There are more than 60 research institutes/centres (public, private, and international) in the park, and also a centre for companies and enterprises, high-tech enterprises, high-tech enterprises (spin-offs), a service centre (no industry) with 1,500 employed researchers and technicians. The rationale for creating the park is the development of new technologies, scientific and technological research, promoting the diffusion of innovation. The functions of the park are: transfer of knowledge and technology, knowledge and information management, promotion of R&D innovation through the development of high-tech enterprises and the growth of the centre, project management

and technical support in the network of regional and national programmes, consulting, management, training, courses for “innovation managers” and “managers for the transfer of innovation”. The activities in the park are comprised of different branches of technology linked to their industrial application: biotechnology, biomedical equipment, new materials, electronics and automation, electro-optics, information technology and multimedia, robotics and communications, environmental protection, etc.

Defining the structure and types of production in the technology park is not the subject of spatial and urban plans. However, in order to determine the future contents and possible location demands of new enterprises, it is necessary to presume/predict the character of site use and the demands of future users. Based on the experience with technology parks that cover the area of 25–200 ha in the EU (Trieste, Bari, Barcelona), and some transition countries of South-eastern and Eastern Europe (Gyor in Hungary, “Skoda” in the Czech Republic, “Litostroj” in Ljubljana), it is possible to give a framework for defining strategic decisions and the productive-technological character of high-tech enterprises.

In our country, the production of planning documentation has been initiated for the technology park in Vršac (Spatial and Programmatic Concept for the Regulatory Plan of the Technology Park in Vršac, 2002.³) The key player in this project is the company “Hemofarm” from Vršac. The technology park is located in the southwest of Vršac, in an area between the railway Belgrade-Vršac-Temisoara (Romania), the main road Belgrade-Vršac-Vatin (Romania), and the railway station Vršac, covering an area of 25 ha. This zone is well equipped with infrastructure – a customs office and shipping companies are in the immediate vicinity, as well as the local air runway. A development strategy for the industrial zone/technology park has been prepared in “Hemofarm”, as the main initiator and stakeholder in the creation of the technology zone/park. The emphasis is on support for establishing small and medium

size enterprises, through different modes of production/technical cooperation, joint investments, foreign investments, etc., as well as on cooperation with foreign partners, using their experiences and capacities in order to better utilize the potentials of Vrsac and the region. (Examples are the establishing of “Hemomed” and “Zannini” Hemofarm). “Hemofarm” plays an active role in creating a favourable business climate in the community, attractive for foreign and domestic investors, in inciting entrepreneurship and new investments, supporting the start up of small and medium size companies through joint ventures, direct foreign investments and production-technical cooperation. Moreover, it promotes environmentally safe products and provides complete logistic support and sites (lots) for the construction of small enterprises (in the future it may also be possible to rent business or storage space). It also provides assistance to future enterprises in management, marketing, technology transfer, administration, financial and management consulting, R&D, laboratory services and other areas where the knowledge and experience of “Hemofarm” are valuable.

The potential production structure in the Vršac technology park includes products based on new materials – surgical material, bio-medicine, electronics, and medical electronics, medical devices, equipment, optical instruments, measuring instruments and equipment, dental products, biotechnology products, ecologically sustainable products, pharmaceuticals for most therapy groups, veterinarian products, cosmetics, and other products of the pharmaceutical industry, some chemicals and food. The development of the programmatic strategy of the “Hemofarm” pharmaceutical company is coordinated with mid-term and long-term business strategy. The potential programmatic strategy of future small and medium size enterprises within the entrepreneurial zone is heterogeneous, and involves developing “standard” technologies and products from all industrial branches.

The transition of the economic system towards market economy, decentralisation and the rule of law/responsibility deeply influence spatial planning policy and investment planning in Serbia. The complexity of planning economic investments in our country implies that most

³ The regulation plan for the “Hemofarm” technology park has been adopted in 2003.

investment projects will be realised in accordance with the framework provided by the privatisation laws (within the existing capacities/localities). Some planned investments will be realised through the private sector (entrepreneurship), some through partnership between the public and private sector and/or direct foreign investments into new enterprises.

CRITERIA FOR THE CHOICE OF DEVELOPMENTAL PRIORITIES

Strategic determinants for the development of industrial and other enterprises in the technology park should satisfy general criteria of internal and social profitability (socio-economic feasibility), technical/technological progress and innovation utilizing the knowledge of highly educated staff, efficiency in the use of built and natural resources, spatial and environmental acceptability.

From the standpoint of local and regional interest, fundamental criteria for the choice of priority activities and programmes are:

- Coordination with spatial and environmental resources and capacities;
- Increasing employment, GDP growth, economic efficiency of the regional and local environments, and business efficiency of the investors (profitability);
- A more balanced distribution of activities and labour (population); attracting other economic activities;
- Use of renewable and non-renewable resources;
- Energy economy and developing high-tech and environmentally more efficient technologies, etc.
- Increasing technologically efficient and innovative branches in the economic structure of the region and its surroundings

For implementing the strategy of development for the technology park, planning documentation

is needed, i.e. it is necessary to provide an adequate legal base for the policy of development, for the use of construction land, and for the spatial organisation of the technology park area. The main task of the urban plan of the technology park is defining the spatial organisation, the urban-spatial criteria and location conditions, conditions for construction of industrial plants, environmental conditions, etc.

CONCLUDING REMARKS

It is necessary to include strategic guidelines, framework, and conditions of the broader socio-economic context into the process of planning technology parks along main infrastructure corridors in Serbia. The starting point for planning the technology park should be based on the national strategy of socio-economic and spatial development, but also on international practice. In our country, the planning of economic investments in the period of transition and privatisation is rather complex: (a) most investment projects will be realised in the process of privatisation, (b) some investments will be new private sector entrepreneurship investments and private-public partnerships, (c) some investments will be carried out as direct foreign investments into new enterprises (including technology parks)

The activation and use of new instruments of spatial planning policy in Serbia is of particular significance given macro-economic reforms, privatisation, opening and transition of the socio-economic system towards the market system, economic restructuring, internationalisation of production and trade, in which direct foreign investments play a decisive role. Attracting direct foreign investments through the instrument of technology parks is one of the ways to increase the value of Serbia's main infrastructure corridors and to better utilize developmental and location potentials.

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