Description of the different types of Science/Technology Parks and their physical planning requirements.

Introduction

I would like to state from the outset, that I am not an expert on the subject of Science/Technology Parks. However my aim is to share with you some knowledge that I have collected throughout observations from visiting Science/Technology Parks in Europe and in the United States. I am here to examine with you the nature of the subject and how it translates to the Cyprus reality.

We already know that the Government places special emphasis to the extension and the upgrading of infrastructures in the fields of Research, Development and High Technology, aiming for a knowledge based economy and we have already heard about the various initiatives undertaken so far. However, despite the above efforts and the recent accession of our country to the EU, Cyprus still ranks very low in high tech compared to other countries of the Union, even amongst new member states.

A technological revolution has been taking place in western Europe and in the States for more than three decades, and despite the fact that Cyprus is placed well in economic and unemployment terms, there are no significant advances in technology.

The main reasons for the limited development of technology in Cyprus could mainly be attributed to the following:

- The lack of collective effort towards this direction. This is now addressed by the creation of a project team, which specifically deals with this task.
- The fact that Cyprus has not yet chosen the area or field that it will invest into; whether it will be in Information Technology, in Biotechnology, Nanotechnology or any other. This is foreseen to be clarified by the feasibility study.
- The dispersed pattern of existing establishments/companies in high tech fields, which make any potential cooperation and cross fertilization difficult to achieve.

This last point raises the question whether an STP will overcome such difficulties and will create a planning entity with a common development goal. I will further address the importance of physical planning in establishing a successful industry.

Description of Science/Technology Parks

What an STP is about

Let us examine what a Science/Technology Park is about. According to the International Association of Science Parks (IASP):

> 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.

This definition, which is now broadly accepted and used, encompasses not only the different models currently existing in the world, but also other labels and expressions such as Technology Park, Research Park, Technopole, Technology Precinct, etc. Although there may be some differences among the projects under these labels, such differences are not as significant as to allow us to talk of different projects or "categories", but rather of different subtypes of one concept. Therefore it is perfectly possible in this definition to substitute the expression "Science Park" by any of the other expressions mentioned, although I could point out that in my opinion a "Science Park" differs from other "categories" as far as it only deals with research.

STPs not only deal with high-tech Industry; they also deal with advanced services, with Research and Development processes, with the creation of new companies, with technology transfer and technology commercialisation. But most of all STPs deal with innovation: that is, with all the processes, methodologies and entrepreneurial attitudes that aim at constantly adding value to all the different elements of companies´ activities: products, production processes, management, marketing, etc.

STPs are a sort of specialised Industrial Parks, which allow under the best possible conditions, the interaction between education, research and technology development. In these establishments, services and products are of a high tech nature and usually focused in the fields of Information Technology (informatics and software), electronics and telecommunications, public health (chemistry, biology and pharmaceutics), energy and environment.

Contents and Facilities of STPs

An STP, in its complete form, provides the infrastructure which supports and nourishes the development of an idea right to the end product. This resembles the creation of a human being, from inception to birth. The infrastructure does not need to be as extensive if an STP deals with preexisting products or companies.

An STP in its complete form should provide the following:

(a) **Dedicated sector of the University involved in the study of the specific field.**

(b) **Research Centres:** where ideas are developed into prototypes and possible manufacturers are identified.

(c) **Incubator-Innovation Centre:** which is an establishment housing a partnership between the innovator and the manufacturer, where the prototype is further developed into a marketable product. The Centre is fully equipped both technically and in terms of office support and a partnership can rent a space in the region of $50m^2$ and use the facilities for up to two years.

(d) **Business Centre:** which is an office type facility, dedicated to those who have passed the incubating period and have products of a rather small scale. The Centre provides for them letable space of between $150\text{-}500m^2$.

(e) **Centre for auxiliary industries – Containers:** which is a letable industrial space, subdivided in areas of over $100m^2$, used for assembling and packaging of larger scale products.

(f) **Serviced sites/plots or pre-built factories:** which could be leased or sold to companies that decide to remain in the STP on a permanent basis. This concludes the final phase of the development where the company becomes independent, but still benefits from the facilities and location of the STP.

(g) **Technological Centres:** which deal solely with the testing of products. A partnership can use this facility at any stage of the development of the product to determine its properties, such as strength, quality, composition etc.

(h) **Training Centre for Staff:** which is dedicated to the continuous training of staff that work or intend to work in the STP.

Apart from the above main components, a Park may have some supplementary uses, which could contribute to its R&D role and to the cross-fertilization process, such as:

- a congress center,
- public or private agencies involved in research,
- special elementary and high schools, and
- a business school

Finally, according to its type, size and distance from the town, an STP, in its extended form, may include a range of supporting uses, like sports grounds and recreation/commercial and service areas and housing, in order to become more or less self sustained.

Typologies of STPs

We could distinguish the following three types of STPs

- **The urban type:** which is densely developed as part of cities' urban fabric and which is usually next door to an existing university or research centre. This type of STP results from the need to be very close to an existing establishment and from the lack of space within an existing neighborhood.
- **The periurban type:** which has a looser layout and which is organized in a way that facilitates the interaction between education, research and technology development. This type of STP, usually found on the outskirts of cities, combines built up areas with some green open spaces and landscaping in order to create a pleasant man made environment.
- **The green type:** which looks like a real park, is made out of clusters of buildings integrated in existing large green areas. STPs of this type are of very low density and freer layout, and usually exploit woodland, which is found in the countryside. Due to their distance from urban areas they are equipped, almost always, with a full range of facilities.

Physical Planning Aspects of STPs

In my opinion, there are three distinct levels of physical planning of an STP, which are the following:

- Supra – regional and regional level

- Local level

- Internal level (layout and development guidelines)

Supra – regional and regional level

STPs are key factors to the economic development of the region, unlike the conventional Industrial Parks, which are affected only by their locality. For this reason STPs need a regional planning overview and must be regarded as tools to achieve certain goals rather than as being an objective themselves. Their level of success also depends on whether the model of the STP is well suited or not to the given region or city.

Europe now works at a regional level, where each region specialises in different fields, such as trade, technology and culture. In this context towns work in a polycentric manner and they compliment each other. The homogenous spatial planning of Europe becomes a common strategy, and emphasis is placed on regional networks that are fundamental for the successful operation of industrial systems.

STPs contribute to the specialization of regions and thus to their mapping within the European spatial development scenarios. They enable the economic and social development of a given area and they define its character. The economic and social dynamics being in this case complimentary and reciprocal. Surely the economic "winners" are the areas, which attract the dominant social force of our age, the creative class, since they offer the economic opportunities, but also the amenities and lifestyle options desired by the highly mobile members of this class of people.

As a conclusion to this part, I would say that in terms of physical planning:

- STPs at supra – regional level can distinguish a region and map it out as an R & D node in overall European spatial development scenarios.
  This could allow the expansion and development of regional networks and could attract financial assistance from EU funds.

- STPs at a regional level, as means to economic development, should be integrated into the existing innovation system of the country (University, Colleges/Institutes, Research Centres etc.). They should also be networked and linked with the rest of the world.

Local level

The sitting of an STP is important to its success and for this reason the evaluation of alternative locations is necessary in every feasibility study. The final site selection being the outcome of the following location and access criteria.

Location criteria

- Site properly zoned in the relevant statutory Development Plan (otherwise the project could face problems right from the beginning).

- Site in a clean environment with good drainage and good soil bearing capabilities (in the absence of which construction problems may emerge).

- Site capable of presenting a high physical profile in the region (mainly due to its location and overall quality).

Access criteria

- Access to labour force (qualified and non qualified staff)

- Access to markets and communications (roads, airports etc.)

- Access to utilities (water, sewerage, telecom etc.)

- Access to supplies and services (social, commercial, business)

These criteria raise two other important factors, which have to be taken into account in local physical planning, which are the following:

- The critical mass of people needed to sustain the project: The proximity to large urban areas could satisfy this factor, because it secures in a way the availability of labour force now and in the future or at least for the projected employment targets.

- The site size and the possibilities for expansion: European experience has shown that in the case of general Industrial Parks, a minimum size of land of 40 ha, could be sufficient as a starting point, whereas in the case of an STP this size could be more than enough to commence with. Provision though must be made for expansion, as a successful STP can grow very rapidly.

Internal level (layout and development guidelines)

STPs of "urban" or "green" type do not follow any particular layout, mainly due to their need of being accommodated in either very small areas or in extensive woodlands. However, in the various Master Plans of "periurban" STPs, one could distinguish a certain layout, which is repeated in different versions.

This more or less typical layout could be briefly described in the following way:

- The incubator is in a central location and close to the gateway within a "service core"

- The University and the enterprise areas are on either side, integrated in a linear way, and with possible connections to the main road.

- The main buildings, which are closer to the “service core”, are the Research Centres and the Buisiness Centre.

Development guidelines generally will set out some or all of the following elements:

- **Development density or plot ratio:** varies according to the type of the STP, and does not exceed 25% in the case of periurban development.

- **Vehicle parking standards:** vary from 2/3 spaces per 100m² for the less busy parts, to 4/5 spaces per 100m² for office type activities.

- **Building heights:** vary from single storey industrial bays to 3 storeys for office type in the case of periurban development.

- **Set backs:** may be as much as 30m from boundaries of major distribution roads to 10m from boundaries of minor or service roads.

- **Building materials:** may be specified according to particular zones to ensure architectural harmony with adjoining buildings.

- **Landscaping:** which is one of the first development activities to be undertaken on a new site, may, easily reach 50% of the total area.

- **Boundary treatment:** is quite often discouraged between sites in order to achieve a parkland type development, whereas when fencing is needed, it has to conform to specific standards.

- **Environment:** has to be protected in conformity to national environmental criteria but also according to a list of conditions drawn up by the management company of the STP.

Developing the STP in Cyprus

I would like to address some fundamental issues concerning the development of the STP in Cyprus:

- Following such a venture might be risky, due to the competition with other states, which have already had a head start, and due to the rapid advancements in technology. Launching this project therefore, requires a very decisive and well-defined proposal.

- The areas/fields of Research and Technology have to be decided from the beginning and must satisfy if possible the needs of the following three markets:

    - The University of Cyprus and other institutions for applied research purposes.
    - Technological support to Cyprus' enterprises
    - Location of companies from Europe and the Middle East who might want to operate from Cyprus.

- The development of the STP should be gradual, safeguarding the success of each step, and focused on an initial pre-selected site allowing for future expansion. This should be linked to already existing education and research institutions involved in the specific fields, and should have a rather flexible layout.
- We should avoid copying from others, aiming at an innovative project, which will respect Cyprus' specificities, in terms of scale, capabilities, insular character, the Cyprus political issue, and adjusted to the lifestyle/mentality and expectations of the local employment force.

Having in mind all the above elements, it seems that, being close to urban areas, would be beneficial to the project, since the STP could attract more easily the necessary labour force and could rely on existing infrastructures, services and institutions. This leads to what has already been mentioned as critical mass of people and innovation system of the country. The latter is illustrated in the Table taken out from the RISC Report (Regional Innovation Strategy in Cyprus).

For all these reasons, the locations indicated for R&D purposes in the various Local Plans, seem to be appropriate. Similar provisions will be introduced very soon in the Policy Statement for the Countryside, dealing with development in rural areas. In this case, the proximity to urban areas will also be one of the most important site selection criteria.

Due to the fact of being start ups in the technology sectors, it is important to set priorities and to remain focused, rather than spread the effort in many places and directions

A "periurban" STP, easily accessible from motorways and the airport, would be in my opinion the most convenient solution for Cyprus. This solution meets all the criteria mentioned above, but also responses in a better way to the issues of uncertainty, investment, proximity and of gradual expansion.

I would like to thank you for your attendance and I wish that we shall have the chance later for a fruitful discussion.