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TAGUSPARK – FOSTERING ENTREPRENEURSHIP

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ABSTRACT

The objective of this paper is to analyze the role of Taguspark as part of the National Innovation System (NIS) and its contribution in fostering entrepreneurship in the Portuguese economy. One begins with an introduction to the theme of innovation, discusses the theme of entrepreneurship and the creation of companies and approaches the role of Science and Technology Parks in the economic development. One reviews the role of Taguspark in a historical perspective and the results achieved so far, identifies the challenges reserved for the future, as well as how Taguspark has contributed for the NIS and how it can continue to do so.

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I – INNOVATION

The world economy has in the last decades been characterized by an accelerated rhythm of innovation and change, intimately linked to an increasing trend to a global economy and exponential growth of competitive markets. This competitiveness appears as a consequence of policies of opening market allied with the enormous development of information technologies that expands competitiveness to both worldwide and local level. In fact, this globalization or integration of the economy to a global scale, in the form of open commerce, expanding foreign direct investment, across-the-border cooperation between companies has an enormous impact at the local and national markets. Thus, globalization cannot be ignored by any country since the consequences of neglecting this new economic situation would seriously hurt national economies in terms of desired economic and social welfare.

In this context of constant change, where the dissemination of new technologies occurs at a stunning speed, fast and constant adaptation becomes a challenge for the society as a whole. Innovation becomes an essential condition for economic and social development, for the maintenance of the job level and for its competitiveness. It is today widely accepted that innovation, and in particular technological innovation, has been the driving force in the unprecedented improvement of the social welfare and well being of developed countries since the industrial revolution. In fact, looking at the economic indicators along history one can verify that the scientific-based technologies have been one of the greater sources of economic growth.

The challenge to create a National Innovation System (NIS) in Portugal is based on the premise that innovation implicates deep interactions and overlies among the social tissue. It must involve business and non-business institutions, that is, both individuals and organizations. Proinov (Integrated Program for Innovation) defined NIS “as a set of interconnected institutions that contribute to create, develop, absorb, use and share economically useful knowledge in a given national territory”. According to that definition there are five elements that constitute and interact within a NIS: companies; educational and R&D entities; interface and technological support organizations; financial system; and public institutions. Therefore, it is important to characterize the innovation process and its implications.

The concept of innovation. An idea, novelty or invention can only be considered an innovation after being adopted by the market, the diffusion process, understood as the one that takes the innovation to disclosure by the society and consequently to its adoption by the potential users, has a prominent role in the innovation process. Therefore, innovation is a complex process that involves not only technical and economic aspects but also, with equal importance, cultural, social and organizational aspects. One can argue that, innovation is not only an economic mechanism or a technical process, is above all a social phenomenon, since it is through innovation that individuals and the society express their creativity, needs and desires.

Models of Innovation. In the systems integration and networking model, referred by Rothwell as the model of future, the company appears as an open system with gradually more diffuse borders. This implies the adoption of a very flexible organizational structure with the main objective of integrating innovation in its daily life. Facing an increasingly aggressive competition, the shortening of products life cycle and the high costs of research and development, companies understand the need to involve a multiplicity of players in the innovation process in order to accelerate innovation and consequently reduce the associated risks as well as the associated costs.

In this model the emphasis is placed in the flexibility and in the rate of development, which is characterized by being done in parallel and in an integrated form. Thus, making use of simulation models of research and development, involving special interactions with key clients, relationships with suppliers, as well as cooperation with other companies and other external entities. In the bottom line this model serves as the base for the definition of a NIS in which the company is the central element but it is surrounded by an assembly of players without whom the innovation would neither occur nor would be diffused within the system.

Innovation and competitiveness. A company without innovation, simply continues to make what it already made in the past, meaning that, it is highly focussed in its current set of products and regular markets. For that, its market share, as well as, its results will tend to diminish. However, when the company encourages creativity, it becomes possible for the organization to generate ideas that will allow it to compete in new directions. The competitive advantage of companies lay in a set of competencies that are not easily imitated by their competitors. The competitive capacities depend, on one side, on the quality of their competitive strategies, where one can emphasize factors like investment in technology and product, the reinforcement of strategies of differentiation and of specialization, the investment in innovation, the internationalization and the reinforcement of the exporting capacity and the development of management skills. Competitive capacities will depend also, on the external environment where they develop their activities, being the role of public policies in promoting favorable conditions to competitiveness extremely important. Among such public policies we can suggest the management of public expenses and fiscal competitiveness, the efficiency of public administration and the quality of institutions, the stimulus to the human capital, the market competitiveness and a supported social model.

The society of the knowledge and the educational society. Taking into consideration that companies are the core of economic activity, the increase of the potential economic growth depends on the competitive capacity of companies and in consequence on their capacity to increase the added value of their products and services. Considering in the present time, the extremely complex environment where companies have to survive, they are adopting as their organizational model, the system integration and networking model. Moreover, this organizational model only makes sense if it is integrated within a national innovation system where besides companies, there are interactions with other elements, like educational and R&D institutes, interface and technological support organizations, public institutions and a financial system. Taking into account that all these elements are composed by people, the society in general becomes the crucial factor in order to create such a system since it is the source of the necessary human resources for the functioning of those organizations. For that reason, public policies should point to a priority investment in people and above all on social welfare.

In agreement with Galbraith (2000), the success of the American economic growth during the last decade is based not only in the development of a knowledge-based society, where the individual develops technical competencies that permit him to increase his potential of getting employed, but also and above all in the development of social competencies that permit him to take advantage and better interact with all mechanisms at his disposal, in the modern society. In the same line of thought, Carneiro (2001) affirms that we are today in the threshold of a new change of social paradigm. Our society left beyond a completely exhausted model, based in the industrial paradigm where the social and educational system were based on a mass-produced, standardized and bureaucratic industry, going into the knowledge society paradigm based in the globalization, segmented distribution and market orientation. In fact, we can observe that in the last decades, our society has been changing to a knowledge-based society in which becomes crucial to store knowledge.

Due to the globalization and the development of information technologies and communications, knowledge has become of easy access to the majority of the society, being considered the fundamental engine of its development. The challenge today, is to make an effort to look at a foreseeable new paradigm, the educational society and try to develop the conditions so that change can happen in a more efficient and faster way. In this context, the new paradigm calls for an educational society based in learning communities fully capable of assuming the prime responsibility of carrying out educational and training activities in its interior, meaning that knowledge acquirement is done along lifetime at the rate of each one in a more and more personalized way.

This evolution has profound consequences in the social organization since the higher awareness of people, will create a strong civil society supported in dynamic communities which are the driving force of the educational system. In this society, its agents have an active,

responsible and participated role in the definition of its objectives. This means that, the existence of social capital becomes crucial to raise the social welfare level, which has deep impact in the economy and is the only manner that national innovation systems will be able to function. In this sense, social capital is defined by networking and institutions, where institutions manage the interactions between nodes, composed by people and organizations, such as, companies, universities, technological centers, banks and public institutions.

II – ENTREPREURSHIP AND THE CREATION OF COMPANIES

As mentioned above, we live in an era characterized by technological changes, associated with shifts in consumer's preferences, modifications in the regulatory framework or even significant alterations in the geopolitics forces and tendencies at the global level. Since innovation implies change many times it faces strong resistance. In fact, innovation is an ambiguous phenomenon capable of attracting supporters but also of creating strong opponents. On one hand, companies can show some resistance to change, arguing that at the moment their activity is giving positive results and they do not find the right incentives to change. On the other hand, innovation becomes crucial to survive in a world increasingly competitive, in which not innovating means to stop and consequently jeopardizing the future. In this sense, the emergence of new technologies can be an opportunity for the creation of new companies, although it can also be a strong threat to the already existing ones.

To this process in which new technologies disrupt and many times replace older ones, Schumpeter, called creative destruction. In effect, Schumpeter pointed out that the motivation that is behind the entrepreneur to pursue innovation, is the benefit that he can gain from achieving a temporarily monopolistic position. Naturally, this advantage has a tendency to be temporary, because due to the highly existing competition, rapidly there is a group of companies ready to copy the innovator in order to also profit from that privileged position. Therefore, the magical formula that the innovator has to fight his imitators is barely his capacity of presenting a series of innovations in an endless process, being always a step ahead of his competition. In this way, entrepreneurship, through the creation of new companies, arises from the capacity of taking advantage of new business opportunities generated by the market. On one hand, due to a more diversified but more sophisticated demand and on the other hand, due to a more flexible but more specialized offer.

In this worldwide context, where one can watch the constant changes in values, the shortening of product life cycles, the increase of global competitiveness, the changes in demographic standards and economic resources and the need to increase the capacity to obtain new products, services and processes, the survival of organizations, local regions and even nations is based on their capacity to innovate. That in turn depends strongly on the total use of the human potential, which to be exact, depends on the existence of individuals that have the capacity to learn, combine new forms of knowledge and materialize it in innovations.

Thus, the creation of a company necessarily implies the existence of a project, innovative or not, and an entrepreneur, alone or in-group, but not only. Beyond the individual decision of the entrepreneur, the macro economic environment and the turbulence of the economy, there are other factors, that being part of the surroundings and the existing business culture are essential to encourage the creation of new companies, namely, the local existence of technical and business competencies, infrastructures, highly specialized workforce and financing mechanisms like venture capital. If we keep in mind that companies represent the base of a nation's wealth creation, the competitive position of a country drifts, according to Michael Porter, from the competitive position of its companies in their respective segments of activity.

Therefore, if on one hand, the competitive performance of companies is influenced by the political, economic, social and technological context of the country where they are located, on the other hand, the higher or lower competitiveness of its companies is the major determinant of the nation's competitiveness. For that reason, the investment on creating a National System of Innovation, has the objective of increasing the competitive capacity of the companies that

operate in that country, with the purpose of improving its competitiveness as a nation. This way, the nation can reach its ultimate purpose of increasing the economic and social welfare level of its population, that is, to achieve a sustained improvement of the standards of living.

III – THE ROLE OF SCIENCE AND TECHNOLOGY PARKS

The role of Science and Technology Parks (STPs) in a national innovation system is fundamentally the creation of formal and informal links. As a consequence, the STPs contribute actively to speed up, enlarge and stimulate the innovation and technology transfer processes, since it is through these networks that information, resources and technology-based ideas circulate. At the present time, there are few doubts on the preponderant role that STPs have had in the world, as highly innovative policy tools for regional development.

At the regional level, STPs present links to the local universities and R&D institutions, frequently have strong relationships with financial institutes, consulting professionals and public institutions, as well as, have access to numerous sources of information relevant for the development and exploration of technology. In international terms, due to the associative movement of STPs, they are able to have access to the local information of each partner, as well as, to its contacts, thus allowing the creation of international networks that can facilitate immensely the internationalization processes of their tenants. As a matter of fact, STPs play a fundamental role as privileged places of encounter among science, technology and industry, allowing industrial diversification, technology transfer and the establishment of communication networks. However, they cannot be limited only to the physical space, since they must above everything stimulate contacts and consequently generate bigger visibility and credibility for the tenant companies.

The success of the STPs depends entirely on the success of the technology-based companies installed there. Therefore their main role will be to create infrastructures and a favorable environment that will offer competitive advantages to the different types of potential customers companies, that can go from entrepreneurs and their new born companies, passing through small e medium companies already in activity, until subsidiaries of big national and foreign companies, not forgetting services companies. In essence, a STP will have to foster entrepreneurship and support the creation and development of new innovative technology-based companies, which will be capable to operate successfully on the market.

The concept of STP dates from the thirties in the US, namely, its origin can be identified with the technological park of Stanford University, that has lead to the creation of Silicon Valley. However, the widespread movement through the world has an existence of around four decades, and the distinct STPs that were created in the diverse regions and cities of the globe, had to suffer the necessary adaptations caused by different levels of economic development, by distinct cultural environments, by a wide variety of social and political institutions, as well as, by a diverse wealth supply in terms of social capital. As a consequence of this variety of contexts, environments and realities, several different models of STP arose, making the concept to adapt along the years, accompanying the economic and social evolutions in a progressively globalize world. Attending to the existing reflections among the STP's family, as well as, to the constant evolutions of STPs and to the new models that are being created, IASP, in March of 2002, threw a new definition of Science and Technology Park:

- "A STP is an organization managed by specialized 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 STP 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".

It is interesting to notice that, the real estate component being present and being crucial to the concept, it does not appear no longer in first place, reinforcing the idea that the physical space, or more precisely, the planning and organization of the territory is structural for the activity but is not in itself an end. Along the years, through their innovative and pioneering spirit, STPs have introduced new forms of promoting the relationship between universities and the industrial and business environment, were pioneers in the creation of spaces for non-polluting activities, have conceived high quality master plans containing important elements of design in the architecture of buildings and landscape and gave a huge contribution to the development of new methodologies for the creation of new companies, namely, through incubation and spin-off processes in narrow collaboration with business incubators.

Sanz (2001) defends that the STP's movement continues to suffer deep alterations in its concept and points out evidences for the STP's model of the future. Consequently, a new concept of STP is beginning to appear, the "Learning Village", where one can find integrated in a limited geographic place, business spaces, educational and R&D centers, as well as, residential and services areas. These villages are established with strong information technologies and communication infrastructures, where their inhabitants and users, whether being individuals or organizations, display as their main characteristic a continuous determination to integrate and participate in the creation, acquisition and distribution of knowledge through life learning processes. Evidently the real estate component has to be present, however independently of the importance that it will have, it should not divert the management team from its central role as a preponderant element in fostering entrepreneurship in the society, promoting innovation among companies, stimulating the technology transfer from the knowledge centers and supporting the small and medium technology-based companies in the expansion of their networks, in the development of their knowledge management processes and in the progress of their internationalization efforts.

In the bottom line, these new "Learning Villages", can become reference elements in a global society, since they are global at the same time they present local roots, giving life and support to a new generation of people who feel, on one hand, comfortable in being a world citizen, but on the other hand, preserve their distinct marks of identity. This movement from a traditional STP to a new integrated model is already happening and Taguspark is one of the examples, spread out through the world, of this evolution.

IV –TAGUSPARK

Historic background. Taguspark, the Science and Technology Park of the Lisbon Area, with an area of 200 hectares (111,4 in the 1st phase), is the main component of a master plan located in the Oeiras municipal council, referred to as the integrated plan of the Science and Technology Park. With a total area of 360 hectares, the integrated plan of Taguspark is composed by four components, Taguspark, Barcarena's Old Gunpowder Factory, Cabanas Golf and Oeiras Park. The Old Gunpowder Factory Complex is a project that joins together cultural, patrimony, leisure, residential, educational and R&D elements. It is where Atlantic University is located and it is the only component of the integrated plan that is not private since is being developed by the Oeiras Municipality. The component designated by Cabanas Golf was conceived to be an 18-hole golf course complemented with housing, commerce, services and tourist activities through its hotel units. Finally, Oeiras Park is an area designed for residential functions and supporting activities to the needs created by the development of the park, for example, second grade education, university residences, commerce and services.

Tagusparque, SA, the managing company of Taguspark, was constituted in 1992, through a governmental initiative, as a private company with mixed capitals, being 56% of its equity (21,75 Millions Euros) in public hands and the remaining 44% in private hands. There are 17 shareholders from several sectors, meaning that the equity is distributed in the following way, 31% - banking sector, 26% - universities and R&D institutions, 17% - private companies,

17% - local authorities, 7% - governmental agencies and 2% - others not identified with a sector.

The core concept of Taguspark, consists in taking advantage and increasing the potential of the synergies existing between universities, R&D institutions and technology-based companies, the three pillars of its spatial occupation. Taguspark has several universities as partners that are in different states of development. The Technical University of Lisbon is at the moment launching a proposal contest for its buildings in the Park. The Instituto Superior Técnico is in its third year of operation, offering three engineering degrees with approximately 500 students. The Atlantic University is, since 1996, installed and operating in the area of the integrated plan of Taguspark. Finally, through its engineering faculty, the Catholic University started lecturing in January 2000, in the neighborhood of Taguspark.

In what concerns the R&D institutions, the Welding and Quality Institute (ISQ) established its operations in the Park, in 1993. INESC, the Systems and Computer Engineering Institute, despite it has not finished its building, will definitely have a presence in the Park. Other institutions with a presence in Taguspark are Maretec and Portugal Telecom Inovação. The admission of companies in Taguspark was initiated in 1995 and rapidly it became one of the locations, in Portugal, with one of the biggest concentrations of technology-based companies. If in an initial phase, the admission of companies was due above all to a relocation of their headquarters, at present, with the effort of developing activities to support the creation and development of new companies, half of the companies started their activities in the Park.

In the end of 2001, there was 146 tenants installed in a covered area above the soil of 145.053 m^2, distributed by the 111,4 hectares of land within the 1st phase of Taguspark. With more than 5.000 employees, they represented a total aggregated revenue of 917,8 millions Euros. Specifically, the Business Innovation Center (CIE), constituted by 120 technology-based companies, working in the domains of Information Technologies, Electronics, Telecommunications, Biotechnology, Fine Chemistry, Environment, Materials, Energy and Production Technologies, with more than 1700 employees was responsible for a total aggregated revenue of 250,6 millions of Euros. In the CIE, 47% of the companies are installed in spaces with less than 100 m^2 and 38% in spaces between 100 and 500 m^2. The average size of those companies is 14 people by company, with the smaller having one person and the bigger 209 employees. This population is characterized by its youth, since 81% of the people is less than 40 years old, and by the high level of education, since 53% has a bachelor degree, 5% a master degree and 2% a Ph.D.

The incubation of innovation. Innovation, that is to say, the materialization of news ideas, being the driving force of the economic and social structure transformation, constitutes the guarantee of the reinforcement of companies competitiveness and therefore of the Country. It is more and more evident the need for a permanent innovative attitude, not only from entrepreneurs but also from all its employees to assure the survival and the sustained growth of any modern business initiative. Naturally, innovation is not exempt from risk. Most of the time, as more innovative is a business initiative the higher is the associated potential risk and consequently the higher will be the likelihood of failure. However, when the innovative initiative has success, that is, when the market reacts favorably, the results are abundant and worthwhile. As a consequence, entrepreneurs accept the risk, do not discourage with failure and work incessantly in the pursuit of success. In summary, today, without innovation there will be no sustained growth.

The culture of innovation that is being created in Taguspark is based fundamentally in two essential conditions necessary for culture development. On one side, the existence of an well-adapted infrastructure, that is, the establishment of a favorable environment for innovation. On the other side, the application of efforts in the technological and scientific animation among tenants, that is, the promotion of synergies and taking advantage from it. In this manner, the coexistence of Universities, R&D institutions and technology-based companies is a reality that

is being built, so much from the point of view of infrastructures for their location as from the animation activities for their development.

However, the creation of a culture of innovation is a slow process and is being done by Taguspark in a sustained way. In the implementation of this process, that is still happening, Taguspark launched an Incubator of Ideas. Mainly, its activities are centered in supporting the creation and development of new technology-based companies, in collaboration with a Business Innovation Center named CPIN (the Promotion Center of Innovation and Business) and with other technological and scientific infrastructures, such as, the Instituto Superior Técnico (IST), industrial property agents and consulting firms. In fact, as part of its supporting strategy, Taguspark has cooperated with several institutions, such as, IAPMEI (Institute for the support of small and medium sized enterprises) and DGI (Directorate-General for Industry) in the development of public financed projects, IFEA/ISEG (Technical University of Lisbon) in training for entrepreneurs, IST in the elaboration of technical assessments for projects/ideas running for support, INPI (National Institute for the Industrial Property) in matters related with intellectual property, CPIN in incubating services, among others. Consequently, the mission of the Incubator of Ideas is to promote the technology-based innovation and the creation of new companies through a sustained bet on the intellectual capacity of potential entrepreneurs, with the aim of enriching Taguspark and, consequently, contributing to the general development of the economy through the growth of the business sector.

When promoting the creation of an Incubator of Ideas, Taguspark intends to encourage all the entrepreneurs who have a technology-based innovative idea, to set up their own company in order to market their idea in a sustained way, with lower risk and consequently with higher probability of success. This way, the Incubator of Ideas emerges as an initiative that represents an alternative for anyone willing to start a new undertaking. The entrepreneur will find in this organization a support structure that is prepared to provide the following facilities: technical support specialized in management to help him in the preparation of his business plan, passing through advice in the strategic orientation of his future company; the means for him to materialize his idea, creating the conditions so he can develop his activities in an environment that is favorable to innovation and adequate to the tasks he is proposed to carry out, namely, giving him access to a working site, meeting rooms, communication and reception services and a library focused in management subjects; financial services, like controlled costs of installation and small participation in the equity, advice and follow-up on the best solution in financing sources, provision of training in management technologies and disclosure important information.

Therefore, in this relationship the entrepreneur is going to find a system of support and an encouraging environment, helping him to overcome a natural feeling of insecurity that can exist around him, a possible lack of technical and financial means, his inexperience and the difficulty in finding the right premises, which could be actual barriers to his technology-based initiative. Being this activity in full operation, between June 1999 and December 2002, there were 477 contacts from different entrepreneurs looking for the available supporting services. Within these 477 initiatives, there was actually 240 applications to the Incubator of Ideas, from which were selected 52 projects to receive the various available supporting services. As a result, the Incubator of Ideas supported the creation of 24 new technology-based companies, from which 14 chose Taguspark for their location, while the remainders looked for installation outside the Park. However, it should be highlighted, that the dissuasion of ideas with a propensity to failure, is an extremely important support. The entrepreneur far from feeling discouraged because his idea was considered without potential, he should use the aspects considered less positive as springboard to develop another successful business initiative. All along the developed activity it was possible to withdraw some conclusions, that gave some hints to prepare the introduction of significant improvements in the process of supporting the creation and development of innovative technology-based companies.

From the set of conclusions, the following stand out: there is a large potential of innovation in the Portuguese society that is latent in its individuals with greater initiative but it

also shows important limitations that should be understood in order to increase the efficiency and effectiveness of the activity of support to the creation of companies; the business sector represents the greater source of entrepreneurs but these people show critical temporal limitations that oblige them to face the process of transformation the idea into business, in a part time regimen; the entrepreneurs coming from the academic background are a widely minority, which represents a big gap that restrains the increase of the scientific intensity of the presented projects; the inventors that present innovative ideas are by nature unable of conducting the process of transformation the idea into a business project and by that are limited to its commercialization through a third party.

Networking. Taguspark has developed several activities that have contributed for the creation and implementation of various informal and formal networks, which involve beyond tenants, entities from its influence area, as well as, entities with a national and international scope.

a) The Tagus Club, the club of Taguspark's tenants, maintains as its objective the creation of favorable environment to the cultural, social and sportive relationships among tenants, in order to facilitate a beneficial professional approach. This initiative intends to generate meeting opportunities for the tenants that can serve as a basis for the creation of personal bonds among them, which can turn into business relationships

b) The Competence Center is a cooperation network among advanced technology-based companies, which includes above all companies settled in the park, however the entry of other partners is accepted in order to complement the same. The creation of this competence and cooperation network rests on two pillars. On one hand, on the existence of a group of technology-based organizations that were already selected taking into consideration their activities in certain science and technology domains and that are operating inside the Park in the geographical proximity of each other. On the other hand, on the existence of a managing company that knows well and individually each tenant and has been carrying out a set of activities with the objective of taking advantages of the synergy resultant from the existing proximity among those tenants. Being the Park a place with a large concentration of competencies in several scientific and technological domains, the Competence Center emerges as a structure that may operate into the outside as if it were one sole big technology company, functioning within the concept of one stop shop for technology needs. Like so, the demand for technology solutions can find an answer through the Competence Center supporting team or directly through its search engine

c) The Incubator of Ideas, is an initiative that was established to support people seeking to start up a new company and that does not put as a mandatory condition the installation of the new company in the Park. Therefore, it is implicitly creating an informal network of outside companies that having benefited from the services offered will be concerned in maintaining the established relations, as well as, stimulating future contacts with other organizations within the Park. As it was already mentioned, in the scope of its incubating activities, Taguspark established partnerships with several organizations, such as, IAPMEI, DGI, IST, CPIN, IFEA/ISEG, OPTIMUS (I-nnovators Program), ECBio, Tecninvest and more recently INPI through the creation of a unit for industrial property promotion (UIPP).

d) Taguspark has participated, as the leader of the partnership, in a business tutorial project. The mission of the project is to identify entrepreneurs starting their business and find a business tutor in order to establish a tutor/entrepreneur pair, with advantages for both intervenient. The purpose of business tutorial is to place the experience of a successful businessman at the service of an entrepreneur launching a new company. The implementation of the project was assured by a network of organizations, led by the GDA-FP (Cabinet for Dynamism and Supporting Professional Training of PEDIP) and that count with the collaboration of a group of entities, such as, CPIN, GrupUnave (Interface Institution of the University of Aveiro) and AIM (Industrialist Association of Minho Region). The main goals of the project are to: contribute to reduce the rate of mortality of

start ups; putting at the disposal of the new entrepreneur the experience of life of the business tutor; improve business efficiency through the dynamics of problem sharing and its resolution; constitution of a network of business tutorial that permit to multiply the effects of the tutorial processes; contribute for the reputation and public recognition of the involved entities

e) It was initiated in cooperation with Tecninvest, a new project co-financed by the European Commission in the scope of the "Innovation and SME's Program", named TRITEC, with the purpose of fostering business cooperation, involving venture capital companies besides big companies and small and medium enterprises (SMEs), in order to leverage financial resources and divide the risk. The promotion of these alliances will be oriented by the market needs and not by the availability of a certain technology, that is, the partnerships to be established should be market driven and not technology pushed. On one hand, facilitating the access of the technology-based SMEs to the market, through the identification of existing business opportunities in a pre-selected group of big companies. On the other hand, these big companies can benefit from the international search of very specialized suppliers, without the inherent costs. The TRITEC project is an initiative promoted by an European consortium of 5 organizations, that besides Tecninvest, involve Thames Valley Technology (England), TTZ – Bremerhaven (Germany), Toulon Var Technologies (France) and Consorzio Step Ricerche (Italy)

f) Taguspark was involved in a joint project named On-line: Virtual European Network of Technology Parks for Innovative Services (ONLI), that linked Technological Parks, Universities and Technology Transference Centers in a virtual European network. This virtual network is functioning within the concept of one stop shop for providing internet services to European SMEs, related to management of innovation, technology transfer, support to spin-off and intellectual property. In this way, the SMEs can have instant access to the available technologies, training, consulting services, auto evaluation tools, success histories, good practices and diverse information through several links. The consortium is constituted by 6 partners of 4 European countries (Thessaloniki Technology Park, Aristotle University of Thessaloniki and Center for Technology Transfer from Greece; OuluTech from Finland, Taguspark from Portugal and Technologiepark Ostfalen from Germany), that were selected because of their accumulated experience in their respective fields of activity and consequently because of their specific knowledge in the thematic areas of the project (Technology Data Base & Technology Watch; Technology Assessment; Technology Audit; Technology Clinics/ Networking; Financing of Innovation; Marketing of Innovation). The main objectives of this network are to: apply and validate a set of tools developed for the promotion of the technology transfer in SMEs; test and validate the promising concept of offering services to SMEs through Internet in the form of virtual consulting; diffuse the specific know-how developed by each organization in each country and join them to the regional know-how of the other partners.

g) Taguspark gave its special sponsorship to the creation of a North-South network of technology companies, which the Portuguese component is named Taguslink - Innovation Network of the Lisbon and Tagus Valley Region. This network, approved by the DG XIII of the European Commission in the scope of the program INNOVATION, intends to foster innovation by the relationship developed among its members and is open to the participation of SMEs (industrial and services), big innovative companies, R&D institutions, universities and public agencies for the support to business innovation and technology development. The main objective of this informal network is to promote the competitiveness of its members through the encouragement of innovation and development of products and processes; the facility of technology transfer; the creation of a forum to identify, analyze and diffuse technologies, techniques and management procedures; the promotion of information and experience exchange in matters of importance and mutual interest; the introduction of an international dimension to these activities. Subsequently, Taguslink will be integrated in an international network, the North-South Innovation

Network, that will include the counterpart networks established in England (The M4 Innovation Network, with 4 years of operation served as the model for the remainders), in Spain and in Italy. In the future, it is predicted its enlargement to networks of other European Union members.

h) Taguspark was involved in LISTART - Lisbon and Tagus Valley Region Technology and Innovation Strategies, through the presence of one of its executive directors in the Steering Committee. This project, supported by RITTS of the program INNOVATION of the European Commission, consisted in an initiative promoted by the CCRLVT (Commission of Coordination of Lisbon and Tagus Valley Region) in cooperation with the ITEC (Technology Institute for the European Community), the Innovation Agency and DGI, with the main objective of formulating, implementing and accompanying a strategy of regional innovation for the Lisbon and Tagus Valley Region, having in mind an accurate adjustment between the offer and demand of technology services and innovation.

V – THE CHALLENGES FOR THE FUTURE

In pursue of its main objectives as a STP, Taguspark has seek to act as an active partner in the universe of institutions that typically compose a National System of Innovation. In fact, through its international connections, as well as, through the implementation of evaluation processes with national and international consultants, Taguspark has identified weak points in its performance that have been corrected and improved, but also, good practice examples that have been disclosed. As it was mention before, it is strategic for the development of the country, to foster the creation of technology-based SMEs. In this way, it was identified some issues that are blocking this process and that should be resolved with some celerity:

1. The fact that entrepreneurs deriving from the business sector do not have at their disposal financial tools that will enable them to dedicate all their time and consequently all their effort in the phase of creation of their own company, is a great barrier to more technology projects overcoming the idea phase and arrive to the market. Typically, venture capital is not available in a very initial phase, since the potential return of investment does not cover the necessary accompaniment of the initiative. And most of the time, the access to bank loans is not easy to entrepreneurs, since it requires guarantees that they usually do not have.

In view of that, it should be created measures, such as, favorable lines of credit or nonrefundable grants that would allow entrepreneurs to fully dedicate their time to the phase of business creation. These incentives could be managed by STP's, business incubators or business associations, that is, institutions that naturally are near the entrepreneur through the support they offer, not having by that any additional cost. Taguspark through the equity participation in some new born companies in the Park, intends this way to try to partially overcome the existing market gap, bringing some visibility and credibility to those projects. Knowing however that only some of the initiatives will have the intended success, but ensuring this way the link to venture capital that will be available for more advanced phases. In the quality of shareholder, Taguspark also can make financial supplies to the company, enabling it to have access to loan conditions that on another circumstance would not be at its reach.

The association with the TRITEC project and with the I-nnovators program from Optimus are examples of attempts to identify tangible market opportunities that can be an encouragement to the appearance of new companies, through an easy way of financing those initiatives and consequently by the reduction of the inherent risk.

2. Another point of concern is the fact that entrepreneurs coming directly from the academic world are in low number, which has a direct influence in the desired increase of the intensity of the scientific level of the business projects presented. The overcoming of this gap passes, in large degree, by the alteration of the educational career statute of

universities where the progression in the career should not depend only on the research and on the respective scientific publication. In fact, it is crucial the existence of incentives that lead to technology transfer from the knowledge centers to the society. Consecutively, if the know-how generated in the university arrives to the market, the investigator, as well as, the university can benefit from it, through intellectual protection mechanisms. This can happen by patent submission or by the creation of new companies through spin-off processes. In the bottom line, this approach of universities and R&D centers to companies, can be a very interesting form of auto financing. At this level there are several lines of action that can be exploited:

a) Taguspark, in the scope of its project "Support the Creation and Development of Technology-Based Companies in a Favorable Environment", is concerned in developing methodologies that will allow to detect technologies with business potential, inside universities. This way, the objective is to try to identify departments or research groups that show a more open profile to the commercialization of their research, whether through the constitution of new companies, or through the licensing of their intellectual property. Then, support those initiatives in order to obtain some successful examples that can foster others cases, by demonstration;

b) Another complementary form is the promotion of entrepreneurship among bachelor, master or doctoral degree students. This can be done through the awareness of the academic world to this important issue and then using its professors as an active form of passing the message to students and investigators with the objective of developing a true culture of entrepreneurship. In a first phase, the approach should be done to some specific professors with the adequate profile so they can introduce the entrepreneurship theme in their lecturing programs, which can pass for example, by the elaboration of a business plan in the scope of a final project;

c) With the objective of approaching academic and business worlds, Taguspark is going to throw jointly with IST, the day of the opened company to the student. During that day, all tenant companies will open their doors to the students of IST that want to visit them, as a way of students getting to know the companies and vice versa, facilitating the launching of trainee programs or eventually hiring processes;

d) Another measure to exploit, consist in identifying jointly with the companies of the Park, R&D projects that for lack of means are suspended and take them to the university so they can be developed in the scope of a class or a final project.

3. Taking into consideration that a National Innovation System (NIS) is centered in companies, the promoting a culture of entrepreneurship becomes the key for its successful implementation. However, entrepreneurship is not only linked to the creation of companies. In fact, in a broader concept within society, it can appear associated with the spirit of initiative and civil responsibility, driving to the notion of civic entrepreneurship. In the bottom line, civic entrepreneurship is the essential ingredient for the existence of the so necessary social capital needed for the development of the educational society to where we moving.

Like so, to stimulate and develop a NIS that has entrepreneurship as its nuclear attribute, the promotion of entrepreneurship has to be done at a national scale. The objective is to foster the appearance of the demand side, so the NIS does not stay only defined and characterized by the offer side. To make the promotion at a national scale is to create a national goal that allows to surpass the natural resistance to change and that conducts to the manifestation of a new culture focused on entrepreneurship. Taguspark has been defending the launching of a national campaign on entrepreneurship, which for its success has to have a mandatory effort of coordination among all entities of the NIS, since the target is very diverse.

This campaign should not have as a direct objective the promotion of a specific entity but the entire system as a whole. Neither should have only as an objective the promotion of

the creation of new innovative companies but the civic entrepreneurship as a broad concept. The communication to the Portuguese society, having to reach a wide audience, has to be clear, consistent and extend the image of the innovative entrepreneur in order to include areas like the civil responsibility and the own initiative. To the public in general, the emphasis should be on the promotion of entrepreneurship as the key of a responsible citizenship, in that the own initiative is within the reach of everybody. To public institutes and governmental organizations the approach should be in the promotion of its contribution for the creation of jobs and social welfare. As to the students, the promotion of entrepreneurship should highlight the increase of opportunities and benefits for their life styles, as well as, the enrichment of their professional career. For the companies, the promotion of entrepreneurship should highlight the benefits that can come from the existence of exit options for their employees, as a way of freshening their intermediary job positions without increasing its number. For universities and R&D institutions the promotion should be centered on the benefits that can arise to society by the technology transfer to the market.

Having in mind that some of the measures mentioned imply deep changes in society, that their implementation is not immediate and that the results will only be visible on a medium/long term, it becomes fundamental for the development of the Country, a national innovation system functioning in articulation, coordinating efforts to achieve common goals and in which each element knows its role and knows well the other elements of the system.

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