

Roadmap for forming Science Parks around excellent Research Infrastructures

D 4.2.2

IFIN-HH - coordinator of Action 4.2

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1. Introduction

In its over 70 years of evolution of the science and technology park concept a lot of information become available in books and articles [1, 2, 3, 4, 5, 7, 9, 10, 12, 13], in ideas and experience presented in thousand dedicated events on all aspects of an STP life. The challenge was not to provide an exhaustive information of the most important aspects but to succeed to focus on the most important issues useful in the launch or improvement of STPs activities.

Roadmap for forming Science Parks around excellent RIs was elaborated on the basis of the international trends and worldwide experience and contacts with decision makers in all the fields of interest for a science and technology parks from the first steps in a STP implementation to the needs of startups founders, banks and venture capitalists. A special attention was payed to the features of the business ecoenvironment development in the Danube Region and the contribution of the project partner countries described in their national reports.

The roadmap was developed based on the day to day experience of people responsible for launching and managing science and technology parks in a Danube Region country but also on the recognized authority of the International Association of Science Parks with a good knowledge of the success or failure factors in whole world.

The roadmap provides a guideline for setting up science and technology parks taking into account the best practices developed in the Region as well as useful information on the different approaches and results including their support programs to improve their capacity to provide useful knowledge, services and instruments.

2. Scope of the project

RI2Integrate project appeared as a need resulting from the unequal development and diversity of the approaches in embeddedness of research infrastructures in the economic activities and in setting up research infrastructure's related business ecosystems in the Danube Region.

Therefore the main objective is to exploit the economic potential available in the region and to better integrate the operation of the EU's excellent R&D infrastructures investment projects through devising and implementing innovative tools for policy learning on macro-regional embeddedness in the Danube Region.

One of the final main results of the project will be an improved transfer of the scientific results into the Danube Region's economy, starting from the large variety of the countries' needs by developing or improving the business ecosystems around new or already operational research infrastructures, i.e. science and technology parks (STP).

Among the three main deliverables developed during the RI2Integrate project, the roadmap for forming science parks around excellent RIs is a tool aimed at facilitating and accelerating the development of business eco environment science and technology parks. These STPs are expected to provide facilities and services capable to produce long time impact effects by improving the involvement and participation of the knowledge providers in activities with an economic impact. They will facilitate the collaboration of innovative SMEs, entrepreneurs and young people with project ideas with experienced researchers aiming at taking over ideas and research results for developing together new products, technologies and services which can reach the market via startups or technology transfers.

The development of successful science and technology parks (STP) worldwide proved that this is a complex entrepreneurial venture and its maturity can be reached, on an average, most probably in 10 to 12 years.

3. Science parks, technology parks, business incubators, science and technology parks

Numerous entities provide useful services for facilitating transformation of new business ideas into marketable goods. Starting from their specific vision and mission, names such as technology park, research park, technopole, etc. are used at international level. The International Association of Science Parks (IASP) covers all the science parks, technology parks, business incubators, science and technology parks under the generic name of science and technology park and provided a definition used by all its members and not only. The diversity of names also becomes evident in the science and technology parks in the Danube Region. The name of the science and technology park used as a label gives a first impression about its vision, mission and services. For instance if the word “technology” misses, a certain reluctance of the potential user interested in technology services may appear.

4. Science and technology parks mean business

Building the capacity to provide useful services for clients is the main goal for a science and technology park. It needs professional scientific, technological and management capabilities as well as adequate facilities to provide training opportunities and support for collaboration for all kinds of needs of the interested stakeholders.

An idea underlined by many successful STP managers and decision makers was that a potential strategy to become a high-quality STP is to use networking for accessing the best practice, the best available capabilities and skills. Networking is essential for the development and operation of every STP.

The access to long-term funding is crucial. A network can provide plenty of services and support but “there is no such thing as a free lunch”. In order to reap the potential benefits of any network, funding schemes are a necessary prerequisite, and successfully reaching the market, their final goal.

Numerous initiatives for STPs originate from the academic environment. The knowledge providers are interested in changing their ideas and know-how in products, technologies and

services so as to become marketable. In most of the cases, the practical knowledge on market and business is not easy to be found in these institutions. Therefore a strong collaboration with the business environment is essential. In such a collaboration, the two mentalities meet each other but their dominance remains almost unchanged, with the academic mindset looking for recognition of their merits by publishing articles in prestigious scientific reviews while the business mentality looks for a successful sale of their goods and for money.

According to experienced entrepreneurs and business people, the motivation to reach the market is not the same for scientists and business entrepreneurs, not only because of their basic lack of pragmatical knowledge but also because of the time perception of the two actors. Time is always short for scientists aiming to present an important scientific article for publication, but when they need to choose the little available time between science or market priorities, it seems that science always wins. For business people, there is no doubt that the market shall always be a priority because the knowledge content of the innovative products has, most likely, already been implemented, and if changes are required, they are approached in strong connection with the market needs.

Some SME managers are not convinced that a science park without a strong business orientation can be managed by scientists, as they consider that such a venture cannot provide the support they need.

When asked about their collaboration with the academic environment, successful leaders of startups and technology parks participating in a JRC event in Ljubljana (Startups and Technology Transfer in Innovation Ecosystems in South-East Europe and the Alpin Region, 15-16 November) do not hesitate to express their reluctance on admitting the researchers' contribution to the development of their activities.

The Technology Readiness Levels (TRL), which describe the development degree of the research results on the way to application, illustrate the existence of the so-called Death Valley that shapes the collaboration and the direct interest and responsibilities for TRL 4-6. These levels represent the stages where knowledge providers and business people show a lack of interest, the risk is high and the investing schemes are difficult to find. Science and technology parks can cover this gap by providing innovative services and adequately skilled personnel for meeting the needs of the interested entrepreneurs.

By supporting the development of startups with a wide range of services, science and technology parks do not take over ideas and research results in order to change them into marketable products, technologies and services but they look for people and teams with project ideas and offer them the necessary training to build capabilities and change their own innovative ideas into salable merchandise.

This is in fact another environment, not limited to either the academic or the business world, which ensures the implementation of the whole cycle from idea to the market. Under these conditions, who should understand better STP needs and organize support for startups as the main product of science and technology parks ? A professor or a business man? A central or a local public administrator? A venture capitalist or an entrepreneur? Each one has a major role, like a link in a chain. There is no recipe for who should lead this process in a science and technology park. It is clear that there are numerous capabilities and qualities that should be required from a person for leading and managing an STP: open-mindedness, managerial and entrepreneurial capabilities and skills, clear mind to develop a daring vision and an inspiring mission, hard-working capacity, an understanding of the needs and features of the academic and business environment, capacity to envisage the risks before they appear, to change the needs into measures and to implement them, communication skills and long-term commitment.

Technology transfer is common in startup activities, ranging from selling itself or being acquired by a larger firm to selling its successful businesses or services. **Science and Technology Parks are usually not technology transfer actors themselves as probably are most of their tenants. As technology transfer and Intellectual Property Rights protection may become essential for tenants business training and consultancy services on these issues have to be organized and provided (see Macro regional guideline for RI embeddedness)**

5. Towards a Danube Region network of STPs

RI2Integrate a useful project in the Thematic Pole 1 - Innovative ecosystem for SMEs of the Innovative and socially responsible Danube region of The Danube Region Strategy

The roadmap tool of the “Embeddedness of high quality research infrastructure in the Danube Region” project – RI2Integrate responds to both specific objectives of the Priority 1 of the Danube Region Strategy. An acceleration of the Science and Technology Parks development in the region by implementation of the guidelines and taking over the best practice recommended and the Action Plan:

- ❖ will improve the framework conditions for innovation so that more startups and new jobs will be created;

- ❖ will lead to a more high level professional assistance by the training of high skilled personnel and a wider offer of better quality services and increase the competences available in business and social innovation;
- ❖ will prepare and extend transnational networking of the business ecosystems by using regional, national and European future support programs
- ❖ will foster technology development and innovation.

The Danube Region has a whole range of business ecosystems, from the most developed ones to those in the initial stages or just planned. Development critically depends on education, creativity, original ideas, entrepreneurial skills, innovation capabilities and skills, dedicated support programs and professional management.

The innovation process in the Danube Region has all levels of innovation performance: one innovation leader (DE) out of 5 in Europe, 2 strong innovators (AT and SI) out of 6, 4 moderate innovators (CZ, HR, HU, and SK) out of 14 and 4 modest innovators (BG RO in EU and MD and UA outside EU).

There is a considerable volume of best practices available in the Danube Region and a strong need for a rapid development of successful science and technology parks. The use of the existing best practice can be an advantage and therefore the development of a strong regional network and support scheme is the way to bridge the economic and technological gap in the area, by developing modern STPs in all countries of the Danube Region.

6. Systematization of the national reports on science and technology parks

The development of a science and technology park depends on many factors such as, for instance: a clear vision, a well defined mission based on actual and future needs, capacity to respond to a complex approach and ensure financial and human efforts required for its long term development, ability to get strong support and timely decision making at local, national and regional level linked to space planning, funding and human resources.

An important step in designing the new tools to accelerate macro-regional embeddedness of RI in the Danube Region was a clear view on the different territorial needs and challenges illustrated in state of the art development framework conditions of RI utilization and the existing instruments and their implementation results.

In drafting the roadmap, an important and useful output was provided by the information resulting from systematization of research infrastructures related science park initiatives in the project partner countries [8].

Two templates have been developed for collecting this information on the state of the art of RI related business eco-environment:

- **data on RI related science parks initiatives** which provided information on founders, owners, operators, type of park, location of venues, status - operational, under construction, planned-, type of identity - legal status, etc.-, provided services, main statistical data, vision, mission, focus, goals and objectives, target groups, criteria of functioning and acceptance, incentives, support for innovation ecosystem and smart specialization, impact, financing and conclusions and useful suggestions for the future roadmap for establishing Science Parks around excellent RIs.

- **country report on developing science parks around excellence RIs** (expected to provide a general overview of the state of the art at national level, with trends and needs for a future development).

According to the national reports and information provided by the project partners from Austria, Czech Republic, Croatia, Hungary, Romania, Serbia and Slovenia, a useful image of the state of the art of the business eco-environment in these countries resulted.

The analysis of the 65 Science and Technology Parks (STP) presented in the project partners reports have led to the following general view:

- a. the 65 STPs operate in 87 locations, use a total surface of over 34 hectares, have 986 tenants, have created 520 startups and almost 1700 new jobs;
- b. 59 STPs are operational, 1 is under construction and 5 are planned;
- c. 32 are proper STPs, 12 are technological parks and 9 are science parks;
- d. 41 are private entities, 8 are public entities, 5 are partnership associations and 5 are non-profit organizations.

Some useful information and conclusions are as follows:

- Universities, national agencies, municipalities, private firms are usually **founders and owners**;
- An efficient management needs a short decision chain and independence in operation which had led, in most cases, to dedicated **private operators**;
- **Vision of STPs** - a great diversity, mostly responding to limited local needs; an ambitious vision can lead to major developments and creates an internationally recognized environment, attractive for high-tech companies;

- **Missions of STPs** - are one of the basic management features and their fulfillment has to be judged together with their measurable outputs; often a general formulation of the mission is accompanied by a thin range of results which leads to a limited impact;
- **Services provided by STPs** - there is a wide range of services; a careful analysis of these services could be of interest for all those STPs which seek to take over the existing best practices available in the Danube Region;
- **Focus of activities in science and technology parks** - STPs' first attempt in deciding their focus is to concentrate efforts on certain fields for which there is a strong interest of the stakeholders; another approach is to provide skills and experience to support new promising project ideas: innovative firms, startup best practice, students, researchers with business ideas and commercialization potential, technological innovations, fast growing companies, mentoring, IPR, new product development, creation of services and new business models, development, prototype and testing of new product and process innovations, a mechanism for the advancement of existing technologically innovative enterprises, investment management and technology transfer support, etc;
- **Goals and objectives** are either general (ex. Implementation of support programs and services for startups) or ambitious (well defined, future oriented goals and targets) or amorphous (with goals strengthening certain features without clearly dealing either with business eco-environment or with research and innovation);
- **Target groups:** high level professionals, academic staff or graduate students, innovative individuals, wannabe entrepreneurs, self-employed persons and founders of companies, beginners and entrepreneurs with project ideas, creative individuals and inventors with entrepreneurial ideas are always welcome in a STP. R&D &I teams with project or business ideas have the best chances to enter into collaboration agreements.
- **Establishing STPs' criteria in operation and acceptance is a crucial decision which will shape evolution, ambitions, attractiveness and success chances** (innovative positive effects, high quality business plan, only startups with innovation potential; only startup entrepreneurs, only entrepreneurial SMEs; R&D with the capacity to create a perfect product or service, profile, innovation, potential export and job creation, open access to research infrastructure; certain fields of activity as for instance biology, medicine, market and job creation potential, etc.);
- **Incentives: awards, acknowledgments for their clients, for the recognition of STPs services and results quality, international awards granted to STPs etc.** (access to high quality services and skilled people, best entrepreneurial support institution award, as for instance the Network Business Award – the highest award of the global Microsoft Innovation Centers network for excellent startup programs);

- **Support for innovation ecosystems and smart specialization:** main contributions to the development of innovation ecosystems are: support for spin-offs and startups; innovation oriented partnerships; a more favorable system for innovation development oriented to startups; strengthening of regional entrepreneurship ecosystem; involvement in co-creation innovation strategies, national programs and best practice; generation of projects;
- **Impact** - can be measurable as it reflects its utility and level of success: number of startups, new jobs, tenants, employees on their premises, the availability and access to high- tech infrastructures and experienced staff, quality of its services, number and quality of training courses, capability to attract young people and entrepreneurs, possibilities to demonstrate best practice and support in its takeover activities, quality of advice, networking and events, are among the most useful tools in facilitating their work, jobs, knowledge and RDI investments, reverse brain drain, sustainability, entrepreneurial training, commercialization, spreading of best practices including in management;
- **Financing:** The funding sources are diverse and a realistic and successful approach could be to ensure a multiple source of funding and a budget for overcoming difficult periods in business. These could be:
 - a) own funds (rental of office spaces, access fees, services contracts, etc.)
 - b) institutional funding, national projects, other public funds
 - c) municipalities funding
 - d) European projects (structural funds, ERDF, Horizon2020, etc.)
 - e) loans (especially for infrastructure)
 - f) sponsorship, donationsAn example of balanced financing from Slovenia:
 - municipalities – 36.71%,
 - international projects – 56.46%,
 - Slovene Enterprise Fund – 4.73%,
 - sponsorship and donations – 2.12%

7. The main conclusions resulted from the project partners information on RI related science and technology parks

- A. *Networking is essential:*** improve social knowledge on STPs importance, create functional collaboration links among organizations, provide infrastructural support

for the development of innovation, managerial and technological entrepreneurship issues leading to startups, support training for experts, mentors and advisers;

B. Ensure wholesome and consistent support for:

- **startups and developing companies**, strong regional orientation in terms of boosting regional development;
- **set-up and functioning of well-established STPs** with a significant economic impact;
- **strong partnerships with knowledge institutions and key players** in national innovation ecosystems;
- **a strong focus on people** with professional experience and practical skills who have common aspirations and are led by a dedicated leader;
- **provision of a wide range of high quality tailor made services** for startups and developing companies with strong local and regional orientation capable to contribute to boosting regional development;

8. Additional outputs: opinions and recommendations from startup managers, decision makers in startup ecosystems, project leaders

Many useful opinions and recommendations on science and technology parks development resulted from presentations made by startup managers, decision makers in startup ecosystems, project leaders, local and national administration representatives, banks, venture capitalists and international organizations in meetings and discussions [6, 7, 13].

a) Startups and Technology Transfer in Innovation Ecosystems in South-East Europe and the Alpine Region – Ljubljana, 15-16 November 2018

Additional inputs to this information were received on the occasion of the participation in the “*Startups and Technology Transfer in Innovation Ecosystems in South-East Europe and the Alpine Region*” organized in Ljubljana (Slovenia) during 15-16 November 2018, where, among others, important issues such as *Trends in the development of startup ecosystems, startup ecosystems as a value adding tool for regional and national economies, How to build a successful startup community, Supporting startups: value adding services and programs, How to attract industrial customers, Successful spin-out stories or The power of networks* were presented by startup and science and technology parks managers, decision makers, discussed and illustrated with real convincing examples by directly involved people.

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Among the lessons learned from the presentations and discussions, mentions should be made about the strong need to bring somehow the knowledge providers closer to the motors of the business world. None of the unicorn startup representatives attending the meeting were researchers or university professors. It seems that a central role for knowledge providers in a science and technology park management needs to be carefully considered as their specific business capabilities and skills are critical for the management of the STPs. STP knowledge providers, once immersed in the business eco environment have to keep in mind that the time and the money have different values and approaches, the permanent search for business opportunities is a must and that means either a quick adaptation or going back to the a more academic environment.

b) Experienced operational science and technology parks

Another source of information was the visits and discussions at the Ljubljana Technology Park and the Business Incubator “Venture Factory” of the University of Maribor, where the most impressive aspect was the diversity of the services offer, the capacity to respond to any need of the clients, the high quality of the people and management as well as the wide range of subjects for training activities.

Among the suggestions and the best practices presented some may be useful for the the operational STPs but also for the new ones:

- a. pay attention to the revenues sources which can result from the organization of events, consultancy, mentorship, customer needs tailored training for the main target groups, potential initiators of startups;
- b. setting up “mentors pools” with managers, investors, successful entrepreneurs, other people with capabilities useful for consultancy and training;
- c. decide if the aims of the STPs are better served by very restrictive criteria or only by a few general ones without limitation to field of activity; “no restrictions except passion, work, results”;
- d. o events in all big towns in the area which could bring public and private clients;
- e. develop an ambitious but realistic program including among others organization of training courses on management, entrepreneurial skills and business acceleration;
- f. funding is made on realized activities not on fixed salaries;
- g. earning money is the firs attraction for entrepreneurs and it is important to be aware that earning money is not something bad.

Consider a widely general advice: do not forget to act from the first day based on the slogan “**science and technology parks mean business**” (only 9 of the 65 STPs use the Science Park term in their official name; SMEs representatives consider the science park

name rather a new form of research institution than an entity capable to respond to their needs to develop innovative entrepreneurial ventures).

c) Discussions on the Roadmap and its implementation in the Magurele Science Park pilot has led to a wide range of recommendations focused on:

- **general approach** and an adequate strategy (science and technology park means business, be where the money is, seize all opportunities available and use those profitable for you, build a motivated team, train yourself in order to become creditworthy and maintain your professional image, always choose the best, build everything starting from an ambitious vision, look to the future client needs and prepare a good service offer, do not ignore social services, build and maintain a good relation with authorities and research providers and make networking the rule of the house);
- **extensive training** for demanding skills (technicians, marketing, entrepreneurial skills, IPR, etc.);
- **experience built in incubation, post-incubation, spin-offs, startup operation, etc.;**
- **products and services which you can sell on the market you know.**

The experts recommended important approaches for the science parks aiming to improve the practical implementation of the roadmap and especially the approach for a successful development of the Magurele Science Park pilot. Among these guidelines, the following best practices were considered:

- always learn from the best;
- gain good knowledge of the clients' needs;
- borrow the best incubation criteria from the best;
- set up soonest possible post-incubation and start up areas;
- build your own experience in startups to be able to help others;
- pay attention to building a strong networking in the area - the biggest cluster;
- train adequate people to become startup operators;
- train people for most demanded skills: technicians, marketing, entrepreneurial skills, etc.;
- build a good service offer for park tenants, for instance energy delivery contracts, parking places (“if not adequately approached in time it can become a nightmare”), social services, kindergartens, pharmacy, businesses, hotels, etc.;
- seize all available opportunities and use those profitable for you;
- “be where the money is !”;
- build good collaboration relations with local authorities;
- build a motivated team (“nobody gave us money, all the results are owned by the team!”);

- adopt the right approach for an ambitious vision: if you wish success, dare to the highest goals! (if not, leave it to others better prepared);
- choose products and services which you can sell on the market you know;
- develop a good technology transfer proposal that can be presented on a half A4 sheet;
- develop a technology transfer scheme to balance demand and offer; (ex when a cooperation between a big multinational and an university needs to be facilitated), you discuss the idea, the budget and the time!;
- ensure access to very good resources and pay great attention on how to properly manage them;
- pay attention to the research institutes' experience in technology transfer.
- consider collaboration with universities and research institutes starting from their facilities to create spin-offs;
- include the application research premises in the MSP Master plan;
- consider science and technology parks not as an extended research facility but as a place where SMEs' people and researchers could be freely helped to develop applications initially explored in research infrastructures;
- develop Science Parks as very attracting places for SMEs;
- involve SMEs in designing Science Parks in all their development stages, aiming at properly meeting their needs.

All the recommendations were analyzed and taken over in a synthetic form in the final deliverables.

9. Partners' contribution to project activities

A clear description of the research infrastructures business related ecosystem was possible only thanks to the efforts of all project partners who discussed and agreed the templates content that could provide a uniform information on the main data of the existing science and technology parks around their knowledge providers. The collected data were systematized and presented in the project partner's meeting together with the available best practices and conclusions resulted from the data analyses.

A general consent on the main conclusions and recommendations illustrated that:

result based leadership, financial support schemes, professional management and decision making are the keys to success;

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networking at all levels, including the Danube Region, and exchange of best practices are essential

entrepreneurial and access to funding schemes training, providing a wide range of services must be first-rank priorities;

effective partnerships with knowledge institutions and key players in national innovation ecosystems are critical;

highly effective, best practices need to be developed in a strong entrepreneurial culture; always keeping in mind that science and technology parks mean business.

A mapping template on stakeholders' needs with regard to STPs was drafted and filled in by the existing pilots (N.B. – the number of pilots changed during the project implementation from originally 3 established in AF to 2 and then again to 3 in 2018 and in 2019 become 4). Now the 4 pilots represent one running Business Incubator from Slovenia , one planned science park under implementation in Romania and two science and technology parks in initial stages in Hungary and Croatia.

An Action Plan template for a science park concept implementation was drafted and filled in by the STP pilots in Romania and Slovenia and is still under implementation by the pilots from Hungary and Croatia.

Due to the complexity of the deliverables connected to Science parks, the partners with planned or initial STPs chose to contract external expertise for some or all of their contributions to their STPs deliverables.

All information available was sent to all partners with STP pilots.

IFIN-HH was represented in 2 Transnational events on PPI and STP roadmap organized by ELI ALPS in November 2018, in Szeged.

Support for participation of project partners in transnational events in Romania is planned and will be delivered most probably next month.

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Embeddedness of high quality research
Infrastructures in the DanubeRegion

WP 4 ACTION WP4.2

Research Infrastructures Integration Tool

Roadmap for Research Infrastructures
related business ecosystem

Developed by TETAROM SA for IFIN HH
(HoriaHulubei National Institute of Physics and Nuclear Engineering)

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Disclaimer: This document has been prepared for the IFIN-HH however it reflects the views and hands-on experiences in managing an STP of the authors, therefore the IFIN-HH cannot be held responsible for any use which may be made of the information contained therein.

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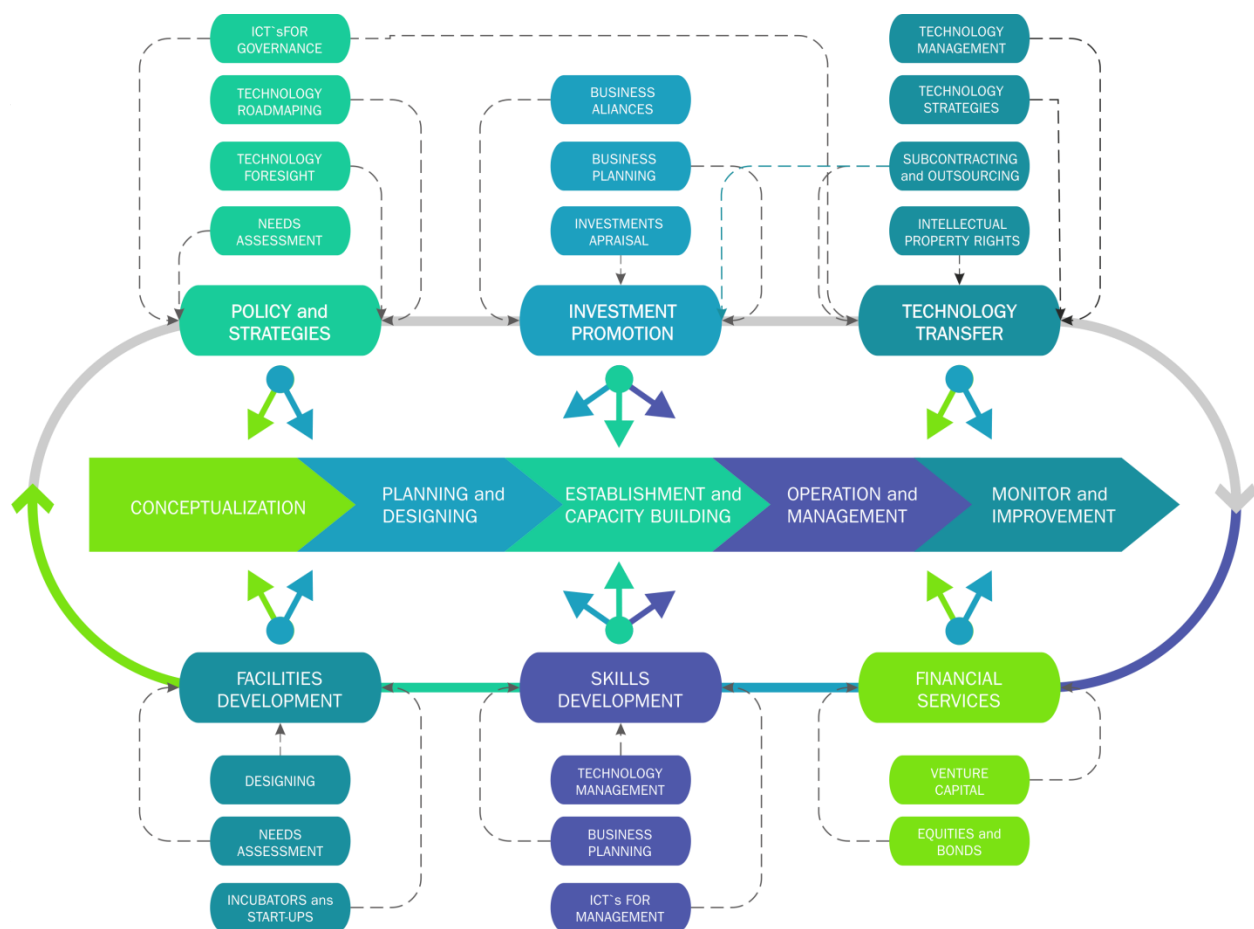
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PREFACE,
SCOPE OF WORK

CHAPTER
ONE

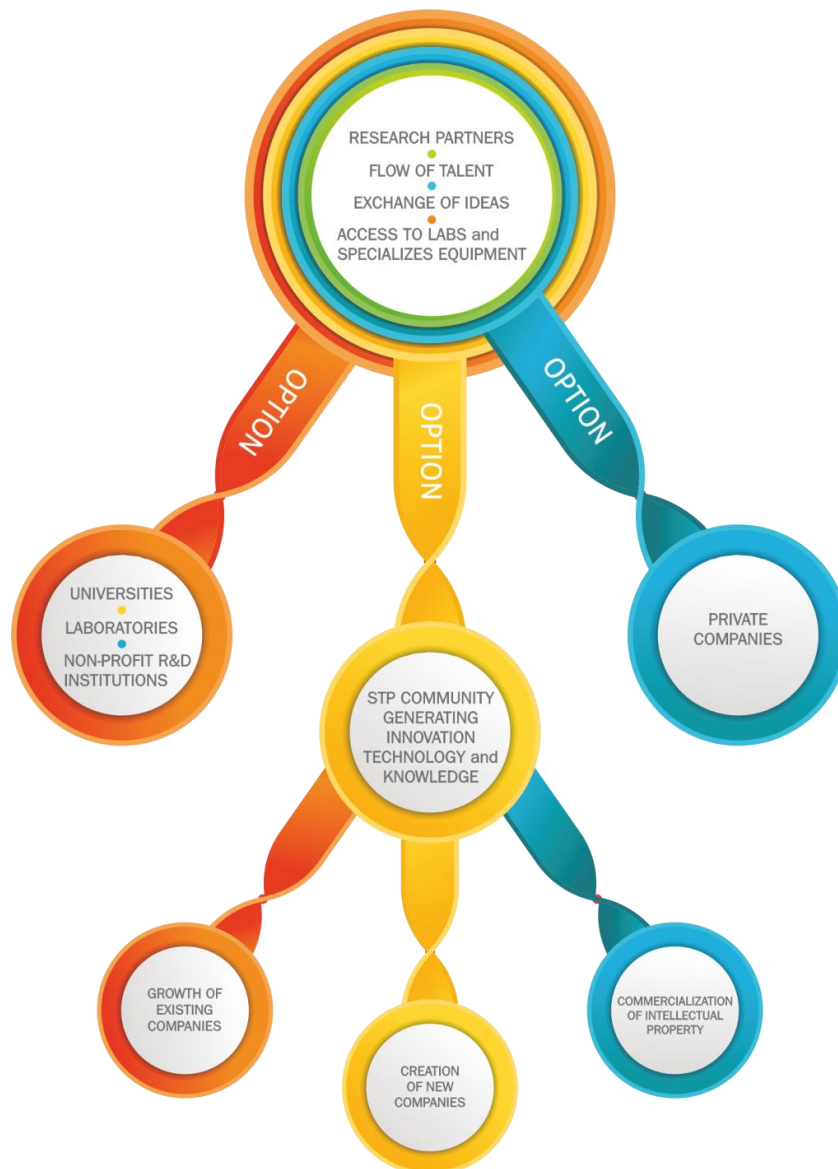
Setting the foundations of a Science and Technology Park, let alone a chain of Science Parks designed to closely work together within a defined region of Europe is a critical step towards the success of this endeavor. Each individual STP within this chain has to be excellent in its resources, its research capabilities, the number of researchers and companies it will attract, and the types of entrepreneurial activity that will be developed in it. Carefully planned locations, strategically placed among various economic centers in the Danube-Region, can turn each individual STP into a large technological hub in which knowledge intensive activities will be nurtured and transformed into innovative market ideas. The expectations for Interreg Danube Transnational Programme are high and its anticipated impact on the regional, national and European research, technology and innovative entrepreneurship environment is considered to be of large scale. That being said, planning and Implementing a Science and Technology Park is a long and complicated process best shown in the relevant IASP STP lifecycle diagram below.



the-art Science and Technology Park in the Danube Region. This model can be easily replicated to serve

the purpose of creating a chain of STP's close proximity of the Region. While the core action of creating a STP are considered to be standard procedure, each individual STP will have to rely on specific assets available in their own development region. Science and Technology Parks (STPs) are developments of real estate (tangible) and human resource (intangible) assets in which land and buildings are used to house public and private R&D facilities, high-tech and science-based companies, support services, intellectual property and venture capital financing.

By providing a location where researchers and companies operate in close proximity, Science Parks create an environment that fosters collaboration and innovation and promotes development transfer,



and commercialization of technology. As shown in Figure 2, ideas flow between the Technology Generators and the companies located in the Park. Furthermore, the innovations, technology, and knowledge generated by the companies and research institutions lead to the creation of new start-up companies, the retention and expansion of existing firms, and the attraction of firms new to the region.

The scope of the current study, assigned by IFIN-HH to TETAROM SA, is to develop the foundation concepts for a ROADMAP and define the next steps for creating a STP in the DANUBE-REGION. TETAROM SA is a member of IASP network (International Association of Science Parks and Areas of Innovation), it currently manages 3 fully operational Industrial Parks in Romania, with 2 more under construction, and manages TETAPOLIS STP located in the city of Cluj-Napoca Romania. Well versed in the business and research environment, particularly in this region of Europe, TETAROM SA has been identified as the most relevant STP management company in Romania for delivering a comprehensive, experienced hands on approach in developing a STP ROADMAP. TETAROM SA designed this ROADMAP in full agreement with IASP best practices for creating a STP and by using the IASP STRATEGIGRAM tool that will help define the individual particularities of each STP developed in the DANUBE-REGION.

Strategigram Tool

We should point out that the **STRATEGIGRAM TOOL** developed by IASP, represent our preferred and recommended tool for strategic profiling of STPs. The IASP Strategigram is a unique software-based tool that enables STP managers to analyze their park's strategy, assess its evolution and compare it to other parks' strategic profiles.

The Strategigram is a service available for all IASP members and is successfully used as a tool to define the most suitable strategic model in the planning of new parks. Using 7 strategic axes, it indicates the position of a STP on each axis based on specific and measurable indicators including governance models, location, target markets and degree of specialization. IASP can also conduct individual customized analysis on request.

The STRATEGIGRAM TOOL is designed to enable science park managers to visualize and analyze their strategic profile, to understand which management decisions may affect that profile, and to compare

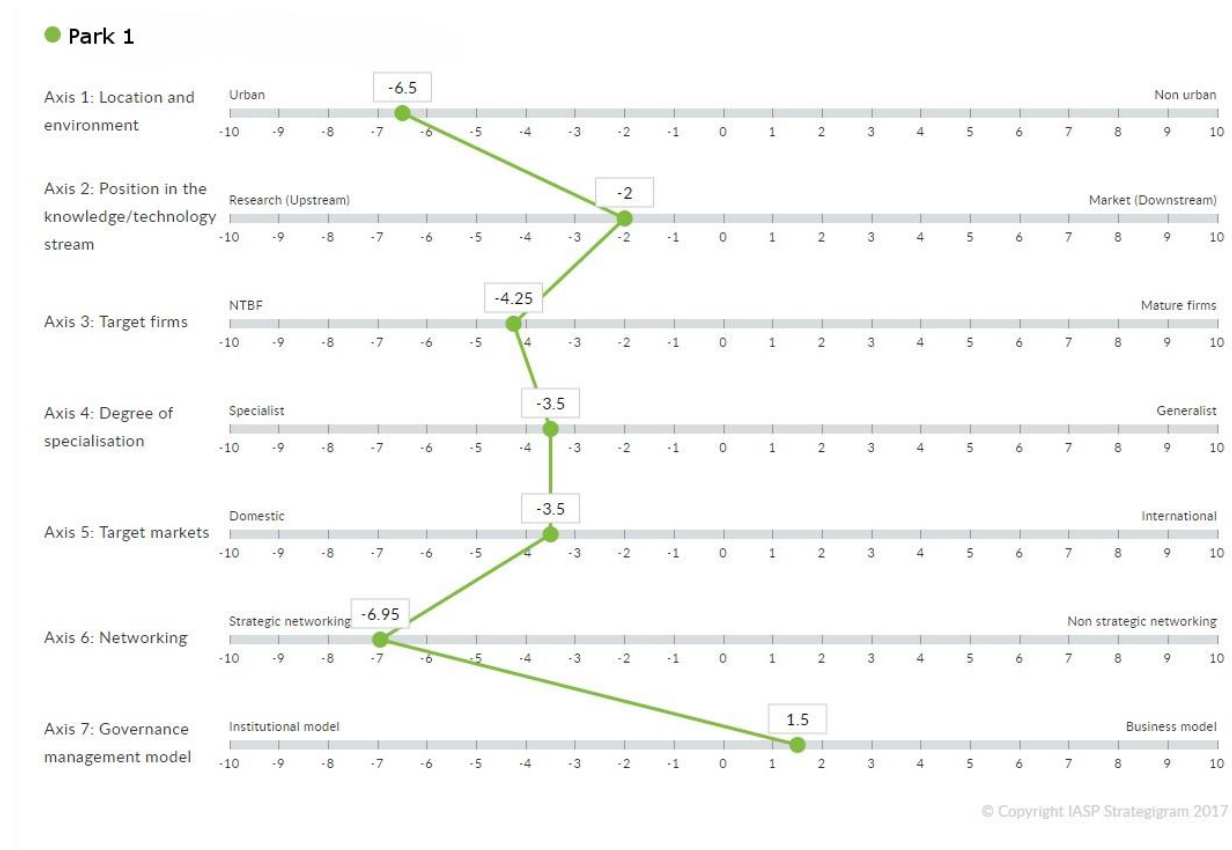
the results with those of other strategic models in use by parks worldwide, thereby allowing managers to improve their international benchmarking capabilities.

The Strategigram is also a powerful tool for new science parks, helping them to outline a strategic model.

Very important: the Strategigram is not a tool to assess the performance of science parks, but rather to discover and analyse the features of a park's model.

How it works

The Strategigram is formed by 7 axes.



There is a set of questions for each axis. The Strategigram software assigns a weight for every answer and determines the position of the park along each axis. The combination of the seven positions will

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configure the strategic profile of the science park. Once the whole questionnaire has been answered, the graphic representation of the strategic profile and explanations about what it means will be available.

There is a total number of seven axes that assess the following:

Axis 1: Location and environment

Axis 2: Position in the knowledge/technology stream

Axis 3: Target firms

Axis 4: Degree of specialization

Axis 5: Target markets

Axis 6: Networking

Axis 7: Governance management model

In our experience this is an invaluable tool that has proven its efficiency and its low or zero cost depending on IASP affiliation status of your STP, therefore we fully recommend the use of this tool.

The planning approach is described schematically in the following diagram:





DESCRIPTION OF
BUILDING BLOCKS
OF STPS, BASED
ON INTERNATIONAL
BEST PRACTICE

CHAPTER TWO

It is important that all parties involved in the Interreg Danube Transnational Programme and who may read this study, share a common understanding about the concept behind expressions such as Science Park, Technology Park, Research Park, and other similar names. The essence of this particular ROADMAP is to create a common denominator in terms of creating a chain of STPs in the DANUBE-REGION. Therefore, we are assigning a great degree of importance towards understanding the building blocks of an STP as a prerequisite for a well-founded ROADMAP.

The advent of the knowledge economy, largely favored by IT based technologies and globalization, and the emergence of a new kind of companies (which are now usually referred to as "knowledge companies") created new needs.

One of these new needs consists in having adequate environments for these companies to grow, locate and increase their competitiveness, as it was becoming clear that the concept of industrial area which have been known until then, and which was quite functional for the industry-based former economy, did no longer respond to these new needs and requirements. In the middle of the twentieth century, a new type of area began to appear in the area of Boston and around Stanford University in the San Francisco area (USA). This new concept that was later to be known as science or technology parks was immediately very successful and from the USA travelled very far, in two or three decades expanding throughout the world.

Based on its thirty years of experience, IASP came up with the following definition of Science/Technology parks:

"A Science Park 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 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".

Notes:

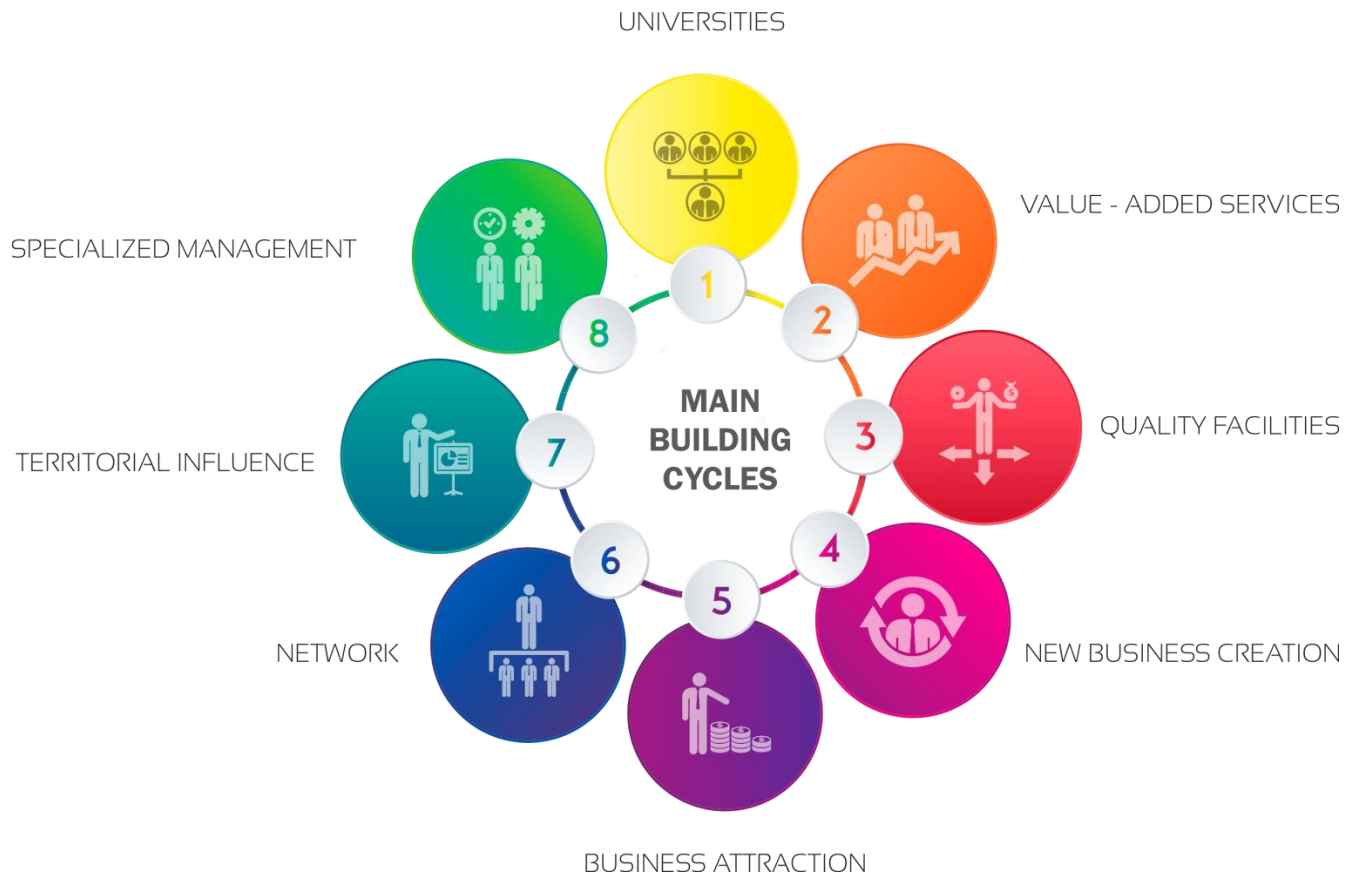
The IASP is a worldwide network. Its definition must embrace the different models which exist all over the world. An effort has, therefore, been made to identify the main common denominators of the different existing models, as well as to set the minimum standards and requirements that any project must have in order to be acknowledged as a “Science Park”.

The IASP has cross-examined and compared the models and experiences of Science / Technology Parks in the 55 countries where its members are located, to ensure the truly global character of its definition.

The IASP definition of “Science Park” encompasses other terms and expressions such as “Technology Park”, “Technopolis”, “Technopole”, “Technology Precinct”, “Research Park” etc. Although there may be certain differences between them, projects under these afore-mentioned labels share many goals, elements and methodology and therefore come under the remit of this definition. The IASP does not preclude the existence of more ‘specific’ definitions for each of these “labels”, but will not recognize any project as a “Science Park”, “Technology Park”, “Technopole”, etc. which does not fit within this ‘broader’ IASP definition.

2.1 Main building blocks

As well as this definition, the following important ideas should be highlighted:



Specialized management.

It should be noted that having a full time specialized management is the first thing that IASP highlights in its definition. STPs are management-intensive projects (as opposed to traditional industrial zones where the management is limited to the initial commercial operations when companies locate in the zone and then collect the rent and take care of standard zone and facility management).

The management of STPs on the other hand implies, besides all the above, the provision of a vast array of value added services, both to new technology based firms created in the park and to already existing companies that choose to locate in the park.



Universities.

STPs have strong connections to universities and research institutes or other high education institutions. The links and connections between STPs and universities can take different forms, but it is regarded as

imperative that such connections exist and they need to be dynamic and fully operational for a project to be regarded as a true STP.



Value-added services

A science park has to provide a number of basic ancillary services to their resident companies just as traditional industrial zones also do (common areas, cleaning and maintenance, parking space, cafeterias and restaurants, etc.). However, these basic services are not what STP's are about. The true trademark of an STP is the provision of a series of value-added services.

These may vary depending on the type of STP — its strategic model — and the type of companies located in the park. Most STPs provide services such as access to labs and research equipment, management consulting, intellectual property advice, international networking, not to mention the various services related to business incubators and spin off mechanisms. As a rule, most of these services are directly linked to startups, as they encompass the base requirements in terms of incubation services provided to startups.



Quality facilities

STPs have higher standards of landscaping, urbanization, infrastructure and buildings than the traditional industrial zones. This is not tantamount to expensive or luxury facilities, but the overall quality of an STP has to be in place.



New business creation

Most STPs have activities, programs and mechanisms to stimulate the creation of new companies. This happens mostly via business incubators, although there may be other traditional mechanisms.



Business attraction

Besides the creation of start-ups and new firms most parks also host already existing companies, ranging from SMEs to big multinationals, although the SMEs account for the larger percentage. SMEs move to

STPs not just for the sake of relocating into a better looking area but mainly because the services and overall environment provided by an STP is important and conducive to increase their competitiveness.



Network

STPs are networks themselves made up by all the companies and institutions located in the park and the links among them all. But at the same time, STPs are nodes of much larger international networks, made up by the hundreds of other STPs in the world. This two-fold networking nature requires a professional approach and management of any STP networking activity.



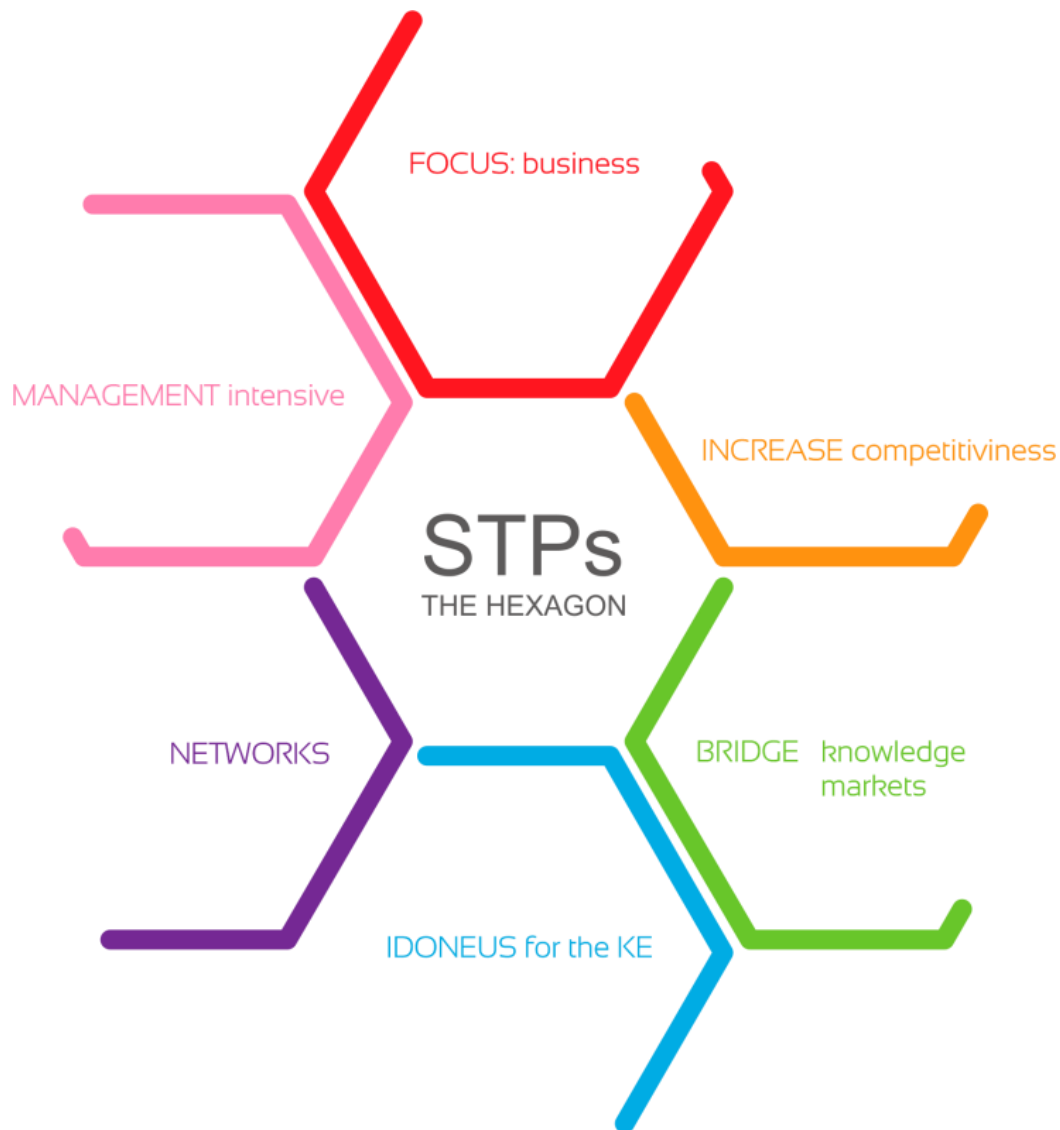
Territorial influence

Successful STPs exert and influence the goals beyond their physical boundaries. In general they spread the culture of innovation and entrepreneurship provided that they have established solid links and cooperation mechanisms with other companies and institutions in their city and region.

From all the above the following basic conclusions can be drawn:

- Despite their names, science and technology parks are neither about science nor about technology, but rather about businesses, companies, start-ups and entrepreneurs. Of course, to support companies, start-ups and entrepreneurs within the frame of the knowledge economy, STPs must secure an efficient access to knowledge and technology, as well as good channels for these technologies and knowledge to reach the market place. In other words, to connect people and institutions that produce knowledge and technology with the people and organizations that consume knowledge and technology, apply it to products and services, and bring it to the market place.
- It is evident that STPs are projects where the three elements of the triple helix (government, university, companies) get together and collaborate to their full potential. STPs are locally rooted projects but with a clear vocation and strong components of internationalization.

Throughout their 70 years of existence, STPs have had a breathtaking evolution: a great variety of models and strategies have been developed and more and more STPs are being created throughout the world. This proves the efficiency and vitality of the STP concept as a powerful tool for the development of the knowledge economy.



STPs: The Hexagon Features

Focus-businesses:

Despite their name (Science/Technology Parks), STPs must be projects focusing on businesses and entrepreneurs, helping them to grow and become competitive. “Businesses” are the core essence of STPs (**SCIENCE IN TITLE / ENTREPRENEURSHIP IN PRACTICE**).

Increase competitiveness:

One of the main indicators (although not the only one) of STPs’ performance is the overall competitiveness of STPs’ tenant companies. STPs must aim at creating successful business communities.

Bridge knowledge-markets:

This role linking academy and industry is at the very origin of STPs. It is an essential feature of the knowledge economy. In countries with traditional universities, it is difficult to cope with the high resistance exerted by traditional academics.

Suitability for the knowledge economy:

STPs all across the world have requisites limiting entry to companies and institutions with strong element of innovation, research and technology.

Networks:

STPs are to be regarded as two-fold networks. As a network in itself, gathering a set of companies and institutions that should find ways to cooperate internally, and as nodes of international networks comprising others STPs and clusters around the world. Networks are essential components of the knowledge economy, requiring a professional approach and management.

Management intensive:

As opposed to conventional industrial areas, STPs require intense and continuous management not only to handle the real state aspects, but most of all to secure the provision of knowledge and value-added services.



STAKEHOLDERS OF THE
PROJECT AND ROLES
- Vision
- ROADMAP Actions

CHAPTER THREE

After ensuring a clear understanding of the FUNDAMENTALS of any STP, in terms of general operation mechanism, as presented thus far, the next area of focus is to define the stakeholders of the project and their roles. Each STP will have a different structure in terms of stakeholders. This variation will be the result of larger set of circumstances related to the region of development, country legislation, current assets, financial instruments, country of residence policy etc.

However, as general guideline for this ROADMAP, we can emphasize the general core structures necessary for operating an STP and their roles. Keep in mind that this set of prerequisites must be expanded and built upon using the IASP's STRATEGIGRAM tool in order to ensure a tailored response to every project that will benefit from this document.

As with every Science and Technology Park, behind its inception, planning, and financing, there is a group of stakeholders, who, as the most important component of a Park, are involved to a greater or lesser extent in its implementation at first, its smooth operation later, and finally it's turning into a profitable business.

3.1 Developer and main stakeholder

The developer of the STP will supply the Park with its building and infrastructure technology, such as infrastructure facilities (water, gas, electricity, roads, telecommunications), general use services (maintenance, security, multi functional spaces) and development support services (innovation, technological transfer, banking, investment consulting, financial, technical and legal assistance). The Developer must also provide a good **science park management company** that has a broad sector experience at public, university, industry and enterprise level, which is the starting point of all healthy STPs. It's now common knowledge that STP clients value industry and business experience as essential for a good collaboration with the STP management, while university partners value the technology transfer abilities of the STP management resulting from a research experience coupled with industry experience.

Experience in the public sector is essential for understanding key elements such as planning, funding sources, general concepts of public accounting, budgeting and value for money. Most EU countries opt for civil servants employees in senior positions, and while high quality public employees can acquire the

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necessary skills over a period of 5-10 years, this choice will have a negative impact on the results achieved by the STP especially considering that the first 5 years represent a difficult period to overcome in the lifespan of an STP. It's highly unlikely that any one individual can harness all the required skills to run an STP, therefore operational management is in most cases a team effort; however most STPs have a dedicated manager in charge of coordinating and facilitating all required tasks and functions.

3.2 University as a knowledge base partner

The key feature that distinguishes a STP from a property development company is an intensive relationship with a knowledge based partner, often represented by one or more universities operating within the same local region as the STP.

A close relationship with the University can benefit the science park in numerous tangible and intangible ways. For instance, science parks can play a role in shaping university curricula and be a focus of enterprise education.

As with every endeavor that puts together two very different actors in terms of primary goals and means of operation, there are often tangible barriers between the academic partner and the science park. The most common denominators include:

- Differences in ambitions and incentives; while academics undertake research in order to progress knowledge and publish results, science parks and their companies are aiming to commercialize and make profits which often require patenting results to ensure exclusivity.
- Differences in timescales; academics are used to work in long cycles, often more than five years and sometimes over a whole life time. Science park companies need to commercialize products and services quickly in order to survive, pay their employees and service loans and equity capital. There is often frustration on either part about the differing expectations and necessities. In order to address any tensions, it will be important continuously provide information about what the park is about, how it can help the university and vice versa what benefits to the park and its companies stem from the close relationship with a high quality research-based organization. The rules governing the use and ownership of intellectual property need to be clearly established. This will be achieved by way of a strong working

relationship between the park management team and those in charge of research commercialization at the associated knowledge base organization. Clarity and overlapping objectives will be essential to achieve satisfactory results for both parties. There should be regular communication between the science park management team and representatives of the knowledge base partner to explore whether linkages are working as effectively as possible.

Stakeholder's general guideline for vision and mission as a defining part of the ROADMAP

VISION

The vision of the Park is to create knowledge – based enterprises that will link local Universities with local, regional and eventually European industries. Consequently, the stakeholders are interested in transforming, in the short run, the STP into an internationally acknowledged technology hub, which will have a leading position in SE Europe in the areas of:

- a. knowledge development and
- b. knowledge-based entrepreneurship

MISSION

To achieve the above, the Stakeholders' mission is:

- to create an environment that will foster innovation, by using all local resources, and by adding remote resources as well to the designated innovation ecosystem
- to decrease the gap between research and business development of the research outcomes
- to nurture synergies between local industries and local companies in general with the research capacity of the region
- to cultivate a fertile ground for the establishment of knowledge intensive firms and research institutes from their countries and abroad
- to support the development of one field of excellence on a European level and at least two others on a regional and a national level

- to contribute to the improvement of the economic profile of the region in which they operate, leaving a positive impact on country's competitiveness
- to create a new knowledge and sustainability culture through innovation for the local community, and more specifically to become a focal-effort on the national level for the development of an innovative youth entrepreneurship.

While other actors, such as private companies, research institutes, government structures, can be involved in the inception process of an STP, it stands clear that the two players described above are fundamental to any STP.

3.3 Further defining the ROADMAP actions FOR PREPARING THE STP PROJECT AND ROADMAP FOR IMPLEMENTATION

A series of further ROADMAP actions are needed to be taken in order to:

- Develop the conducive environment of the STP
- Create the operational, legal, administrative and financial entities and instruments of the STP
- Define the Infrastructure components and their financing

The actions presented as well as the relevant decisions of the STP management will form the platform for the development of the Business Plan of the STP. Mention should be made that these actions are presented as a general guideline for ANY STP in the DANUBE REGION, and that they are subjected to more or less significant changes as a clearer more specific profile for each STP will be made available by using IASPs STRATEGIGRAM TOOL. These actions are:

PROPOSED ACTIONS

ACTION 1	Setting the impact and targets of the STP, and development phases (according to Business Plan)
ACTION 2	Clarifying the STP's ownership and governance
ACTION 3	Establishing the business and financial model of the STP Management Company
ACTION 4	Detailing the activities of the STP Management Company
ACTION 5	Developing a Marketing and Communications Campaign towards National Institutions, International Market and Universities

ACTION 6	Building the value proposition for the potential Research Institutes
ACTION 7	Developing a world / regional / national level competitive package for attracting tenants of all categories to the STP
ACTION 8	Tailoring the projects with financial resources
ACTION 9	Preparation Actions + Studies + Time Scheduling of the STP phases

ACTION ANALYSIS

ACTION 1: Setting the impact and targets of the STP, and development phases (according to the Business Plan).

This is a necessary step in order for the developers and future managers of the STP, to have a common understanding of the STP's impact on the country's economy in qualitative and quantitative terms where possible.

The experience of our own TETAPOLIS STP as well as independent impact assessments have shown that Parks contribute to the economic development (nationally and/or regionally, depending on their size), to the innovation process, to jobs creation and internationalization of their region.

The qualitative impact refers to:

- A. Establishing links among Universities and advancing both sides efforts (STP management and University) towards Commercialization and Competitiveness/ Innovation.
- B. Develop innovation culture at regional and national scale.
- C. Generate new companies, new jobs of high added value and in knowledge based sectors.
- D. Serve as technology transfer mechanisms both internally in the country and from other countries to the country of location.
- E. Serve as government instruments for deploying innovation and entrepreneurship policies and programs.

Several times however, it is necessary for science Park Managers and developers to provide to decision makers and politicians more concrete data on the impact of Science and Technology Parks on major development indicators.

There are two studies aggregating impacts of Science parks on creation of enterprises, jobs and turnover: The Association of Spanish Technology Parks (APTE) study (2006) “Study on the Social and Economic Impact of Spanish Science and Technology Parks” summarizing the impacts of 22 STPs and the US Association of University Research Parks AURP, (the US Association of STPs) 2007 study on “the characteristics and trends in North American Research Parks, summarizing the impacts of 134 University research Parks in the US.

Based on the finding of these two aggregate studies, which relate the size of the STP with the impact on employment and business creation, an extrapolation exercise was done in order to obtain an estimate for the expected outputs of any STP to be developed in the DANUBE-REGION.

APTE study impacts 22 STPs:

Total area (sqm)	Built area (sqm)	No. of firms	Turnover bln €	No. of workers
10.500.000	4.200.000	2010	7.5	51.500

Firms / sqkm of built area = 480 firms

Jobs / sqkm of built area = 12,150 jobs

Turnover / sqkm of built area = 1.78 bln

AURP study Impacts 134 Universities:

Total area (sqm)	Built area (sqm)	No. of firms	No. of workers
188.000.000	30.500.500	4.380	300.000

In addition, AURP states that 2.57 jobs are created in the economy from every job created at the Park due to spillover effects. Therefore, as we saw from the two study analyses above, the creation of an STP has also tangible results that have impact on the local and country’s economy as a whole.

3.4 The targets of the STP could be summarized as follows:

ACTION 1: SETTING THE TARGETS OF THE STP – (BASED ON BUSINESS PLAN TO BE DEVELOPED)

Indicative targets:	B. Impact on employment Creating up to (???) knowledge based, high quality jobs within (???) years from inauguration
	C. Impact on GDP <ul style="list-style-type: none">- Creating a turnover of up to (???) by knowledge based companies created in region or attracted to region.- Creating a sustainable pipeline of (???) new companies per year through its incubator system.
	D. Impact on Innovation / Competitiveness / Technology <ul style="list-style-type: none">- Advancing the Regional Universities / Business Community business links. –- Creating endogenous technological know-how and deepening country specialization

ACTION 2: Clarifying the ownership, governance and the operational issues of the STP development.

This Action is aiming at clarifying the ownership, governance and the operational issues of the STP development, launching and management and gradually at broadening the group of institutions and individuals that will work for that scope, due to its highly demanding and complex nature.

ACTION 3: Establishing the business and financial model of the STP Management Company.

This Action is aiming at establishing the business and financial model of the STP Management Company, based on the outcome of the previous actions, as well as, on details of the financial model of its operation, proposed by the advisors, according to international best practice. It is also aiming at clarifying the ownership and the consecutive investment resourcing and planning for the various components of the STP. The Business Plan and Financial Plan of the Management Company will be based partially on those concepts.

ACTION 4: Detailing the activities of the STP Management Company.

This Action is aiming at detailing the activities of the most crucial, according to all IASP reports, the Management Company of the STP. The detailing of the activities, together with the ownership model and financial model will form the basis of its Business Plan, staffing and finances

ACTION 5: Developing a Marketing and Communications Campaign.

This Action is aiming at developing a Marketing and Communications Campaign towards National Institutions, International Market and Universities. This is an important action, because it will address some of the STP's vital needs, which are the financing (by the National Institutions), the attraction of investments (through the International Market) and the development of a constant pipeline of start-ups (through the Universities).

ACTION 6: Building the value proposition for the potential Research Institutes.

This Action is aiming at starting building the value proposition for the potential Research Institutes that could be planned and established by the Universities, in the STP. Being one of the most competitive / attraction component of the STP, it is necessary to clarify soon the scope, the specialization, the focus, the mode of operation, the partnerships and, finally, the model of the Institutes development.

The value proposition will act as a set of determining offers that will make the STP attractive to Research Institutes

There is a strong competition globally among STPs on the attraction of R&D players (International Research Institutes, top Universities, Company R&D labs etc.) This competition is mainly based on funding offered (in addition to general tenants' incentives for regular STP tenants). Funding in these cases usually comes in form of subsidies for the capital investment of institutes.

Funding may go up to 80% in the first years of operation gradually declining to lower portions of annual costs of maturity stage. Such benefits are granted in Europe, US, Asia and recently in the Gulf thus, competition to attract global players is strong.

On the other hand, a 100% fully government backed activity based on national only efforts and resources cannot guarantee the growth of a new R&D Institute / Center of Excellence into an international player.

Government funding is inevitable for such an endeavor. The proper mix of partnership and the concrete Business Plan is a prerequisite for the value added impact of government investment.

The decision needed for this part of the STP concerns the **ACTION 6**

ACTION 6
BUILDING THE VALUE PROPOSITION FOR THE RESEARCH INSTITUTES / CENTERS OF EXCELLENCE BY UNIVERSITIES

The value proposition should analyze:

- R&D needs of the referent sectors in the country / Region / Internationally
- The companies outside and potential tenants within the STP that could be served
- The technology and market focus, the type of services offered
- The infrastructure, R&D equipment, scientists profile, that will resource the institutes
- The Governance/ ownership/management attractive for each institute (health might be totally different from energy/more public the first-more private the second, the same holds for the Agriculture and water and environment institutes)
- The financial model of operation, the incentives for partnerships with private R&D organizations, the feasibility study
- The business planning, the Infrastructure design, the equipment procurement plan, the staffing plan , the partnership arrangements
- The financial commitments in each case
- The time scheduling of development

Therefore, more specifically, the value proposition for the future Research Institutes and the Centers of Excellence of the STP should analyze:

- the R&D needs of the relevant sectors nationally, regionally and internationally;
- the companies outside and the potential tenants within the STP that could be benefited from the provisions of the Park;

- the technology, the market focus and the type of services that can be offered;
- the infrastructure, the R&D equipment and the scientists profile that will resource the Institutes;
- the Governance, ownership and management that suits better each Institute;
- the financial model of operation, the incentives for partnerships with R&D organizations and the feasibility study;
- the business planning, the Infrastructure design, the equipment procurement plan and the staffing plan, as well as the partnership arrangements;
- the financial commitments in each of the above cases and the time scheduling of development.

ACTION 7: Developing a world / regional / national level competitive package for attracting tenants of all categories to the STP.

This Action is aiming to develop a world / regional / national level competitive package for attracting tenants of all categories to the STP. These are summarized in six main groups:

1. Researchers, University Graduates, International Start-ups and International Incubators;
2. Local Universities and Research Institutes;
3. Medium-size technology-based international companies;
4. Medium-size local /regional companies with intensive knowledge-based activities;
5. Government Institutes promoting development and entrepreneurship (like ministries and organizations);
6. International big technology-based companies.
7. Venture Capital as an internal service provided to tenants

Some of the services that the STP can offer **to Group 1** are: physical space such as incubation, office space, equipment allocation, common use of spaces and consulting services for instance in assessing

national and international R&D grants, central fabrication workshops for product development and start-up support mechanisms.

To Group 2, it also provide space for spin-offs and new institutes but it can mainly provide consulting services in collaboration issues such as bringing together International and National Business with University Labs and Researchers on R&D programs cooperation, or consulting on development of new services, products and troubleshooting; or even on IPR issues, networking with International Innovation Associations.

To Groups 3 and 4 it can provide business space and consultancy in networking with the local public and private sector for the international companies and with the Universities for the local and regional companies, in setting a market level price and developing a master plan of operations and in accessing local and international R&D grants.

To Group 5, the STP can mainly show how to “sell the STP” as an innovation location abroad and teach how to internationalize their activities and attract foreign investments.

To Group 6, it can provide space for large tenant facilities, access to central facilitation workshops and the opportunity of synergies with the clusters of the specialized sectors of the STP, as well as consultancy in local business opportunities as well as access to local R&D programs and other incentives.

To Group 7, we will attach a broader description, particularly since it tends to be wrongfully considered less important than it should be.

From our hands-on experience in working with VC funds on one hand, and collaborating with various STP`s on the other hand, one thing has become clearer: each STP should have its own VC fund.

Finding an investor is one of the most important objectives a startup can have; therefore it should be equally important to all STPs that manage incubator structures. Although there are many funding models, including business angels or acceleration programs, "the large amount of" money always comes from venture capital.

A startup can receive investment from multiple sources. For companies at the beginning of the road, such as Silicon Valley success stories, the first money is usually personal savings or loans from family and

friends. In many cases, the following money comes from business angels or accelerators, and only after a functional product or service has been delivered comes the question of attracting massive investments from venture capital companies.

A venture capital company is not a fund itself, despite the frequent use of this term, but is a manager of several venture capital funds. Basically, such a company is a business in itself, a private investment intermediary, depending on the areas of interest in which those who have money are proposing to invest. IE, for the technology area, there are funds for software startups, hardware startups, etc.

Each Venture Capital (VC) fund goes through several stages, from raising money to liquidating investments. In the first stage, a VC fund attracts money from other funds, such as pensions, insurance companies, banks, wealthy people, private companies, etc. At the same time, VC funds are exploring the startup and companies market to create a preliminary list in which to invest in the future. Money is drawn based on a projection that specifies the type of investment the fund is about to make, the areas it focuses, the expected increases, etc., and these conditions create a first filter of interesting startups for the VC fund.

Basically, at this stage, companies are building a potential portfolio to present to investors whose money will support selected companies. During this period, the fund is not active and does not make investments.

Only in the second phase, when VC funds become active, they will focus on investing half of the money available in new companies, usually coming from the initial list. In the case of a 20 million euros fund, for example, of the 20 million, ten investments of one million will be made.

When meeting a VC representative, each incubator administrator within an STP is recommended to ask whether fund is active or not, in order to be sure that he is likely to receive money or just enter the list of potential investments for some time in the future.

If the fund is active, it may be useful for the startup to have a member in the board of the company who is familiar with the investors' world and who may recommend the start-up in order to increase its chances of receiving a grant.

In the third stage, there are two alternatives, depending on the success of the company. The investment fund may approve either an exit (sale of its own stake) or a new round of investments. In the second case, the fund will invest the rest of the money (ie in the current example, the remaining ten million) only in the companies from its own portfolio, but not in all of them, only in those that have potential, traction and only if market trends show that they will be successful in the future. So if the startup is successful, it is likely to receive a new round of funding. More specifically, it is possible for the investor to participate in a new round of financing without necessarily being the only investor.

As a reminder, any investment fund will focus, starting from the third stage, on selling startups and making profits.

This may be beneficial for incubated companies, but not necessarily for Incubator, because once the start-up has been exposed to external VC structures, there is a high risk that the product or service being developed will be bought by a company that operates outside the STP. This will trigger an exit fee payed by the startup to the incubator IF said incubator has invested money in the startup, but any other potential revenue from further developing the service or product will be lost.

Based on the above explained mechanism of VC funding, we can make several observations:

- 10.** The process of obtaining venture capital from 3rd party companies is a long and difficult one. In many instances, especially when dealing with cutting edge technology, startups often run the risk of having their ideas stolen or developed faster by other startups or mature companies better connected or better financed.
- 11.** Working exclusively with VC companies, means that the product or the service developed within the STPs incubation program will most likely be taken out of the STP, in term the STP will lose any future income from the startup.
- 12.** In order to ensure a constant profit for the incubator, it is recommended that the idea or product of the incubated company be developed (and funded) internally from a own VC fund, the negotiated percentage of the obtained profit ensuring the supply of the VC fund of each STP on the one hand and operational money on the other hand.

ACTION 7 - BUILDING VALUE FOR ALL TARGET GROUPS

- A. Researchers, University Graduates, International Startups, International Incubators**
- B. Local Universities and Research Institutes**
- C. Medium size technology based International companies**
- D. Medium size local/ Regional companies with intensive knowledge based activities**
- E. Government Institutes promoting development and entrepreneurship (ministries, organizations)**
- F. International, Big, Technology based companies**

ACTION 8: Tailoring the projects with financial resources

This Action is aiming at tailoring the projects with financial resources. This step MUST be in accordance to previously obtained data from the STRATEGIGRAM TOOL. Any speculation as to what a best practice might suggest could face country specific realities that will cancel all or some of the suggested lines of action. However, from our experience we can extrapolate three main ways of financing the different phases and components of the STP:

- The Project land development should be financed through the grants of the Structural Funds and the loans of the EIB;
- The Innovation / Incubation Building should be funded only by the Structural Funds;
- The financial engineering should be covered from Structural Funds and private funding;
- The consulting to start-ups and the networking should be covered from Structural Funds;
- The multitenant and big company buildings should be ensured from public-private partnerships and private funding.

ACTION 8 TAILORING THE PROJECTS WITH FINANCIAL SOURCES

- A. Project Land Development to a Park: SF, EIB**
- B. Innovation/Incubation Building : SF**
- C. Consulting to start-ups: SF**
- D. Networking: SF**
- E. Financial Engineering: SF + Private Funding**
- F. Multitenant and Big Company Buildings: PPP + Private Funding**

The development of business ecosystems is currently uneven across EU countries. Most countries don't have a nationally implemented strategy that clearly targets the funding of these structures and this is one of the main causes that generate gaps between countries when discussing research structures. In this respect, the EU Commission's help in financing smart interconnected STPs is invaluable to the future of European research.

In order to balance and further develop research at the EU level, it is absolutely necessary to maintain and establish new finance lines. These funding lines must be accompanied by a roadmap that will provide a common denominator in the development of EU research structures; this will ensure interconnectivity and a cooperation platform, absolutely necessary for the collaboration between these structures.

Our recommendation is to launch a new call at EU level to collect data on the interest of each country in developing STP research structures. This document will form the basis for an opportunity analysis that will define the research needs of each country involved in the project and the funding costs for the research structures. As long as a "blue print" for developing STPs provided by the EU will be used, costs and duration of implementation of the individual projects can easily be determined. Of course, each STP will have its own peculiarities, which is why we recommend the use of the Strategigram Tool in identifying them, but at the same time, in terms of the basic structures, they are the same for each STP.

As the STP matures, more specific financing needs will emerge, and new opportunities will be defined. It's important to keep in mind that the creation of the STP (although crucial for the local, regional or even national economy), is only the first step in defining a fully operational structure tailored to the needs of the market and available resources. In order to turn the STP into a valuable asset for the economy it's necessary to further invest in its development. This is where STP managers are faced with a crucial decision: they can choose to focus on marketable research and on (heavy) taxing resident companies in order to make a profit that can be turned into investment money OR they can choose to find alternate means of funding to further develop de STP. It stands to reason that increasing taxes will discourage smaller companies to operate within an STP; therefore an alternate source of funding is preferable. The EU Commission can play here a determining role in this particular stage of developing the STP by providing additional funds for the STPs that manage to prove their potential on the market.

If the first line of financing will ensure the development of an interconnected chain of research structures, the second line will ensure continuity and customization of each STP according to location, labor capital, specialization, etc.

Moreover, such an initiative would ensure the intelligent development of STPs at EU level. Funding can be ensured by taking into account the profile communicated by each developer, thus ensuring the homogeneity of the specialization lines and avoiding the risk of developing structures with similar specializations. This will define an extremely accurate map of the available research jobs for each country.

ACTION 9: Maturing Actions + Studies + Time scheduling of the STP phases

All the steps of these actions will be further detailed by means of the IASP STRATEGIGRAM TOOL, but as a golden rule, each STP should try to obtain:

- Acknowledgement of the STP as a strategic project for their country of residence
- An agreement and commitment from: Regional Authority, Ministry of Regional Development, Ministry of Economy and Ministry of Education.

SUMMARY TABLE OF ACTIONS		
ACTION	DESCRIPTION OF ACTION	TIME SCHEDULE*
1	Setting the targets of the STP	Indicative, Immediate, Final after Business Plan
2	Agreement on Ownership, Governance of STP and agreement with various stakeholders and partners	Immediate
3	Agreement on financial model and business model of STP and STP Components	Immediate
4	Agreement on the mainstream activities of the STP - STP Management Company	Q1, Business Plan
5	Developing a Marketing & Communication Campaign	Q1, Business Plan
6	Setting the Path for the potential Research Institutes and building the value proposition for them.	Q1 – Q2, by Stakeholders
7	Creating an Incentives ' package for attracting world/national/regional tenants to the STP	Q1, Business Plan
8	Tailoring projects with financial resources	Immediate
9	Setting maturing actions + studies and the phases of development	Immediate

*The time schedule is representative for an STP at its inception point.

The indicative phases of development of the STP are illustrated in the table below. This will take into account the present date of SEPTEMBER 2018 as a starting point for developing a new STP.

PHASE 0	PHASE 1	PHASE 2	PHASE 3
<ul style="list-style-type: none"> -Preparatory Studies -Institution Building Financial commitments / attraction 	<ul style="list-style-type: none"> -Transformation of Land to Park -Development of first building(s) Innovation + Incubator -Development of Intangible mechanisms -Attracting bigger tenants (20% of space) 	<ul style="list-style-type: none"> -Development Construction of Research Institutes -Development of Multisector buildings -Other facilities (leisure, etc.) -Attracting bigger tenants (20% of space) 	<ul style="list-style-type: none"> -Revisiting the Business Model -Further attraction of bigger tenants -Further development of multitenant buildings
2018 - 2019	2020 - 2023	2023 - 2027	2027 - 2030
	10% -20% Occupancy (Indicative)	40% Occupancy (Indicative)	100% Occupancy (Indicative)

