# Business Model of Science and Technology Parks-Comparison of European Best Practice-

# Business Model of Science and Technology Parks:

## Comparison of European Best Practice[1]

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## 1. Introduction

The purpose of this paper is to introduce the best practice of Science and Technology Parks in Europe. Science and Technology Parks have been growing in popularity. Not only is the number of such parks increasing, but also the number of legal regulations on which such organizations are set up and operate is increasing as well. There are estimated to be about 900 technology parks, over 300 of which are in Europe. The main purpose of the parks' existence is to stimulate the establishing and development of innovative new technology businesses. This is usually done in cooperation with science centers, such as universities or research and development agencies.

Due to the growing competition among parks located not only in the same country, but the same part of Europe, it is necessary to design business models that will enable the entities to succeed. Science and Technology Parks are not a homogenous group, and despite their similar objectives and activities it is difficult to talk about a universal business model of their functioning. As proven by Bakowski and colleagues [1], the initiatives behind creating parks result not only from the specific natures of scientific and business communities, but they also reflect industrial traditions, attitudes towards entrepreneurship, as well as sociocultural factors.

The literature on Science and Technology Parks usually focuses on two perspectives — institutional and economic-geographical [2]. The former analyses whether parks contribute to gaining competitive advantage by the tenant firms, and generate positive spillover effects for the local economy and businesses. The other perspective assumes that the park, together with the local region, constitute an entity made up of specialist compa-

1 The body of this paper is mainly based on the paper submitted to the 7th International Conference for Entrepreneurship, Innovation and Regional Development (ICEIRD) 2014, held at Nicosia, Cyprus. We, however, added and modified some managerial implication and organization of the paper.

nies, with a growing network of interconnections and agglomerative effects. The authors of this paper, like Koh and colleagues, rather than analyze challenges facing parks, focus primarily on business models centered around the specifics of their functioning, the way to create and enhance value, satisfy customer needs and make money [3]. In order to determine the key success factors for Science and Technology Parks of the Old Continent, the authors conducted a comparative analysis of business models adopted by selected European organizations of this kind.

## 2. Business models as the directives for organization's functioning

In recent years, the business model has been the focus of substantial attention from both academics and practitioners. Although business models have been integral to trading and economic behavior since pre-classical times [4] the concept of business models became relevant with the advent of the Internet in mid 1990s. Since then the business model has been the focus of substantial attention from both academics and practitioners, as documented by the number of publications, including articles, books, and book chapters in the business press and scientific journals. An overview of bibliography done by Zott and colleagues [5] shows that business models have been used mainly to describe or explain three phenomena: (1) e-business and the use of information technology in organizations; (2) strategic issues, such as value creation, competitive advantage, and firm performance; and (3) innovation and technology management.

For the purposes of this paper, business models will only be treated from the point of view of strategic issues. In any given industry, the methods of doing business may vary, but there are limits imposed by technological factors, by the competitive dynamic among companies and between companies and their channel partners and by customer expectations and preferences, among other things. There have been a number of attempts to create schema for classifying the various types of business models seen in practice [6]. At a more general level, a business model is understood to be a system of assumptions, ideas, and relations between them, which enables to approximately describe (model) a certain aspect of business reality.

The idea of a business model is used irrespectively of the theory, therefore the elements of the model and their relations are somewhat vague [7]. Despite being widely used, the term "business model" is not unambiguous. As shown by Chesbrough and Rosenbloom [8], one of the reasons why academics do not insist on one uniform theory is the fact that the concept integrates knowledge and draws from various academic and functional disciplines.

The business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs. The business model is thus understood as an instrument, whose aim is

to interface between technological development and creating economic value [9]. McGrath and MacMillan [10] see the business model as the way an organization organizes its inputs, converts these into valuable outputs, and gets customers to pay for them.

The business model may be a source of competitive advantage [11]. Eisenhardt & Sull [12] argue that the source of competitive advantage is the company's position in the market, its resources, or key processes — all of which could be referred to as components of a business model. According to Johnson and colleagues the business model is made up of four interlocking elements, which combined create and deliver value: customer value proposition, profit formula, key resources, key processes. Customer values proposition and profit formula define value for the customer and the company itself, whereas key resources and processes describe how the value will be delivered to both the customer and the company.

Business models can play the main role in explaining the way a company works [13]. Afuah and Tucci treat the business model as a coherent construct which explains the competitive advantage and the firm's performance, and define it as the way in which a company builds and uses its resources to offer the customers better value and thus makes money [14]. Afuah [15] focuses on the profitability of the company and introduces a strategic framework, within which the business model is defined with a set of elements corresponding to the determinants of the company's profitability.

The business model is about creating value for all its stakeholders. Some scholars have pointed explicitly to the boundary-spanning nature of business models by emphasizing the need to consider activities performed for the focal firm but outside its boundaries by partners, suppliers or customers. This allows the focal firm to rely on the resources and capabilities of third parties, and harness external ideas and technologies through 'open business models'. Indeed, in some instances entire key activities — such as product development — are shifted outside the firm; but they remain, nevertheless, a central part of the firm's business model (business model design).

According to Chesbrough [16], the business model fulfills the following functions:

1. articulates the value proposition);
2. identifies a market segment and specify the revenue generation mechanism;
3. defines the structure of the value chain required to create and distribute the offering and complementary assets needed to support position in the chain;
4. details the revenue mechanism(s) by which the firm will be paid for the offering;
5. estimates the cost structure and profit potential;
6. describes the position of the firm within the value network linking suppliers and customers;
7. formulates the competitive strategy by which the innovating firm will gain and hold advantage over rivals

Together, the above characteristics offer additional functions, namely to justify the financial capital needed to realize the model and to define a path to scale up the business.

It is worth to point out the differences between the business model and a strategy. Two differentiating features are of particular interest to academics. The first one is the traditional emphasis of strategy on competition, capturing value, and competitive advantage, whereas the business model concept seems to focus more on cooperation, partnership, and creating common value [17]. The other factor of interest to researchers is the focus of the business model concept on the value proposition and a generalized emphasis on the role of the customer, which seems to be less pronounced in the literature on strategy. Despite the conceptual differences of the selected business models and certain aspects of the firm's strategy, scholars emphasize the fact that the business model may play an important role in the strategy of a given firm (business model design).

## 3. Areas of comparison and criteria of the functioning of Science and Technology Parks

Evaluating the performance of science parks can be a rather complex undertaking and is characterized by approaches that are not unequivocal. The tools used for this type of evaluation can be very different: in some cases only financial criteria are used, in others innovation-related indicators are used [18]. The evaluation of the performance of a science and technology park can be also made against a competitor or another entity of this kind regarded as a benchmark, or based on a group of various criteria relating to the areas regarded to be key to its functioning. In the case of the benchmarking prepared by the Polish Agency for Enterprise Development the following aspects are considered [19]:

- sources of financing of the park,
- operating activities,
- designing and creating a technology park,
- effectiveness,
- value for the tenants,
- outside connections and influence on the region,
- creation and transfer of knowledge,
- competence and experience.

A wider approach to analyzing the performance of technology parks results from European experiences. According to the European Commission, such research should be done in all the main areas that are necessary to make a complete evaluation of a park. These are [20]:

- creating development strategies and objectives,
- organization and management,
- infrastructure and resources,
- financing, budget,
- park tenants,
- operating activities,
- services offered,
- effectiveness and influence on the surroundings,
- promotion and communication (benchmarking of business incubators).

These criteria were a starting point for comparative analyses conducted for the report on Science and Technology Parks operating in the Southern Baltic region. The criteria for evaluation in this case were: the tenant firms, technology transfer and commercialization, organization and management, services for the tenants, cooperation with local communities, financing, HR, business incubation, defined and implemented strategy, promotion and communication, and transportation facilities.

The paper proceeds to describe business models implemented by selected Science and Technology Parks.

## 4. Selected business models of European Science and Technology Parks

### 4.1. *The Berlin Adlershof Science and Technology Park*

The Adlershof Berlin [21] technology park was set up in 1991, at the location of the East Germany Academy of Science — the biggest science and innovation institution in Germany. Its chief asset was the location in the south east of Berlin and in the proximity of one of the largest air hubs in Europe — the Schönefeld airport. Another important aspect is the road infrastructure around the park, that is the A113 motorway, which connects the center of Berlin with the A10 (Berlin ring road).

Among the key factors driving the success of the park has been the cooperation with the city authorities on developing the plans of the road infrastructure around and within the park, and with the public transport companies on public transport services and their quality. The management of the park, together with the city authorities, have developed a network of city transport connecting the Adlershof Berlin area with all parts of the city, with public transport services provided also within the park. Moreover, the park has a fast railway connection by the S-Bahn. Thanks to that the employees and the visitors have convenient access to the park. Connecting the technology park with the public transport network has facilitated work and cooperation with the tenants of the units from outside the park.

The Berlin Adlershof Park has a unique way of supporting start-ups. Every company

interested in establishing itself or its branch office on the park can receive a so called *Business Welcome Package*. It consists of the following elements:

- a fully furnished and equipped office, ISDN line, fax, printer, Internet access;
- a furnished, ready to move in apartment;
- facilitated use of public transport (so called Credit ticket);
- consultations available with local experts on recruitment, local market research, finding partners or suitable venues;
- tax services, e.g. legal advice, tax training, PR training.

On top of that, the *Business Welcome Package* comprises 3 months of soft services (e.g. support from local experts, information about regional market, or legal advice).

The Berlin Adlershof technology park is an example of how a dispersed park functions. This means that organizations resident in the park, not being part of one structure and not managed by the park, provide park services, realizing all functions of the park.

### 4.2. *The Tamar Science Park / Plymouth Science Park*

Tamar Science Park [22] was established in 1995. From the beginning the emphasis has been on a close cooperation with the scientific community of the University of Plymouth. The tenants have access to the biggest European platform *Knowledge Transfer Partnership* (KTP). Using the information from the platform, the tenant firms can enhance their competitive advantage and productivity through engaging in innovative activities. The park workers monitor the tenants' business profiles and technological needs on an ongoing basis. They look closely at the technologies developed by the scientists from the University of Plymouth, looking at their relevance to the tenants' needs. Thanks to these practices, the park can boast a high number of patents registered by the tenants. The success of the park can be put down to an effective bringing together business and scientific communities, introducing effective, low-cost instruments of exchanging knowledge within the park, and the tenants using the biggest program of knowledge and technology transfer (KTP). What is more, the park can pride itself on an effective process of commercializing knowledge (a large number of incubated spin-offs).

On top of that, the park offers additional services of supporting technology transfer development in the form of regular tenant meetings. During such meetings, each company can present its innovative products to the others, encouraging cooperation. The tenants highly value the informal lunches with the representatives of the park's management, which enable a fast exchange of information on new projects developed by the tenants. Closer business cooperation between the park's tenants has a positive impact on the emergence of next innovations.

### 4.3. *The Lahti Science and Business Park*

Lahti Science and Business Park [23] is today one of the world's leading environment technology parks. It is majority owned by the Lahti municipality, with 74% stake. The remaining 26% is dispersed among firms connected with science and technology units, firms, universities, and universities of technology. The park's strategy is to concentrate on a selected industry — environmentally friendly, or so-called clean technologies. The new policy of the park's functioning was adopted in the first decade of the 21st century. The decision to specialize in a narrow field, together with a shift in the policy on supporting innovation, resulting from the fast growth of the park and the region, has attracted new investors and significantly enhanced the park's international reputation. Today the Lahti Park prides itself on the high efficiency of research and development activities conducted in its area.

Apart from focusing on one industry, strategic changes have also concerned the model of the park's functioning in respect of supporting innovative processes and the model of technology transfer. The introduced model: "*Advisory Professorship Model*" assumes the realization of responsible and profitable regional policy on innovation support. At the heart of the model is building strategic cooperation between universities, research institutions from the Lahti region, and their counterparts worldwide. Selected park workers ("*Advisory Professors*") regularly take part in the research and development projects conducted within the park. The implementation of this model has caused the number of professors who cooperate with the park to almost double, despite the fact there is no university in the neighborhood. This fact enhances the evaluation of the technology transfer model, and proves the model's effectiveness.

The example of the Lahti Science and Business Park demonstrates an effective implementation of the park's strategy, based on a narrow industry specialization, and new models of supporting innovation. Using a niche in the environment-friendly technologies has helped the park to evolve from an institution like many other competitors, to one of world's leaders in this area of activity.

### 4.4. *Technopolis Pulkovo*

The Technopolis Pulkovo [24] park is located in southern Saint Petersburg, near the Pulkovo airport. It is operated by a subsidiary of the Finnish Technopolis Plc — one of Europe's leaders in managing Science and Technology Parks. Opened in September 2010, the park offers a full range of office space and business support services, including the possibility to use the relations within the project realized with the support of Technopolis Plc.

Some of the key drivers of the park's success are: high goal-orientation manifested by fast space hire, which has enabled the park to achieve the set financial goals, charging

market prices for the hiring and maintenance of the office space, and support services, together with the full ownership by Technopolis Plc, characterized by a markedly business-like approach to the realized projects. Moreover, the possibility to cooperate with companies from 15 different parks operated by Technopolis Plc or its subsidiaries is of great benefit to the tenants. The park enjoys the use of a rich university infrastructure and a wealth of qualified workforce. The lack of a similar business institution in Russia gives the place an additional advantage.

The project is a perfect example of a business approach to both setting up a new park, and developing the already existing ones. Such a formula of functioning aims at maximizing the operator's profit and achieving fast returns. The classical functions of a technology park, such as incubating innovation firms, knowledge transfer, or raising start-up finance seem to be of secondary importance to the project. The high, 40% office occupancy one month into operating was a proof that the employed model was accurate. It is worth noting that some Technopolis Plc parks in Finland charge premium prices for office hire.

The described practice should encourage a reflection on strategic financial planning. It is necessary for every park to develop a long-term vision of financing its activity — whether it will ultimately rely on income from the tenants, or whether outside support will be needed, e.g. EU funds, or subsidies by the founding body.

### 4.5. *The Mjardevi Science Park*

The Mjardevi [25] park offers a very wide, complex range of services tailored to the needs of the clients. One of the biggest, and fastest growing technology parks in Sweden was set up in 1984 as an initiative of the Linkoping Commune authorities, who remain the park's chief stakeholder. The key drivers of the Mjardevi park's success are:

- its location in the vicinity of the Linköping University campus and close cooperation with the university;
- constantly upgrading the infrastructure to keep up with demand;
- taking part in LEAD — one of Europe's best incubators;
- implementing the "Rivstart" program, which offers a complete set of consulting services for the new tenants;
- the "Soft Landing" service package for Polish and European organizations;
- a wide range of facilities for the employees, which impacts their satisfaction levels.

The feature distinguishing the Mjärdevi Science Park from other European technology parks is above all the wide range of services, suited to the needs of the tenants (e.g. leasing office modules). The park's biggest tenants are: Ericsson, Releasy, Sectra, Combitech, Logica, Motorola, Flextronics and Toyota.

The Mjärdevi Science Park offers newly established companies space in one of

Europe's best incubators, operated in association with the Norrkoping Science Park and the Linköping University, that is the *LEAD Incubator*. What is more, in 2005, the park introduced the "Rivstart" program for new companies, which combines the location on the park with additional advisory services and training programs. To maintain the fast rate of growth and enhance the park's brand on international markets, a strategy of park internationalization was initiated. To this end, the park introduced activities aimed at attracting foreign tenants, under the name of "Soft Landing". The program consists of an array of facilities to meet the needs of foreign investors in terms of establishing in the Swedish market (m.in. access to a network of knowledge and technology exchange run by the park, as well as legal and marketing assistance). The Mjärdevi Science Park cooperates closely with legal firms, offering legal advice on intellectual property law, or patent procedures.

The park administrates, initiates, and organizes networks of cooperating companies that provide services for the tenants. Tenant meetings are organized on a regular basis. The park has seven restaurants, sport facilities, a spa center, a nursery school (Swedish and English spoken), as well as a hairdresser, parking lots, a supermarket, a post office, university departments, and ATMs.

### 4.6. *The Chalmers Innovation Business Incubator / Lindholmen Science Park*

Combining an incubator and the rest of a park's offer within one management structure can have negative consequences, and result in a limited offer for one group of clients. A way to avoid such problems is to separate the incubator from the structure of the park. One example of such separation is the Lindholmen Science Park, which appointed a separate body to run the Chalmers Innovation Business Incubator [26]. Chalmers Innovation is a technology incubator, focusing on growing enterprise. Its offer is dedicated to carefully selected start-ups in the advanced technology industry, with a high growth potential. The offer also includes elements of pre-incubation, focusing on transferring knowledge to persons from the science and business environments, or to students who are planning to start their own innovative business.

The motto of the Chalmers Innovation is "We train a business, not a person", and the key success driver is the individual approach to the idea that the client wants to realize. Other success drivers are: recognizing the differences between the needs of large, often multinational companies, and incubated firms, as well as assigning the services for the latter to a separate, specialized entity. The park's activities are characterized by a high flexibility and a high quality of the competences the incubator's staff. Of special attention are the possibilities to raise capital for the incubated firms. It is possible thanks to cooperation with Venture Capital companies, which provide funding for the incubated firms (like Innovationsbron, VGR, Almi Foretagspartner or Vinnova). In 2008 a dedicated Chalmers Innovation Seed Fund was established, which enables the incubated firms to get up to SEK10m financial support.

The effectiveness of the incubator model is confirmed not only by the Best Science Based Incubator award for the return on investment won in 2003, but primarily by the effectiveness of the firms which are using its services or used them in the past. In April 2010, a list of Swedish fastest growing companies was announced, two of which were firms from the Chalmers Innovation Incubator — LumenRadio and Xylophane. The incubated firms register from several to more than a dozen patents every year, and the solutions generated by them are attractive for the best companies in the industry. OK system, a company incubated in Chalmers, was taken over by Sonic Solutions in 2006, and in 2010 Autodesk (the creator of the AutoCAD) was acquired by Illuminate Labs.

### 4.7. *I3P S.c.p.a.*

In I3P S.c.p.a. in Italy, the tenants can use the *Mentoring Services* [27] program. It is based on the services of advisors, who help to better understand the principles of running a business, the way a market functions, and to find new customers and investors. Thanks to Mentoring Services, entrepreneurs get expert advice on:

- establishing a critical vision of the company's development;
- increasing effectiveness;
- enhancing the managements' business skills;
- building long-term strategy of the company's development by identifying its strengths and weaknesses;
- implementing new management solutions and techniques.

A special database profiles the mentors and the tenant firms. Meetings of the two sides can be both arranged and spontaneous. They result in agreements on cooperation, its terms and conditions, and objectives.

## 5. Key success factors and elements increasing the attractiveness of parks

As signaled earlier, Science and Technology Parks are not a homogenous group; therefore it is difficult to conduct their comparative analysis. Depending on the specific nature of the location, sources of financing, or the character of the activity, different parks owe their success to quite different factors. Nonetheless, the findings of the research by the International *Association of Science Parks and Areas of Innovation* on a sample of 119 parks throughout the world indicate that there are certain universal key success or failure drivers. The most important are the following factors [28]: the park's image and prestige, links with universities and/or other higher education institutions, the park's location, institutional support or presence, access to markets, the presence of 'anchor' companies, and local demand and customers.

Based on the experiences of parks in various countries, the *Polish Agency of Enterprise Development* has isolated the following success factors [29]:

- the proximity of a university that actively encourages entrepreneurship, and close relations with scientists;
- an atmosphere of partnership between local administration, business, and science;
- the acceptance of local community for supporting innovation business and integration with local development plans;
- competence and involvement of the management in realizing the park's functions together with a clear, long-term strategy, and competent staff;
- access to venture capital;
- taking care of developing the area, the possibility to expand the surface, and design areas conducive to creativity, interaction, and innovation;
- access to enterprise support services, and specialized pro-innovation services;
- developing active networking at various levels and assessing their effectiveness, creating technology firm clusters;
- selecting tenants so as to generate synergy among them, identifying their needs, and providing access to networks and services;
- high standards of technology and transportation infrastructure, surroundings which make the park an attractive place to live;
- functioning of a park technology incubator, connected to a university's preincubation programs and forms of start up support;
- creating a positive image, marketing activities building the park's attractiveness, the presentation of success stories of tenant firms.

Apart from the above success drivers, the *International Association of Science Parks and Areas of Innovation,* diagnosed several aspects that make STPs more competitive [30]. As much as 58%[2] of respondents claimed the quality of residents to be very important, with 41.2% opting for regional differentiation, and 37% customer service. Further elements were property rentals and lease rates (30.3%), breadth/depth of tenant services portfolio (29.4%) and proximity to markets (28.6%).

## 6. Conclusions

The overview of business models of selected European STPs in this paper leads to a conclusion that there is not a one, perfect model of business. One might however attempt to show the areas that are key to the park's success, which could be considered when

2 The scores did not make up 100%.

creating a new business model for a park, or adjusting an existing one.

One of the first areas to analyze is the range of provided services, and their fit to the needs of the tenants. As shown by the experience of parks such as I3P S.c.p.a. or the Mjardevi Science Park, firms can expect support in areas ranging from gaining new markets, and building business relations in an international environment, expert advice in designing long-term strategy for growth, a wide range of facilities for the employees, to assistance in technology transfer (e.g. The Tamar Science Park). Offering a full range of services suited to the expectations increases the attractiveness of the park as a place of establishing business, attracting new residents. It must be noted that it is necessary to increase the park's efforts in initiating the process of fitting the solutions offered by the park to the needs of the tenants.

The parks' services must also be differentiated depending on the size and maturity of the tenant firms. Using the same resources to satisfy the needs of dissimilar tenants leads to a situation when smaller/younger companies receive less support from the park's management. Thus, assigning the services for the incubated firms to a separate, specialized body, like in the case of The Chalmers Innovation Business Incubator, seems to be a worthwhile option. Another important aspect is a careful selection of residents, based on expert and complex assessment of the business plan in terms of technology, marketing, finance, and legal. Good transportation infrastructure for the tenants also plays a significant role (Adlershof Berlin).

The case of Technopolis Pulkovo in turn, proves the point of dual action — focusing on the one hand on developing infrastructure, and on the other on developing technology and innovation. It also reflects a business approach to the functioning of a technology park, illustrated by market rental prices and the adopted structure of funding. It is therefore possible to combine a proinnovation mission with a business approach to projects and activities realized within the park's framework, providing the park has a long-term vision of the methods of financing them.

Another interesting direction of potential change is concentrating the park's activities on a selected industry. As shown by The Lahti Science and Business Park, the strategy of specializing, coupled with an active policy of supporting innovation and developing networking within the park, has resulted in attracting new, recognized investors, and strengthened the park's international image.

In this paper the authors attempt to collate the business models of Europe's leading Science and Technology Parks. One must bear in mind however, that it is not possible to copy the models directly, as they resulted from many local conditions, such as the existing infrastructure, organizational culture, relations with city authorities, or social capital. Designing/modifying the business model every time requires taking a wide perspective on the existing conditions and relations with market participants.

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