

# The development of a modern Science Park: A Swedish good practise

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**RESUMO:** O objetivo deste estudo de caso é buscar um entendimento mais profundo das razões e das atividades relativas ao desenvolvimento dos Science Parks atuais, bem como identificar os atores envolvidos e seus relacionamentos. Para alcançar este objetivo analisamos a trajetória do Mjärdevi Science Park (MSP), situado na cidade de Linköping, Suécia, desde a sua criação até os dias atuais. Neste nosso estudo pudemos identificar as diversas interações realizadas pelo MSP com diversos atores regionais, nacionais e até mesmo internacionais, construindo assim uma extensa rede de relacionamentos. Por ter construído uma base sólida, atuando muito próximo dos seus inquilinos, foi possível o desenvolvimento contínuo ao longo dos anos, mesmo passando por períodos de crises e dificuldades. Em meados dos anos 90, Mjärdevi Science Park foi considerado o 9º parque com crescimento mais rápido no mundo [1] e hoje é, sem dúvida, um caso de sucesso. Tornou-se uma “boa prática” no contexto europeu a abordagem inovadora dos parques serem integrados à estrutura regional.

**PALAVRAS-CHAVE:** Parques de Ciência. Desenvolvimento regional. Boas práticas.

**ABSTRACT:** This study aims to get a deeper understanding of the reasons and activities related to the development of Science Parks of today, identifying actors involved and their relationships. To achieve the goal, we analysed the story of Mjärdevi Science Park (MSP), located in Linköping, Sweden, from its inception to the present. In our study, we could identify the several interactions carried out by the MSP with regional, national and even international actors, thus building an extensive network of relationships. Having built a solid foundation, working very close to its tenants, it was possible to maintain a continuous development over the years, even in times of crises and difficulties. In the middle of the 90s, Mjärdevi Science Park was considered the 9th park fastest growing in the world [1] and today is undoubtedly a success story. It has become a ‘good practise’ in the European context regarding the innovative approach of being a park integrated in a regional framework.

**KEYWORDS:** Science Parks. Regional growth. Innovation. Good practise.

## 1. INTRODUCTION

North America witnessed the birth of the first Science Parks in the mid-20th century and later their profile characteristics has evolved in many ways, such as the research and market. The relationship with the local community and firms has also undergone changes, consolidating parks as an important element of regional integration and development. The Bayh-Dole Act was one of many US policy initiatives that enabled the appearance of a favourable environment for the creation of partnerships between universities and firms in the late 1970s and early 1980s. This relationship was intended for the commercialization of university research results [2]. A favourable environment has stimulated the establishment of new parks in the US and also has been a reference model in the development of Science Parks in other countries [3].

The International Association of Science Parks and Areas of Innovation (IASP) defines a Science Park as “an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.” [4]. Westhead [3] affirms that Science Parks carry the idea that the technological innovation is led by the scientific research, it means that Science Parks “can provide the catalytic incubator environment for the transformation of ‘pure’ research into production”. In addition to this, Colombo and Delmastro [5] consider a Science Park as:

“... a property-based initiative which (i) has formal operational links with centres of knowledge creation, such as universities and (public and/or private) research centres, (ii) is designed to encourage the formation and growth of

innovative (generally science-based) businesses, and (iii) has a management function which is actively engaged in the transfer of technology and business skills to ‘customer’ organizations.” (p.1107)

Science Parks have served as pillars in the development of both their tenants and the region in which they are located, as presented by Hommen et al [6] and Lofsten & Lindelöf [7].

In order to understand the development processes of a Science Park, our study have focus on the following research questions: how and why is a Science Park developed? And how and what stakeholders are involved in this process?

## 2. METHOD AND DATA

To answer the research questions, we performed a longitudinal case study (1983-2016) on the motivations and activities that led to the creation of the Mjärdevi Science Park (MSP), including its main stakeholders.

Several reasons led us to choose MSP, but we can point out three main reasons: (i) MSP is located close to the Linköping University, so we can have good access to information; (ii) MSP has a rich history for over 30 years of operation, having several cases of successes and failures; and (iii) the MSP’s story includes different types of stakeholders and relationships [8].

According to Yin [9], cases studies are the most applicable method for investigating “a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”. Furthermore, the case study methodology has a major role in building theories, being considered by Eisenhardt and Graebner [10] as the most relevant bridge “from rich

qualitative evidence to mainstream deductive research”.

We collected secondary data from scientific papers; from institutional documentation, such as web pages and press conferences. The founder and former CEO of the Mjärdevi Science Park is one of the co-authors and was able to describe the development of the park in details since he was an active observer from all the period considered. We were also able to count on the participation of three key actors, who played a relevant role in the history of the park.

### 3. MJÄRDEVI SCIENCE PARK CASE

In 1984, Mjärdevi Science Park (MSP) started its operations in Linköping, the Sweden's 5th largest city, located southwest of Stockholm. The Park is sited in an area with 70-hectare, bordering the Linköping University, which facilitate the integration between entrepreneurs and researchers. Today MSP has more than 300 technology-based firms operating and approximately 6,000 people employed. Because of this, over its 30 years of activity, MSP has become an important component in regional economic development.

Even having large firms as tenants such as Arris, Autoliv, Ericsson, Flextronics, IFS and Sectra, the most tenant firms are small. The MSP competence areas: visualization, modelling and simulation, connectivity and mobile broadband, and vehicle safety as well as security systems; are the result of the sum of the competences of its tenants.

MSP support its tenant firms, regardless of the size or development stage, providing business consulting, opportunities to reach international markets and support to find funding.

#### 3.1. The beginning

SAAB, a Swedish company of defence products and aerospace security systems, experienced difficulties when the government announced cuts in subsidies in the late 1970s. Since SAAB has the largest group of workers in the region, these adversities directly affected the city of Linköping, who also underwent economic problems. In order to try to overcome this situation, the Municipality of Linköping, SAAB and Linköping University had several meetings to discuss ways to find solutions for the problems and ensure the continued growth of the region.

At the same time, both in the US and Europe, regional development was driven by the increasing involvement of universities in local activities, mainly stimulating spin-off companies to explore the latest technologies developed in their research. To complement the activities carried out by universities and also support these new spin-off companies that was emerging, governments have established in regions close to universities new business incubators and also Science Parks [11][12].

Following this reasoning, in 1983, Linköping Municipality established a small-scale incubator called Technology Village in an industrial area near the University and the Linköping city centre. Tenant companies could rely on offices and simple administrative services. It was the first step of what would be later the Mjärdevi Science Park. The new park became one of the two first Science Parks in Sweden.

#### 3.2 Establishing the park

With the success of Technology Village and its consistent growth, it was necessary to provide consultants, more sophisticated and complete operational support and also financial resources. However, the region faced difficulties in finding qualified people to meet the demand of companies, a problem that was intensified with the growing number of university graduates, who are increasingly leaving the region looking for new and better job opportunities. There was no doubt that something must be done to improve the attractiveness of the region and ensure the minimum conditions necessary for the continuous growth and development. For these reasons, it was decided to establish a Science Park in the region, in order to retain graduate students and also attract qualified professionals to support the growth of enterprises and the region as a whole.

It was under this scenario that in 1984, MSP was launched in a large area near the Linköping University and just 5 kilometres from the city centre. With the establishment of the Park, some of firms that were in Technology Village have decided to move to the new Park, in order to have better integration with the University. On this occasion, some of those firms founded an informal network of mutual aid, named Small Business Development in Linköping (SMIL), to facilitate the evolution of their ideas into real products.

In its first year of operation, Mjärdevi already had six firms and 150 employees. And not just small firms have shown interest in the Park but also larger companies, such as Ericsson, which set up Ericsson Application Centre at the park in 1987, and also Nokia, establishing Nokia Data in 1989. It is important to emphasize the relevance of the presence of companies of this size in order to ensure a steady and growing flow of people and resources and, as a result, strengthening the development of the park.

The first MSP crisis occurred in early 1990s, when Sweden experienced a recession, including a financial and property crisis. At this time, Mjärdevi had many unallocated spaces and so the landowners began to allow companies of any specialty to rent their property. This possibility become a huge threat to the development of the Park, since this could disfigure its competences, deviating from their main purpose: develop the region by taking advantage of university research.

In order to prevent severe damage to the park development, its main stakeholders reached a final decision regarding the profile that companies should have to be admitted in the park. According to the defined profile, managers should choose only technology companies. With this decision, the admission process has become clearer, allowing also identify which companies should be attracted.

Upon reaching the hallmark of 49 firms and 1,000 employees, Linköping Municipality creates a new limited company called Mjärdevi Science Park AB (MSP Office) to work on planning, management and marketing of the Park. This way of organising Science Park activities was very new and later on other parks followed.

MSP Office became a firm responsible to work on the internationalization of the MSP brand, supporting its firms to reach other markets and foreign companies to come into the Park. MSP Office also played an important role in communicating with students, presenting park companies and employment opportunities linked to the Park, convincing

many of them to remain working in the park after graduation.

### 3.3 Expanding and developing

The Centre of Innovation and Entrepreneurship (CIE) and its first program: Entrepreneur and New Business Development Program (ENP) were the seed of a new “informal” incubator created by MSP Office and Linköping University. The Centre was designed to explore and integrate entrepreneurial activities with the educational activities of the university, so several spin-offs were created and they needed a space to operate. The informal incubator grew and became later Mjärdevi Business Incubator, the first complete incubator of the Park.

Mjärdevi Science Park had a continuous and consistent growth after years, both in new start-ups, and firms and employees. Its international network also had growth fast and important players became partners of MSP.

In the year of 1996, MSP already had 110 firms and about 3,000 employees and became an important player in the region setting up the regional organization and the participation of the key stakeholders. Along with them, MSP took part in the development of Growlink, a regional network to support members to have access funding, providing advice in all the stages of the company development.

By completing its 15th anniversary in 1999, Linköping University starts offering five theoretical and practical courses in technology- and knowledge-based entrepreneurship.

MSP also became very active in the International Association of Science Parks and Areas of Innovation and used the Association’s network to construct a sister park network.

In 2007, Mjärdevi Business Incubator open its door having all the conditions and apparatus required to host technology-based start-up firms. For the first time MSP has an incubator with these characteristics.

This expansion period was also marked by the entry of venture capital companies to the Park, the creation of a childcare centre with English speaking professionals and, above all, the creation of an office at the University to address the collaboration of research and marketing of its results. MSP established HomeCom Linköping, a network to support the research and development of products, becoming a centre of excellence in data communication. All these new and different activities for the Park was a way of responding to new and emerging needs from tenants and entrepreneurs localised in the park.

With a consolidated infrastructure, offering quality services and the presence of managers attentive to the needs of the tenants, MSP turns the 21st century in full growth and expansion, with 150 companies and 5,500 employees.

### 3.4 Growing and advancing to the future

In early 2000, the companies in the IT industry and also small businesses have suffered greatly because of the recession. This directly affected the growth of the park and for the first time in its history the number of workers in the park declined. Ericsson and Nokia laid off together around 1,800 employees in this period.

However not all suffered the same influence from the crisis and could draw a positive path of growth. For example, two spin-off firms from the University, Sectra and Kreatel,

moved to newly available facilities and Intentia occupied the building released by Nokia. The Park as a whole also performed well despite the crisis and continued to have more companies coming in than going out. In this period, the number of new enterprises was twice the companies that left the Park. In addition, Nokia’s former employees constituted their own businesses in the Park using the expertise that brought from Nokia, transforming a catastrophic scenario of numerous layoffs into a new entrepreneurial and innovative scenario, with many opportunities. This importantly showed that Science Parks could be an important actor regarding facilitating and co-ordinating transformations of business establishments within parks. This was something new and not earlier noticed in the Swedish context.

Once the crisis was prolonged for some years, it became critical create consistent strategies for MSP firm growth and the Park as a whole. The actions began with a reassessment of the research areas of the University by a working group comprising members of sixty companies, the board of the region, trade unions, Linköping University, and R&D organizations. The aim was to align the existing research areas, or even creating new areas, with projects related to life science technologies. The group has created a new project called “New for tools life” and submitted it to VINNOVA, the Swedish Agency for Innovation Systems, which approved and sponsored the project. The University also created an Office of Innovation in order to commercialize intellectual property arising from their research.

As part of the strategic planning for steady and solid growth, MSP has developed a project with the intention of attracting foreign companies wishing to test the Scandinavian market. The project called “Soft Landing” started in 2005 and offered a number of benefits for businesses, such as reduced rates, legal and business consulting, and access to networking Park, among others. The objective of attracting such companies was not only strengthening the business sector of the park but also import new cultures, ideas and talents. In general, the project was very successful and received companies from various countries. Over the years, the activities could be naturally absorbed by the procedures of the MSP management and the formal design can be extinguished.

In 2007, the Mjärdevi Business Incubator and Norrköping Incubator were merged into a single new incubator – LEAD, owned by Linköping University, was an important step taken to improve the conditions for support for new companies.

After four years of consolidation, the park celebrates its 25th anniversary with growth sustained on its own resources and merits. For the future of the park and its activities, MSP increases its interest in its University students and seeks to strengthen its relationship with the student community.

In order to bring new ideas and vision of students with respect to the desired working environment, MSP started a board of students in 2011 to work in conjunction with the traditional Park board. The Shadow Board, as it became known, operates bi-directionally in the flow of information, since that rejuvenates the MSP management also serves as an instrument to take information to students and prospective students about the opportunities in the park and how exciting it can be to work in existing companies in the park. Thus, MSP managed to influence many students to plan a post-university life in the Park, ensuring workers and talents for the future. The new ideas of the students have also secured

significant changes in the park, such as the creation of the creActive meeting space in 2013. This arena offers rooms for meetings in a stimulating environment for creativity and innovation, with all necessary infrastructure totally free of charge.

After 32 years in operation, the number of companies and employees has grown consistently, reaching about 300 companies and more than 6,000 employees.

#### 4. MAIN MILESTONES

**Table 1: Main milestones of MSP development**

Year	Main milestones
1983	Linköping Municipality established a small-scale incubator called Technology Village.
1984	Mjärdevi Science Park was launched. Small Business Development in Linköping (SMIL) was founded.
1987	Ericsson established the Ericsson Application Centre at MSP.
1989	Nokia Data established the Nokia Data at MSP.
1990	MSP faced its first crisis.
1993	Linköping Municipality created "Mjärdevi Science Park AB", a limited company responsible for the development and marketing of Mjärdevi Science Park.
1994	Centre for Innovation and Entrepreneurship (CIE) is established.
1999	15th anniversary. Linköping University launched its entrepreneurship school.
2000	Nokia closed its centre in MSP. Ericsson reduced its staff by approximately 1000 employees.
2001	The instability of the IT sector was beginning to affect the development of Mjärdevi. Mjärdevi Business Incubator opened its doors.
2002	The new project "New tools for life" was submitted to VINNOVA, which approved and sponsored the project.
2004	20th anniversary. Mjärdevi began to grow once again after three years of negative growth and low absorption rates.
2005	MSP created Soft Landing programme aiming to attract international companies.
2007	The Mjärdevi Business Incubator and the Norrköping Science Park incubation program were merged into a single new incubator – LEAD, owned by Linköping University.
2009	25th anniversary. After four years of consolidation, MSP had growth sustained on its own resources and merits.
2011	MSP established a board of students - Shadow Board - to work in parallel with the traditional Park board.
2013	As a result of the Shadow Board work, the meeting place "creActive" was built at MSP.

#### 5. CONCLUSION

Over the years, Mjärdevi Science Park has learned how to evolve and develop, overcoming adversities and finding alternative paths to its growth and its tenants. Science Parks

are like other organisations developed in different stages and in this case, we found four stages such as (1) "Beginning" (preparation of starting a park); (2) "Establishing the park (initial tenant services); (3) "Expanding and developing" (professionalised service related to real needs of tenants) and; (4) "Growing and advancing to the future" (securing the long-time development of the park).

Many different stakeholders were involved in this process, as for example the Linköping Municipality, Linköping University, large and small businesses, incubator, and many professionals determined to promote the growth of the region through entrepreneurship and innovation. And all this is in accordance with the mission described by the IASP, which states that 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." [4].

Science parks are built with the purpose of creating an environment favourable to the emergence of technology- and knowledge-intensive firms. A Science Park offers not only physical infrastructures, but also opportunities for obtaining financial resources, exchange of knowledge between companies and organizations in the region [7][13], and especially access to skilled and talented people, an essential resource to the development of any business and the people connected to the businesses [14].

This study generates a number of implications for managers of Science Parks and others involved in the development of the parks. Our longitudinal approach show that Science Parks are developing continuously and today have a wider mission than for 40 years ago, when the first parks were created. Today parks have a broader mission that just serve firms with business development advice, they are getting more integrated in the regional economical context, e.g. attracting talent to the region; supply a broader set of services for firms, including family support for their entrepreneurs as well as creating meeting places for people even not working at the Science Park.

These changes are important to take in to the consideration when developing and running a modern Science Park. It should also be stated that the creation and development of a Science Park is not a quick solution and takes time and shall be taken into account when transferring good practises. A Science Park like Mjärdevi might to a large extent be to possible replicated in another context. However, it is important to be aware of the importance of adopting to local contextual characteristics and present culture issues [15].

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