



**A curricular internship in Sanjotec: participation in the
emergence of a Science Park as an excellence innovation
centre**

by

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Abstract

Incubators and Science Parks (SP) are popular policy instruments that have been used to promote entrepreneurship, innovativeness and economic development (Bergek and Norrman, 2008; Chan and Lau, 2005). However, these instruments are not homogeneous because they have different typologies and distinct forms of organisation of the incubation processes (Bergek and Norrman, 2008), perform diverse roles (Schwartz, 2013) and emerge in distinct contexts, both at the national and the regional levels (Tamásy, 2007). Despite these differences, in general, they ensure diverse and customized networks, resources and business assistance, being crucial to business success (Bergek and Norrman, 2008; Peters *et al.*, 2004). Incubators are a vital instrument to minimize the liabilities of New Technology-Based Firms (NTBFs), by offering, among other initiatives, specific programs and training (Ganotakis, 2012). Moreover, incubators have a fundamental role concerning the development of consistent networks (Aernoudt, 2004; Bøllingtoft and Ulhøi, 2005), acting as a bridge or an intermediary for the incubated firms (Aernoudt, 2004).

The internship in Sanjotec was crucial for gathering a deep understanding of the model that has been recently adopted by this organization as it embraces the aim of becoming a renowned SP. Namely, it was possible to analyse the bridging function of this type of organizations and their tenants.

Sanjotec aims not only at augmenting the added-value of its services and resources but also to build a strong reputation, and internal and external networks. In order to do that, a careful analysis must be made to identify internal Strengths and Weaknesses, but also to find Opportunities and Threats in the surrounding environment.

Hence, a SWOT analysis was developed to investigate how the organization may grow and stay competitive and attractive to its tenants in a sustainable time path. The involvement in this organization strongly contributed to qualified and deep interaction with entrepreneurs and innovative and successful firms.

JEL-codes: O31, O32

Keywords: R&D, innovation policy, incubators, Science Parks

Resumo

As incubadoras e os Parques de Ciência e Tecnologia são instrumentos de política que têm vindo a ser utilizados ao longo do tempo com vista a encorajar o empreendedorismo, a inovação e o desenvolvimento económico (Bergek and Norrman, 2008; Chan and Lau, 2005). Apesar de ser um instrumento frequente, não há duas incubadoras iguais, porque estas acabam por evidenciar diferentes tipologias e distintas formas de gestão dos processos de incubação (Bergek and Norrman, 2008), desempenhando diferentes papéis (Schwartz, 2013) e, ainda, acabam por surgir em diferentes contextos, tanto a nível nacional como regional (Tamásy, 2007). Apesar das diferenças, estes instrumentos tendem a assegurar redes diversificadas e customizadas, recursos e serviços de suporte, fatores críticos de sucesso para as empresas (Bergek and Norrman, 2008; Peters *et al.*, 2004). Para além disso, as incubadoras são instrumentos de política importantes para minimizar as fragilidades e os problemas que as novas empresas de base tecnológica tendem a enfrentar, através da disponibilização de várias iniciativas, das quais se destacam programas específicos e formação direcionada às necessidades detectadas (Ganotakis, 2012). As incubadoras acabam assim por desempenhar um papel importante no desenvolvimento e construção de redes consistentes (Aernoudt, 2004; Bøllingtoft and Ulhøi, 2005), agindo como pontes ou intermediários em prol dos interesses das empresas incubadas (Aernoudt, 2004).

O estágio na Sanjotec foi crucial para melhorar o meu entendimento do modelo que tem sido adotado por esta organização, com o objetivo de aumentar a sua reputação e reconhecimento enquanto Parque de Ciência e Tecnologia. Desta forma, foi possível analisar de perto a função desempenhada pelo parque enquanto intermediário na construção de redes entre empresas residentes no parque e outros atores internos ou externos. A Sanjotec pretende, assim, não apenas aumentar o valor acrescentado dos serviços e recursos disponibilizados, como também construir uma forte reputação e redes internas e externas robustas.

Para prosseguir estes objetivos, é, pois, crucial, a identificação das Forças e Fraquezas da organização, assim como o estudo de Oportunidades e Ameaças existentes no meio envolvente. Com base nisto, procedeu-se à elaboração de uma cuidada análise SWOT, de forma a desenvolver um melhor entendimento da importância das Incubadoras e dos Parques de Ciência e Tecnologia enquanto instrumentos de apoio às empresas, e de que forma a organização poderá crescer e permanecer competitiva e atrativa de forma sustentável. Para tal, foi relevante a interação com os empreendedores e empresas inovadoras e de sucesso lá sediadas.

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Biographical note

Ana Raquel Sampaio Correia is 22 years old and was born at 2nd November in Santa Maria da Feira, Portugal.

Her academic career includes the secondary school course in Science and Technology with a final classification of 18 values, in Santa Maria da Feira, and the undergraduate course in Management accomplished in 2012, in University of Aveiro, with a final grade of 16 values.

The area of entrepreneurship and innovation has always captivated her, so in 2012 she enrolled in the master course in Innovation Economics and Management at School of Economics and Management, University of Porto (FEP). In 2014, she entered the job market through the internship opportunity that emerged due to her master course.

This dissertation, the internship report of her experience in a Science Park, is the final contribution in order to obtain the Master degree.

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“Success consists in being successful, not in having potential for success. Any wide piece of ground is the potential site of a palace, but there's no palace till it's built”.

(Fernando Pessoa)

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Introduction

Incubators have been a popular policy instrument to promote entrepreneurship, innovativeness and economic development (Bergek and Norrman, 2008; Chan and Lau, 2005). Furthermore, they provide mechanisms that allow for technology transfer, a critical component in the innovation process (Philips, 2002).

Several issues related to incubators have defined a research field in the last years, that emerged in the 1990's (Aernoudt, 2004; Chan and Lau, 2004; Hackett and Dilts, 2004; Schwartz, 2011, 2012, 2013; Tamásy, 2007). However, most contributions, namely in what concerns the measurement of their effectiveness, are still largely inconclusive (*e.g.*, Bøllingtoft and Ulhøi, 2005).

Despite some inconclusiveness, many authors defend the relevance of incubators in regional and national policies for the survival and growth of emergent firms (Aernoudt, 2004; Chan and Lau, 2005). In general, researchers agree that it is extremely difficult to compare incubators (Schwartz, 2012, 2013). In fact, incubators are not homogeneous because they have different typologies and distinct organizations of the incubation processes (Bergek and Norrman, 2008), diverse roles to perform (Schwartz, 2013), and emerge in distinct contexts, both at the national and the regional levels (Tamásy, 2007). These distinct features are associated with diverse and customized networks, which implies that there are critical resources and business assistance necessary to assure a successfully implementation of these initiatives (Bergek and Norrman, 2008; Peters *et al.*, 2004).

Even though incubators have particular characteristics, their common goal usually is: “to provide some degree of supporting infrastructure to compensate for perceived failures or imperfections in the market mechanism” (Bøllingtoft and Ulhøi, 2005, p.269). Therefore, they are a policy instrument aiming to address market failures and reduce the ‘liability of newness’, namely of New Technology-Based Firms (Aernoudt, 2004).

As a matter of fact, one of the major problems faced by these New Technology-Based Firms (NTBFs) is linked to the specific profile of the technical entrepreneur (Oakey, 2003), who is a highly qualified human resource, usually an engineer or a science graduate (Storey and Tether, 1998). However, he/she often lacks the ability to commercialize the invented products (Phan *et al.*, 2005). It is therefore important to

complement this entrepreneur's technical skills with education and training regarding management, making it possible for these emergent firms to survive and prosper (Ganotakis, 2012; Storey and Tether, 1998). Hence, incubators are a vital instrument to minimize these liabilities by offering, among other initiatives, specific programs and training (Ganotakis, 2012). Another way to reduce the entrepreneurial gap is through the development of consistent networks (Aernoudt, 2004; Bøllingtoft and Ulhøi, 2005) and, at this level, incubators act as a bridge or an intermediary to incubated firms' needs (Aernoudt, 2004).

This internship will allow a deep understanding of the intrinsic problems associated with NTBFs' entrepreneurs and the allocation to an organization which is both an incubator and a science park, Sanjotec. The main focus of the research work conducted during the internship will be to analyse in detail several internal and external characteristics of Sanjotec. For this purpose, a complete SWOT analysis that will allow the identification of strategies to impact on Sanjotec as an excellence innovation centre is developed. Thus, the integration in this organization demands a full understanding of the adopted model by the organization, also through a comparison with the related literature.

This document is organized as follows. Section 1 consists of a literature review on the main research subjects. It starts with an introduction on the basic concepts and the interaction between innovation, entrepreneurship, incubation and science parks. Then, a review on the thematic of NTBFs will be presented, to allow for an understanding of the particularities of these firms, commonly featured by a high probability of failing to survive. Here, the concept of incubator will also be fully explored, highlighting the impact of incubators on enhancing entrepreneurship and economic development. Finally, after highlighting the role of networking at incubators, the concept and role of Science Parks will be presented. Section 2 explains in detail the organization and the expected tasks in the internship. The novel contribution of this report is in Section 3, with the presentation of the methodology adopted to combine the tasks of the internship with the analysis of Sanjotec. A SWOT analysis is presented in detail and several strategies are identified. Section 4 concludes.

1 Literature review on technology-based firms and incubators

Innovation cannot exist without entrepreneurship (EU, 2010). And, as Schumpeter (1934) explained, innovation involves the commercialization of new inventions. Therefore, entrepreneurship is required to exploit the opportunities detected by entrepreneurs (EU, 2010).

In the specific case of technological entrepreneurship, opportunities emerge through science and engineering (Beckman *et al.*, 2012). This fact emphasizes the importance of the process of technology transfer, which may be defined as “the transfer of a technology, technique, or knowledge that has been developed in one organization and then transferred to another where it is adopted and used” (Melkers *et al.*, 1993, p. 223).

Thus, the role of New Technology-Based Firms (NTBFs) is not only acquiring and transforming technology, but also delivering the value created in universities, research institutes, or Research and Development (R&D) facilities into the market (Fontes and Coombs, 2001). Therefore, incubators may have a positive impact by facilitating technology transfer (Peters *et al.*, 2004; Philips, 2002), and minimizing the liabilities of the NTBFs, thus increasing their chances of survival and growth (Aernoudt, 2004).

1.1 New Technology-Based Firms

“A nation needs to have firms with the ability to innovate and diversify into new technologies, products and industries” (Rickne and Jacobsson, 1999, p.216).

The notion of NTBFs presented by Rickne and Jacobsson (1999) involves two dimensions: it must be a firm that develops or uses technology - *technology-based* – and it must be *new* - an emergent firm in the market – and it is usually, but not necessarily, independent and small (Rickne and Jacobsson, 1999). However, there is no consensus in the conceptualization of NTBFs, each author proposing a different definition. Cunha *et al.* (2013) summarize different authors’ contributions, concluding that NTBFs must be new, not just relating to the firm’s age, but also presenting newness in terms of technology and industry. Moreover, the concept seems to be consensually associated with a majority of the social capital being owned by the entrepreneurs.

Positive expectations concerning the impact of these firms on the economy have been emerged because NTBFs are commonly able to identify and develop new technologies

with a great potential impact on the market, which can lead to faster growth (Fontes and Coombs, 2001). In fact, the evidence shows that “technologically more important inventions are more likely to be commercialized through the creation of new firms” (Shane, 2001, p. 217). Therefore, technology-based firms present an innovative behaviour significantly superior to the ‘average’ firms (Fontes and Coombs, 2001) and are able to perform a critical role in the creation and development of emergent technologies, through the access to new technological knowledge and its conversion into marketable and commercializing products (Fontes and Coombs, 2001).

However, these young and often small technology-based firms face several limitations, lacking several resources namely regarding entrepreneurs’ business skills, which can thwart the performance of the firms (Fontes and Coombs, 2001; Storey and Tether, 1998). In fact, new and innovative firms have a greater probability of failure because they do not have enough legitimacy, have more problems at competing against the already established players, and, on top of that, emerge in unstable environments. Stinchcombe (1965) was pioneer in identifying and explaining this phenomenon of the ‘liability of newness’.

Consequently, access to external funding is one of the greatest constraints that impact on the growth trajectories of NTBFs. Besides, timing is crucial because there are short ‘windows of opportunity’ in which investments should be made (Storey and Tether, 1998). Moreover, there is a ‘knowledge gap’ between entrepreneurs and investors since NTBFs’ founders have difficulty in persuading them about their ability to successfully manage the firm and the return of R&D investments (Storey and Tether, 1998).

Another critical liability lies in the fact that NTBFs lack credibility and the novelty of the products commercialized seriously aggravates the difficulties faced by these firms (Storey and Tether, 1998), particularly concerning the process of transferring science and technology research into the economic sphere through commercializing products (Fontes and Coombs, 2001).

The survival and growth of NTBFs are crucially dependent on the presence of other elements and on the relationship they establish with them (Fontes and Coombs, 2001). Therefore, there is a need to entail other actors to complement and better manage the existent liabilities. More on the role of networks in NTBFs will be explained in sub-section 1.2.5.

1.1.1 Characteristics of NTBF's founders: the technical entrepreneur

As Storey and Tether (1998, p. 936) state: "NTBFs tend to be established by highly educated founders, which implies they are formed with more 'human capital' than most low-technology firms". Therefore, NTBFs are significantly different from the typical firm. It is well known that NTBFs employ relatively more scientists, engineers and doctorates (Rickne and Jacobsson, 1999).

Ganotakis (2012) argues that the creation of NTBFs requires technical academic qualifications to allow a successful exploitation of the leading edge technologies and the introduction of new radical products in the market. In fact, only firms with the best human resources will be able to be at the 'leading edge of knowledge' and have the chance to transform markets and societies (Storey and Tether, 1998).

On the other hand, NTBFs' performance can improve by acquiring management and technical skills through experience and education (Ganotakis, 2012). After all, even if technical competences are critical, they are not enough to guarantee successful firms because entrepreneurs must complement their education levels with both business and managerial skills (Ganotakis, 2012).

Oakey (2003) advocates that managerial competences can be acquired through formal business education. Therefore, there is a need to develop the business skills of potential entrepreneurs in universities, for example, by providing courses in entrepreneurship (Storey and Tether, 1998). This business education will help entrepreneurs to learn how to successfully manage firms and make better strategic decisions, identifying the right markets, access funding, and improve their marketing skills (Ganotakis, 2012; Oakey, 2003).

In addition, Ganotakis (2012) argues that national and regional policies should encourage management learning and training. Therefore, policy instruments such as incubators and Science Parks have an important role in strengthening entrepreneurs' skills and may perform a key 'marriage bureau' role, by combining the technical skills of the entrepreneurs with other players who have more experience in different subjects (Storey and Tether, 1998).

1.2 Incubators and Science Parks: tools for entrepreneurship

Technology-oriented business incubators have been a central issue to politicians across the world at least since the success of Silicon Valley in the U.S. (Tamásy, 2007). However, incubators' mission and objectives differ significantly across countries and cultures (Aernoudt, 2004).

Bridging the entrepreneurial gap and exploring how Europe can become more supportive to entrepreneurship, without infringing upon its traditions and cultural background, is one of the goals of incubators (Aernoudt, 2004).

1.2.1 Fostering economic development in Europe

The concept of business incubator was first developed in the U.S. It was only later that Europe established similar initiatives, when in 1984 the European Union (EU) introduced the concept of BIC (Business Innovation Centres) integrated in a Business Innovation Network (Aernoudt, 2004).

BIC shelter both emergent and existing firms. They are essentially designed to support small and medium (SME) innovative businesses and entrepreneurs, by offering a services' 'tailor-made' integrated system and, therefore, encouraging innovation in the regional system (EU, 2010).

Since BICs' main goal is the reduction of regional disparities, they have an undeniable role in promoting European economic development (Aernoudt, 2004).

However, Aernoudt (2004, p.127) argues that "one of the biggest barriers for the development of incubators in Europe is the lack of entrepreneurship". In what regards Portugal, entrepreneurship seems to be more motivated by the existent difficulties in the access to the labour market and career improvement than by to the ambition of creating more value for societies (QREN, 2012). However, at this level, some positive indicators have been emerging in Portugal, such as the increase in the number of students in master and PhD scientific based courses (QREN, 2007), featured by a great potential of transferring knowledge to firms through the commercialization of technology.

Within this type of environment, the creation of technology-based incubators is crucial since they combine entrepreneurship with the commercialization and transfer of technology to the regional community (Philips, 2002).

In addition, as already mentioned, incubators are important instruments for minimizing the problems faced by NTBFs. As Fontes and Coombs (2001) argue, sooner or later

most of these firms are faced with the limitations of national demand for technology intensive products, whether as market resistance to sophisticated products offered by a start-up, or as the standard need to expand the market.

Actually, technology-based firms face the same difficulties of most new firms attempting to enter a new market. However, these difficulties seem to be reinforced by certain specificities of these firms (Fontes and Coombs, 2001). For example, and this is clear for the Portuguese case, there is a much more limited demand for high-technology products, which combined with a conservative behaviour of the market towards newness aggravates these problems. However, even if these firms' products do not successfully enter the market, at least they end up contributing to potential applications of the created technology (Fontes and Coombs, 2001).

Beyond the above mentioned limitations, important constraints emerge within these firms namely regarding seed financing and business angels' networks (Aernoudt, 2004). Incubators, once more are relevant tools to overcome these gaps and promote innovativeness and the creation of technology-based firms (Bergek and Norrman, 2008). After all, "NTBFs are crucial to the long term development of an economy and in this sense deserve special treatment" (Storey and Tether, 1998, p. 944). Incubators emerge as an 'eye-catching' instrument to achieve such ends, being crucial to formulate the right policies to nurture these firms and enhance their performance.

In conclusion, it is essential that Europe focus in building networks and benchmarks its practices in order to develop entrepreneurship, incubators and a virtuous circle for the regional economy (Aernoudt, 2004).

1.2.2 Incubators: conceptualization and characteristics

To find a consensual definition is a difficult task, because 'incubator' is an umbrella concept that is used to describe a wide spectrum of initiatives. There are, however, several similarities about the concept, even if there are not two incubators alike (Peters *et al.*, 2004).

Most authors who discuss this topic agree that an incubator provides a mix of services that range from physical infrastructures to business support services and access to networking (Aernoudt, 2004; Bergek and Norrman, 2008; Bøllingtoft and Ulhøi, 2005; Chan and Lau, 2005; Hacket and Dilts, 2004; Peters *et al.*, 2004; Philips, 2002).

The common definition found in literature refers to an incubator as a supportive environment to the establishment and development of emergent firms (Chan and Lau, 2005; Peters *et al.*, 2004). For example, Aernoudt (2004, p. 127) sustains that “Incubators nurture young firms, helping them to survive and grow during the start-up period when they are most vulnerable”.

The European Union (2010, p. 6) provides a more detailed definition: “a place where the incubation activities are carried out, and where the would-be entrepreneurs and the existing SMEs find a suitable place, in terms of facilities and expertise, to address their needs and develop their business ideas, and transform them into sustainable realities.”

Therefore, incubators offer a combination of factors that aid the entrepreneurial process (Peters *et al.*, 2004). After all, an incubator is a means to an end, and not an end in itself (Hackett and Dilts, 2004) and a vehicle to compensate the restricted resources of the young innovative firms, concentrating spatially a variety of vital elements in order to guarantee long-term survival after graduation, growth and sustainability (Schwartz, 2011). Bøllingtoft and Uhløi (2005, p. 269) defend that “the combination of different resources, services and skills is thought to create a synergy for incubates”.

Therefore, an incubator performs a ‘bridging function’ by searching and managing the process of innovation in new firms, supplying the resources needed at different stages of development and also managing the cost of potential failures (Hackett and Dilts, 2004). Thus, incubators will act as mediators of the impact of the other actors or institutions, by amplifying the positive factors and minimizing the negative (Hackett and Dilts, 2004) and by leveraging the entrepreneurial talent, contributing to the expansion of their potential (Bøllingtoft and Uhløi, 2005).

In the end, an incubator is also “a manufacturer of new firms” (Hackett and Dilts, 2004, p. 43). In any case, the main goal is to produce successful firms that will become economically viable and independent and that are able to leave the incubator in reasonable time (Aernoudt, 2004).

It is important to note that two distinct models for the incubator, technology and innovation centres, are established around the world (Thierstein and Wilhelm, 2001).

On one hand, the Continental European model is mostly publicly funded and is a part of the public innovation policy. This policy is centred in regional development and the promotion of innovation networks (Thierstein and Wilhelm, 2001). These centres

commonly face a dilemma: serving as many firms as possible or enhancing their profitability by strictly defining their full capacity.

On the other hand, the Anglo-Saxon model identifies as the central focus the promotion of NTBFs, which requires close links and physical proximity to universities and other higher educational and research institutions (Thierstein and Wilhelm, 2001).

Thus, incubators may differ significantly in terms of their objectives (Bøllingtoft and Ulhøi, 2005). Some are created to promote regional economic growth while others have as their primary goal the transfer of academic research into products by promoting close linkages between universities and technology-based firms (Bøllingtoft and Ulhøi, 2005). In fact, Thierstein and Wilhelm (2001) state that incubator centres in larger and more developed cities tend to focus in technological and research activities, contrasting with the centres located in more peripheral regions, which usually target the non-tech fields as their core activity, such as everyday economic activities related to their regional networks.

Then, the geographical environment is an undeniably key determinant to the success of the adopted incubation model (Tamásy, 2007). However, it may occur that *a priori* friendly environment may lead to disappointing performances as well as it may be possible to overcome an unfavourable environment by fully embracing the opportunities that emerge (Tamásy, 2007).

Either way, even if each incubator has their particularities, they share a common goal which is to provide the conditions to compensate for the perceived failures or imperfections of the market (Bøllingtoft and Ulhøi, 2005).

To acquire credibility in the market is also an intangible benefit that emergent firms can obtain by being associated with an incubator with good reputation (Chan and Lau, 2005), as well as the creation of an entrepreneurial *milieu* (Dettwiler *et al.*, 2006).

In the specific case of the technology-oriented incubators, their role is to provide the supportive environment to facilitate the transfer of science and technology into the economic sphere, through the commercialization of innovations (Philips, 2002; Tamásy, 2007). In spite of the definitions here presented and reviewed, it is important to consider and understand that the concept itself evolved over time, because ever since the creation of the pioneer incubators the offer has been changing according the perceived needs and challenges faced. More on this topic will be developed in the next sub-section.

1.2.3 Expansion of the value proposition across generations of incubators

Bruneel *et al.* (2012) summarizes the evolution of business incubators' conceptualization, describing three generations with different offers. In the first one, the core support is the offer of subsidised and flexible office space and other shared resources such as laboratories or meeting rooms (Bruneel *et al.*, 2012; Schwartz, 2011; Tamásy, 2007). Chan and Lau (2005) observe that tenants consider this component highly beneficial, predominantly for firms whose product technology requires more time to develop. This "hardware" component eases the problems faced in the early stages of the start-ups by reducing fixed costs through sharing of resources (Schwartz, 2011; Tamásy, 2007). Hence, it allows that tenants benefit from economies of scale within the business incubator (Bruneel *et al.*, 2012). However, an initiative can still be considered as an incubator even if physical infrastructures are not provided, a phenomenon called as virtual incubation (EU, 2010).

Even if the offer of physical infrastructures is the core and the most common feature, the proposition of value associated with the incubator has been expanded over time. Hence, the second generation already offers business support services, such as coaching and training (Bruneel *et al.*, 2012), also assisting in marketing, accounting and human resources managing (Schwartz, 2011). These last support services are perceived as important parts of the intellectual human support for a start-up (Chan and Lau, 2005). Since, as previously described, business advice is crucial for technology-based entrepreneurs, the offer of these services allows tenants to solve their problems in a faster and more efficient way, and to ascend more quickly in the learning curve, by avoiding a too costly process of trial and error (Bruneel *et al.*, 2012).

Finally, the most recent generation focus on the development of networks which will allow the incubator to act as an intermediary in the access to external resources, knowledge and even credibility from actors in the surrounding environment (Bruneel *et al.*, 2012; Peters *et al.*, 2004). Networks can be established in order to obtain both tangible and intangible resources and may be internal or external (Soetanto and Jack, 2013). The relevance of networks will be further explored in this report.

1.2.4 Science and Technology Parks

“Science Parks and incubators are the intermediate organizations that provide the social environment, technological and organizational resources, and managerial expertise for the transformation of a technology-based business idea into an efficient economic organization” (Phan *et al.*, 2005, pp. 170-171).

In literature, incubators and Science/Technology Parks are commonly considered as identical initiatives (Peters *et al.*, 2004). Despite that, most researchers link incubators to the early stages of development in a firm’s life (Aernoudt, 2004; Bergek and Norrman, 2008; Hacket and Dilts, 2004; Löfsten and Lindelöf, 2005).

Most Science Parks (SP) provide incubator programs because incubation is considered to be an important function for the survival and growth of technology-based firms (Chan and Lau, 2005). Therefore, different firms coexist in the SP (new as well as more mature firms) because the park’s management usually complements its portfolio (Westhead and Batstone, 1998; Jimenez-Zarco *et al.*, 2013).

Science, Technology and Research Parks correspond to policy instruments implemented to encourage innovation (Löfsten and Lindelöf, 2002) and urban regeneration (Westhead and Batstone, 1998), acting as ‘bridge builders’ between the academic and the economic sphere (Kakko and Inkinen, 2009).

According to the United Kingdom Science Parks Association (UKSPA) and the definition adopted by Monk *et al.* (1988), SP are initiatives with formal and informal ties with institutions such as Universities and Research Centres, that focus on the creation and growth of knowledge based businesses, and have a management function on the transfer of technology and business competences to their tenants.

Different categories have been used to describe the same concept such as innovation centres, industrial parks, science and research parks, and there is not an universal definition of SPs (Monk *et al.*, 1988; Thierstein and Wilhelm, 2001). Instead, we have a wide range of concepts.

On top of that, different types of SP have distinct institutional contexts, goals, characteristics and stakeholders that may also continuously change (Phan *et al.*, 2005; Thierstein and Wilhelm, 2001).

Moreover, it is not possible to understand the emergence and growth of SP in specific regions without analysing the environment where they emerge because each location has its own particularities (Druilhe and Garnsey, 2000).

It should also be noted that SP are initiatives usually created through public-private partnerships, with a variety of stakeholders that have influence in the establishment of the business model, which adds even more complexity in the definition, characterization and understanding of SP (Phan *et al.*, 2005).

According to Sternberg (1990), the three main goals of SP are the creation of start-ups, the creation of qualified jobs in the region, and the transference of research results into practice – technology transfer. Thierstein and Wilhelm (2001) sustain a similar position, considering that the promotion of start-ups and their innovative potential, as well as the enhancement of the regional innovative potential are the main goals of SP. Thus, SP are expected to accelerate the diffusion of technology, and play an important role in innovation and industrial renewal (Löfsten and Lindelöf, 2005).

Silicon Valley grew as a great centre of R&D taking advantage of the proximity to the best universities and a remarkable domestic consumer market. Cambridge also took advantage of the proximity to a world-class university. These examples suggest that access to talent is a critical component to the creation and development of a successful SP (Phan *et al.*, 2005). In fact, SP tend to attract a more motivated type of entrepreneurs because a SP is usually associated with an innovation-generation environment (Löfsten and Lindelöf, 2002). In fact, the presence of a SP is an incentive for people to stay in the region and motivates them to create their own business (Druilhe and Garnsey, 2000).

One of the most relevant economic contribution of SP is the opportunity they give to academics to start their business through the commercialization of their research (Löfsten and Lindelöf, 2002; Westhead and Batstone, 1998).

Bakouros *et al.* (2002) and Westhead and Batstone (1998) sustain that the main reason for the establishment of firms in SP is the access to the Park's infrastructure and communal space, which involves parking facilities, communication and transportation connections, and administrative services, and also the better image associated with the address of the SP. In addition, the access to research facilities, the increased recruitment possibilities of recent university graduates and potential synergies between tenants are also considered valuable (Westhead and Batstone, 1998).

Sternberg (1990) argues that the most valued benefits are the reduction of fixed overheads, the enhancement of contacts with other tenants, the reputation of the Park and the greater chances of financial funding. The access to consulting services, establishment of contacts with R&D facilities and the degree of flexibility achieved by adapting to the changing needs of the firms are also considered important.

It is, however, the region's actual demand that should crucially determine the critical resources and services offered by a SP (Thierstein and Wilhelm, 2001). The management body responsible for the Park must be capable of evolving according to the changing environment where the SP is integrated in order to create more value to its firms (Phan *et al.*, 2005). Moreover, the Park needs to design a service portfolio adapted to the needs and characteristics of the firms, to be able to customize its offer in terms of network spectrum, financial resources, mentoring and training (Jimenez-Zarco, 2013).

Also concerning the management of the Park, it is rather significant to consider that the needs of the tenants change according to the lifecycle phase they are in. When firms are young, they tend to expect that the incubator is able to fulfil managerial functions (such as identifying funding opportunities, recruitment and development of business networks) on their behalf. However, as time goes by, firms start to be more independent and begin performing that type of functions by themselves (McAdam and McAdam, 2008).

Another critical factor in the analysis of a SP is associated with the charged rents and the flexible conditions offered. This is most relevant since SP offer the possibility for firms to grow and stay in the Park (Westhead and Batstone, 1998), not having the need to reallocate and eventually losing already established networks (Dettwiller *et al.*, 2006).

However, this flexibility has some caveats because the possibility of expansion faces a limit when the occupation of the space is 100% (Sternberg, 1990). There are other crucial disadvantages perceived by tenants such as the disturbance caused by interviews, and visitors' traffic; the possibility of rivalry; and also the fact that a possible negative reputation of the centre may impact on the firms within (Sternberg, 1990). Even in terms of networking and synergies, Bakouros *et al.* (2002) came to some disappointing results since firms do not seem to have research-based synergies in terms

of joint research or shared equipment. Overall, firms' most common links were social interactions and commercial transactions (Bakouros *et al.*, 2002).

The capacity of a SP to address the liabilities of NTBFs is related with the resources available on-site and the access to loan funds and other funding options (Löfsten and Lindelöf, 2003). Consequently, it is fundamental that the Park manager has the ability and time to closely observe and offer advices about the best resources and partners, performing the role of a broker, also in the identification of funding opportunities (Löfsten and Lindelöf, 2003, 2005; Westhead and Batstone, 1998). In fact, the manager of the SP should then act as a gatekeeper/mediator in the provision and development of information and links with research institutes (Westhead and Batstone, 1998; Löfsten and Lindelöf, 2003).

The manager of the Park has also a critical role in decisions regarding firms already installed in the Park, the search for new projects and the assessment of potential applications. All the decisions made at these several levels affect the sustainability of the Park (Jimenez-Zarco *et al.*, 2013).

Firms in a SP tend to have closer links with universities, which can be beneficial to NTBFs if managers, decision makers and academics enhance the potentialities of co-operation (Westhead and Batstone, 1998; Löfsten and Lindelöf, 2002). After all, the development of research networks through formal links with universities can be helpful to develop insightful training and business programs to assist entrepreneurs (Löfsten and Lindelöf, 2002).

In line with the above arguments, what seems to be the ideal model of incubation considers the combination of SP, university and NTBFs in the same equation (Chan and Lau, 2005).

However, even if the link between NTBFs and universities is at the essence of the concept of SP, in some contexts the access to universities' resources is restricted to only low-level contacts and informal contacts, such as the recruitment of recent graduates (Löfsten and Lindelöf, 2002).

1.2.5 The role of networking

Incubators need to extend their offer beyond physical installations to be able to provide a superior value to the firms (Hansen *et al.*, 2000). Thus, via formal and informal

networking, incubators can provide access to several types of resources adapted to their unpredictable and constantly evolving needs (Peters *et al.*, 2004).

As explained before, incubators evolved and started to focus in the development of networks and networking activities that play a key role in the incubating process (Hackett and Dilts, 2004; Peters *et al.*, 2004). Thus, networks are now perceived as a vital element at incubators (Aernoudt, 2004; Soetanto and Jack, 2013). And, in the end, incubators perform the role of intermediaries or mediators (Peters *et al.*, 2004) between the know-how community that produces assistance and the firm that requests support (Rice, 2002).

The two dimensions of networking

Networks at incubators can be seen in two dimensions, as explained by Soetanto and Jack (2013). The first dimension concerns the networking activities developed to acquire tangible and/or intangible resources, while the second dimension differentiates between internal and external networks.

Obtaining tangible and intangible resources

First of all, the central purpose of incubators is the provision of resources where gaps exist in the form of resources, knowledge or competences (Rice, 2002), helping to overcome the NTBFs' liability of newness (Rice, 2002; Soetanto and Jack, 2013).

Regarding **tangible resources**, incubators may use a wide range of activities to promote the sharing of equipment or research facilities, with both internal and external partners to enhance efficiency and help reducing costs (Soetanto and Jack, 2013).

Surprisingly, the majority of the firms tend to develop more networks to obtain intangible resources (Soetanto and Jack, 2013).

However, **intangible resources** are more complex, such as knowledge, experiences and advices that can help solving problems or challenges (Soetanto and Jack, 2013). This is in accordance to Dettwiler *et al.* (2006), who argue that knowledge sharing is the crucial reason to promote collaboration among tenants in incubators. Furthermore, close proximity facilitates the transfer of valuable information (Schwartz, 2011), such as non-codified tacit knowledge (Soetanto and Jack, 2013).

Internal and external networks

An incubator that fosters networking will develop partnerships not only among their tenants, but also with external actors of the network, which will lead to a flow of knowledge and human capital (Hansen *et al.*, 2000). Moreover, collaboration with other firms can help addressing the entrepreneurs' lack of commercial and business skills (Fontes and Coombs, 2001).

Therefore, incubates need to pursue opportunities to develop internal networks with others tenants, as well as build relationships with external actors with the help of the incubator (Bøllingtoft and Uthøi, 2005). After all, a SP location near the key stakeholders, such as customers, suppliers and researchers will lead to the creation and enhancement of critical networks to aid in the development of NTBFs (Löfsten and Lindelöf, 2005). Hansen *et al.* (2000) stresses the creation of synergies through collaboration among tenants, which enhances innovativeness and helps achieving interesting symbioses (Bøllingtoft and Uthøi, 2005; Soetanto and Jack, 2013).

Westhead and Batstone (1998) found that tenants value the development of a communal atmosphere and the presence of communal spaces, which suggests that incubators should promote frequent interactions among tenants through formal and informal meetings and establish other activities to encourage the development of closer links (Soetanto and Jack, 2013). The provision of a meeting place such as a cafeteria is essential to develop informal bonds between tenants, and to create and develop synergies and networking (Tamásy, 2007). Aernoudt (2004) has a similar opinion, stating that the enhancement of networking between tenants will contribute to gains in efficiency, which can lead to an increase in the turnover ratios in incubators.

Contrary to this view are the findings of Chan and Lau (2005), who conclude that networking events between tenants do not have the expected effects of performing a linking function, because most of the times firms prefer to work by themselves since they have not much in common. In spite of that, they consider that networking can be useful if it is encouraged in the right stage of business development of the firms; otherwise it can be considered as a 'political show' to justify the public investment made (Chan and Lau, 2005).

Networks can also emerge between tenants and external actors, such as potential customers, partners, employees, financiers and researchers (Bøllingtoft and Ulhøi, 2005; Scillitoe and Chakrabarti, 2010). Networks will be of great use to complement tenants' needs and to obtain resources, and to find important advice from outside experts and partnerships through strategic connections, which will allow them to establish themselves ahead of their competitors (Hansen *et al.*, 2000).

By collaborating, the firm has opportunities to take advantage of the expertise and technology of the partners (Soetanto and Jack, 2013). In addition, by interacting with external actors, firms gain access to scientists and researchers from universities and research institutes (Soetanto and Jack, 2013), which is crucial to find opportunities and test ideas (Löfsten and Lindelöf, 2005), and also leads to a much more effective process of technology transfer between the two spheres (Fontes and Coombs, 2001).

After all, NTBFs have an important role in industrial networks, by facilitating the transfer of technology and enhancing the industrial fabric (Storey and Tether, 1998). Moreover, the transfer of technology between research institutes and local industries will eventually lead to the emergence of research directions in consonance with local industrial needs, resulting in a natural adjustment between present information, knowledge and human capital (Fontes and Coombs, 2001).

Finally, taking advantage of external networks is also helpful to potentiate learning opportunities and to build legitimacy in a faster way (Bruneel *et al.*, 2012).

Building a valuable network

Firms can build relationships with multiple agents interconnected in the network to obtain a variety of benefits and also to assist in building competitive advantage (Burt, 1992).

Consequently, structuring the network in the most effective way is a central issue, since there is an opportunity cost to consider and the preservation of networks requires time and energy, thus reinforcing the importance of having non-redundant contacts and focusing on the primary ones (Burt, 1992). After all, "there are good and bad networks for entrepreneurial success" (Peter *et al.*, 2004, p. 89).

Indirect ties are efficient and effective ways to maximize the benefits of networking (Ahuja, 2000; Burt, 1992). This is due to the fact that indirect ties are useful sources of information, providing a mechanism for knowledge spillovers, and on top of that, they require relatively low maintenance costs (Ahuja, 2000).

However, whether direct ties - valuable not only to obtain information, but also to gather critical resources - mean higher benefits comparing with those from indirect ties depends on many variables such as the context, the content of the ties, and the type of outcome desired (Ahuja, 2000). In addition, the optimal structure of networks will depend on the objectives of the network members, because their choices demand a trade-off between different potential interesting outcomes (Ahuja, 2000).

“[T]he ability to connect up to strategically important clusters of networks is a critical managerial skill” (Bøllingtoft and Ulhøi, 2005, p. 286). Thus, incubators need to avoid being isolated and enjoy the benefits from clustering and networking (Fontes and Coombs, 2001).

In fact, NTBFs in Science Parks provide a better structure to support formal and informal networks than off-Park firms, (Dettwiler *et al.*, 2006). However, it is also crucial that technology-based firms choose the right incubators, those who have ‘a common technological base’ that can provide better support (Scilitoe and Chakrabarti, 2010).

The value of customization

Soetanto and Jack (2013) advice against the current practices of networking at incubators that choose to deliver standardized network support instead of adapting it according to tenants’ needs, which reinforces the opinion of Peters *et al.* (2004) of the crucial role of network customization.

Unfortunately because of their focus, agendas, and lack of resources business incubators are not always aware of the firm’s needs or the different type of networking activities incubator firms engage in (Soetanto and Jack, 2013, p.435).

Consequently, they often end up offering the easier to gather sources, instead of looking for the ideal and tailored players to actual needs (Soetanto and Jack, 2013). In fact, developing flexible support contributes not only to the survival but also to the growth of

the incubated firms (Soetanto and Jack, 2013). Therefore, incubators' managers need to recognize their limited capabilities of direct assistance, which takes time and retards the processes, and instead provide access to the contacts and actors who are more suitable to help (Scillitoe and Chakrabarti, 2010).

Thus, incubators are slowly realizing that they need to improve networking support (Hacket and Dilts, 2004; Soetanto and Jack, 2013). It is vital to carefully study and consider the different characteristics of the firms, such as their innovative level; and also to identify the stage of development of the firm, which will help to suppress the obstacles by networking with the right players (Soetanto and Jack, 2013).

It is also important to understand that highly innovative firms tend to be more active in developing networks when compared to medium to low innovative firms, because they are more likely to face higher obstacles (Soetanto and Jack, 2013). However, a mix of tenants with different levels of innovativeness in an incubator usually hinders communication (Soetanto and Jack, 2013).

In the end, if incubators are in fact able to offer valuable networks, adjusted to the specificities of their firms, the potential role that NTBFs have "in technology acquisition, transformation, and dissemination within innovation networks" (Fontes and Coombs, 2001, p. 79) might be maximized or at least better managed.

2 Sanjotec

2.1 Sanjotec – Scientific and Technological Association

Sanjotec - Scientific and Technological Association (Figure 1) is a non-profit association in São João da Madeira (SJM), Portugal, created to encourage the region's competitiveness, by supporting the creation and growth of new and innovative projects.¹

Therefore, Sanjotec has the role of a facilitator, enabling a closer interaction between the industrial and the scientific spheres, and promoting the transfer of the available knowledge in the scientific base into valuable industrial products of interest to the local business community.²

As a result, Sanjotec focus on the diffusion of an innovative culture, promoting entrepreneurship by offering different types of business assistance and support to its firms through their integration in large and complex networks.



Figure 1- Sanjotec headquarters building

Sanjotec was an initiative of the City Hall of SJM in line with the strategic plan for innovation and competitiveness of the region. Therefore, it was a strategic decision to implement a SP close to the two main industrial areas in the city (Figure 2), to better assist the needs that may emerge in the industrial context of the region.

¹ *Sanjotec: Missão*, http://sanjotec.com/?page_id=816, accessed: 14 May 2014.

² *Sanjotec: Apresentação*, http://sanjotec.com/?page_id=17, accessed: 14 May 2014.

S. João da Madeira is a small municipality of 8 km², with high population density (2730,1 people/km²), located in the northern region of Portugal, which is part of the Entre Douro e Vouga sub-region, 40 km from Porto. SJM is a community of 21.700 inhabitants and 350 industrial companies, mainly SMEs, which have an annual sales volume of approximately 700 Million €³.



Figure 2 - Industrial areas and Sanjotec's location

2.1.1 Main characteristics

Sanjotec's first building (The Business and Technology Centre) officially opened in October of 2008 with 16 entrepreneurial projects already on-board. Since then, there was a considerable growth of the centre.

In 2012, there were already 40 firms in the Park (Figure 3). However, since 2008, 11 firms abandoned Sanjotec (Table 5). Of the 11, most of them went bankrupt, not being able to survive in the competitive markets, while others gave up on the strategic decision of being located in Sanjotec.

³ INE: *Statistics Portugal*,
http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_unid_territorial&menuBOUI=13707095&contexto=ut&selTab=tab3, accessed: 15 May 2014.

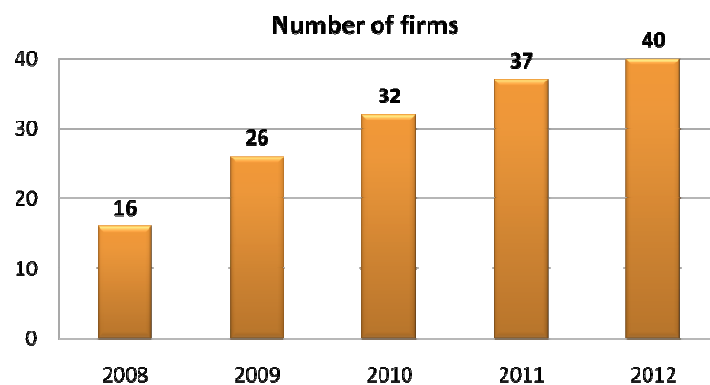


Figure 3- Number of firms in Sanjotec

In 2012, according to the last available data, Sanjotec's firms registered an annual sales volume of 10,3 million euros (Figure 4), and a full amount of 4,3 million euros (41%) of exports (Figure 5 and Figure 6).

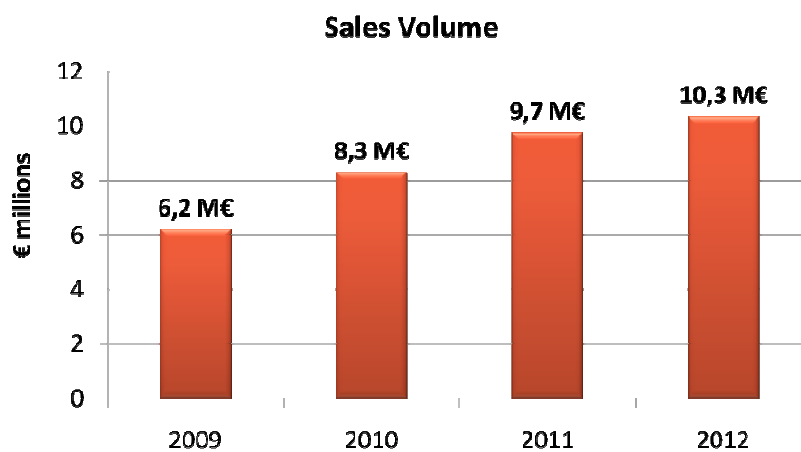


Figure 4 – Annual sales volume of Sanjotec's firms per year

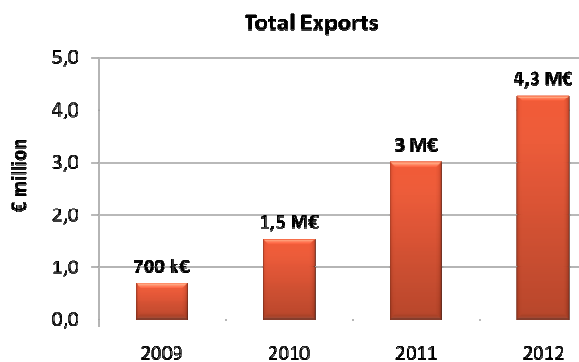


Figure 5 – Total exports of Sanjotec's firms

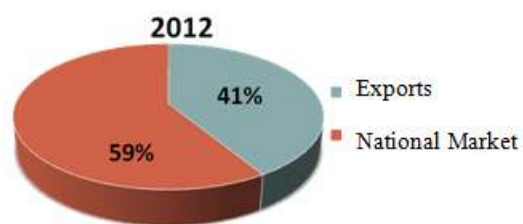


Figure 6 – Sanjotec firms' share of exports

Sanjotec's achievements can also be measured by the number of firms incubated through the years that still remain in the Science Park, because it is expected that after a successful incubation, firms remain in the SP where they have space to grow.

Presently, there are 40 firms in the Technology Centre (Table 4). The occupancy rate turned quickly into 100% because firms started to grow and to occupy more physical space. This led to the implementation of an 'open space' approach: encouraging new projects to share rooms with previous tenants. However, this is only a temporary solution, because there are already 5 firms waiting and in need of moving out of the headquarters building: CreativeSystems, Flymaster, Tech4Home, Tech4Food and Desicad. CreativeSystems is a striking case, because this firm currently employs more than 40 people and takes an entire wing in the third floor, including part of the access corridor.

This critical situation led to the start of phase 2: the creation of a Research & Business Development Centre (Figure 7), which was already planned since the SP genesis. This centre is currently under construction and it is expected to be concluded in late November. The building, with more than 9.000m², will have seven floors, three of them at the underground level (Figure 8). It is expected that with these firms leaving the main building, there will be 30% more available space for new firms, which in return will lead to an occupancy rate of 50% in the R&D Centre.

In the future, the goal is to keep investing in more units according to the expansion and growth of Sanjotec's reputation and success (Figure 9).



Figure 7 - Research & Business Development Centre



Figure 8 - Research & Business Development Centre



Figure 9 - Future perspective of Sanjotec SP

- 1- **Headquarters – Business and Technology Centre**
- 2- **First Research & Business Development Centre I (under construction)**
- 3- **Research & Business Development Centre II (expected in the future)**

Meanwhile, new challenges have emerged. Sanjotec has been experiencing an expansion at the level of its core business (technology-based projects). In the beginning of the year Sanjotec has been invited to manage the Creative Industries Incubator in S. João da Madeira - Oliva Creative Factory (OCF). Also, in the present year, Sanjotec has agreed to harbour projects in the social innovation field, being now one of two physical hubs for social innovation projects in Porto Metropolitan Area.

Thus, Sanjotec has been evolving, now embracing a structure similar to UPTEC, the Science and Technology Park of Porto, which has multiple specialized centres. The intervention areas that Sanjotec- Scientific and Technological Association currently manages, concerning different types of projects with distinct innovative nature (Figure 10), can be summarized as follows:

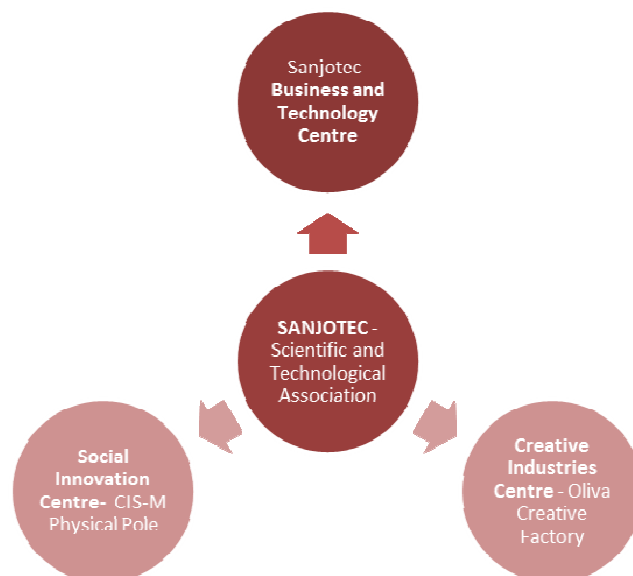


Figure 10 – Sanjotec Centres

- **Sanjotec – Business and Technology Centre** is the home of technology-based projects, the core of Sanjotec intervention and the field in which there are more know-how and experience. This building is now able to host 40 tech-based firms.
- **Creative Industries Centre at Oliva Creative Factory (OCF)** embodies an Incubator (with an open space policy), a Business Center, and Commercial Stores (Figure 11 and Figure 12). The number of firms in this centre is growing exponentially since Sanjotec started managing it: from 6 to 20 projects (Table 6) in 3 months. Within this process, 3 firms migrated from the Technology Centre because their core business was already on Creative Industries.



Figure 11 – OCF’s gates



Figure 12 - Oliva Creative Factory (OCF)

- **Social Innovation:** Sanjotec’s role in this field is still very incipient. Currently, there is only one project being supported in this field, Feltrando, which is incubated in OCF.

Sanjotec is waiting for the results of the CIS-M (Metropolitan Centre for Social Innovation) ‘Call for ideas of social innovation’ to harbour the winning projects of the contest, that will be physically located either in the Technology or Creative Industries Centre in line with their respective types.⁴

⁴ With a metropolitan scale, CIS-M materializes physically into two poles –São João da Madeira and Santo Tirso, both with the mission to promote and increase the society’s awareness to social innovation. The main goal is to capture, host and develop ideas and social innovation projects with potential to generate a positive social impact in Porto Metropolitan Area (for more details see *Lançamento do CIS-M – centro de inovação social metropolitano*, <http://www.amp.pt/gca/?id=903>, accessed: 2 June 2014).

2.1.2 Organisational model and governance

The organizational model of Sanjotec is summarized below (Figure 13):

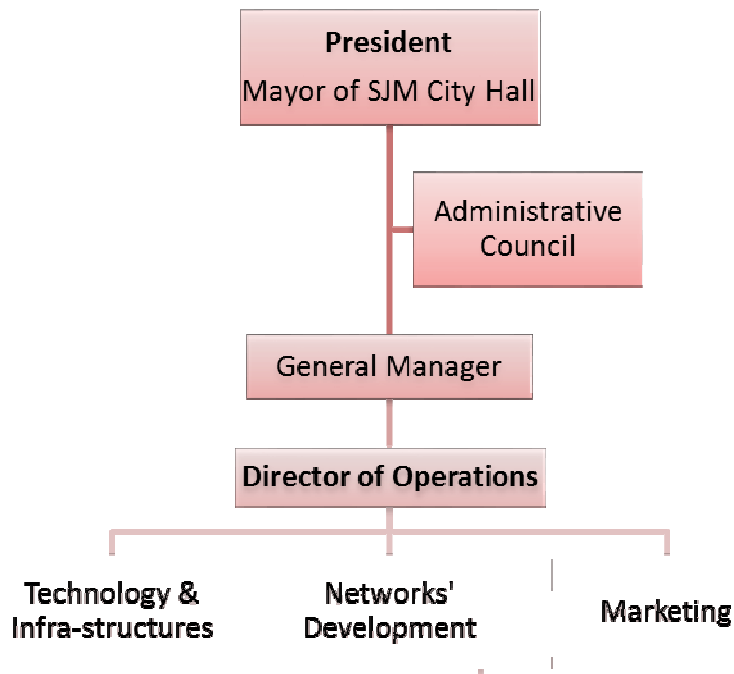


Figure 13 - Organizational model of Sanjotec

The president of Sanjotec is the Mayor of SJM City Hall, Ricardo Figueiredo. The Administrative Council members are Sanjotec's founding partners: SJM City Hall, University of Aveiro, Entrepreneurs Club of SJM, Faurécia, PortusPark, CEDINTEC (Centre for Development and Technological Innovation) and the Portuguese Footwear Technology Centre).

José Carlos Gomes is the general manager who performs financial and accounting functions and is in charge of critical and strategic decisions. Then, at the operational level, Alexandre Rios Paulo is the responsible for the daily management of the Park. He is responsible for attending and mentoring the tenants, and establishing important networks in order to better assist them.

During this internship main tasks were performed at the operational level, coordinated by Alexandre Rios Paulo, allowing a close contact with the dynamics of the Park. These tasks were important for assisting the creation of scientific and technological value, and also for designing and mapping events important for the development of tenants' skills

and for stimulating networking, both at the internal and external levels. In the next chapter, main activities and interventions that occurred during this internship will be further explained.

Sanjotec relies on a very small, but capable team that manages its activities through straight collaboration, which demands a collective staff effort to be involved in different processes. Therefore, there are no departments or strictly assigned work to each member of the team, requiring that all are perfectly synchronized and aware of the current and future situation at the Science Park. This internship offered the participation in this type of organization.

2.1.3 Founding partners

The founding partners of Sanjotec (Figure 14) add valuable inputs that ensure a collaborative network with the necessary skills to successfully embrace the identified intervention areas.

The relationships among all associates are reinforced by regular quarterly meetings, where the operational director reports to the general manager and the administrative council.



Figure 14 – Sanjotec’s founding partners

The administrative council members and the founding partners are:

- SJM City Hall;
- University of Aveiro (UA) – member of the European Consortium of Innovative Universities (ECIU);

- Association of Science and Technology Parks of Porto (PortusPark): a network of 14 Science and Technology Parks in the North region that harbour more than 340 firms.
- The Entrepreneurs Club of SJM – member of the regional Entre Douro e Vouga Entrepreneurial Council;
- Faurécia - Seats for Automobiles, S.A., a member of the multinational Faurécia Group, operating in the automotive sector with a 18 Billion € sales volume in 2013;⁵
- The Portuguese Footwear Technology Centre (CTCP) which develops and coordinates R&D projects in the footwear sector and related industries; provides technical consultancy and training, and focus in the research, testing and prototype building of new equipments and products since its creation, in 1986. The Portuguese Footwear Technology Centre is a member of the EURIS, the European Union of Research Institutes for Footwear.
- Development and Technological Innovation Centre (CEDINTEC) who helps firms in their innovation processes.

Due to the wide experience of its founding partners, Sanjotec has been capable of developing specific expertise in several areas:

- Promoting entrepreneurship and providing consultancy, technical support, tests and prototypes;
- Promoting, developing and supporting the execution of technological projects, including R&D activities that contribute to the industrial modernization and the competitiveness of industry;
- Supplying facilities and equipments that fit the needs of technology-based firms;
- Promoting cooperation and the spreading of technological and scientific information between its associates, R&D institutes, universities, projects in innovation and R&D at national and international levels;
- Identifying and selecting funding for the projects developed by its associates;

⁵ *Faurecia Annual Results 2013*, <http://www.faurecia.com/files/corporate/publication/file/2013-annual-results-ven.pdf>, accessed: 2 June 2014.

- Promoting the registration of patents and exploring intellectual property rights;

2.1.4 Networks

In order to be able to offer more value to its tenants and better answer their needs, Sanjotec develops and participates in several networks.

- **International Association of Science Parks (IASP)**

IASP is the worldwide network of Science, Technology and Research Parks (STPs) and areas of innovation. The network members are essential to enhance regional competitiveness and contribute to global economic development through innovation, entrepreneurship, and the transfer of knowledge and technology (Figure 15).⁶



Figure 15 – IASP's logo

Being a member in this global network means the participation in a complex interaction of thousands of innovative companies and research institutions all over the world, fostering all kind of synergies.

- **TecParques**

Sanjotec is also associated with TecParques (Figure 16), the National Association of Science and Technology Parks. This is an important link to the major worldwide network of Science Parks and Areas of Innovation – IASP.

The goal of this association is to promote and add value to the portuguese Science and Technology Parks, and to enhance their interaction with other national and foreign organizations related to innovation and knowledge transfer, as well as supporting innovation-based companies.⁷

⁶ IASP: A worldwide network of innovation, <http://www.iasp.ws/>, accessed: 3 june 2014.

⁷ TECPARQUES: Objectivos, <http://www.tecparques.pt/OBJECTIVOS.html>, accessed: 3 june 2014.



Figure 16 - National Association of Science and Technology Parks



Figure 17 - Association of Science and Technology Parks of Porto

- **PortusPark**

TecParques helps strengthening relationships between Science and Technology Parks at a national level. An important link that connects Sanjotec to the national network of SP is PortusPark (Figure 17).

PortusPark is a network of Science Parks and Technology incubators in the northern Portugal geographical area (Porto) that provides advanced services to the firms located in the SP of the PortusPark network.⁸

Its vision is to promote the northern region as an area of excellence and life quality relying on knowledge, technology and innovation, in order to be internationally distinguished through the creation of qualified jobs inside sustainable companies, and to be able to offer products and services of increasing added value to the global market.⁹

PortusPark has a critical role in the establishment of partnerships between the members of each Science Park, higher education entities, municipal councils, trade associations, corporations and other entities.¹⁰

Furthermore, the services and activity of PortusPark are oriented towards the SP in the network, as well as to the firms located in the Parks, offering a variety of customised consulting services.

⁸ *Conceito PortusPark*, <http://www.portuspark.org/index.php?id=80>, accessed: 3 june 2014.

⁹ *Visão PortusPark*, <http://www.portuspark.org/index.php?id=76>, accessed: 3 june 2014.

¹⁰ *Serviços PortusPark*, <http://www.portuspark.org/index.php?id=88>, accessed: 3 june 2014.

- **ENOLL - The European Network Of Living Labs**

ENOLL is a community of Living Labs with a sustainable strategy for enhancing innovation on a systematic basis. The main goal is to create and develop a dynamic european innovation system. ENOLL aims to support co-creative, human-centric and user-driven research, development and innovation in order to better attend people's needs.¹¹

S. João da Madeira Industrial Living Lab (SJM – ILL) is managed by Sanjotec and was created to encourage Entre Douro e Vouga regional competitiveness by establishing a dynamic model to support SMEs' innovation processes. In order to attain this goal and be able to address the requirements associated with the life cycle of a product (from the idea, to prototyping and market placement), the living lab needs to link all the main stakeholders: public administration, knowledge creation institutes, firms, and funding and finance partners.

The target end users of SJM-ILL are local SMEs of footwear and automotive industries and their customers. The SJM-ILL is a co-creative space for innovation focused on giving empowerment to the local industrial community end users.

2.2 Sanjotec - Business and Technology Centre

As it has been explained in the previous section, Sanjotec is considerably expanding its reach. However, the present report will focus on the analysis and study of Sanjotec - Business and Technology Centre (Figure 18) which hosts technology-based firms.



Figure 18 - Business and Technology Centre: Sanjotec's headquarters

¹¹ *Open Living Labs: FAQ*, <http://www.openlivinglabs.eu/FAQ>, accessed: 5 june 2014.

The Business and Technology Centre aims at encouraging technology-based firms with its core business in Robotics, Industrial Automation, Biotechnology, Chemistry, Design and Information Technologies. A sum of 40 technology-based firms is already established in Sanjotec headquarters (Table 4).

In addition, there are two other institutions of public interest hosted in Sanjotec: N3i, an association created to link investigators, investors and inventors; and Universidade Aberta, the only institution in Portugal of distance learning public higher education.

2.2.1 Offer- resources and services

Sanjotec offers a mix of services to satisfy technology-based firms' needs and accelerate firms' creation and growth.

Therefore, each firm pays a monthly fee that includes access to several **basic services** that go beyond the offer of shared physical facilities, such as:¹²

- Infrastructure management and preservation;
- Security and surveillance services (CCTV, visitors' reception and access control);
- Cleaning services of both shared and rented areas;
- Internal mail distribution;
- Telecommunications (internet access, free in-house calls and competitive prices to other destinations);
- An auditorium with 150 seats to host events (Figure 19);
- 2 shared meeting rooms (Figure 20);
- 3 training rooms, with a capacity for 20 trainees. Two of the rooms are equipped with 15 computers each.

¹²Sanjotec Serviços, http://sanjotec.com/?page_id=536, accessed: 5 june 2014.



Figure 19 – Auditorium



Figure 20 - Meeting room

In addition to the services listed above, Sanjotec offers several **Advanced Services** to its tenants:

- General juridical support: an external lawyer comes every month to solve tenants' legal problems;
- Accounting services: provided by one of the firms in the Park specialized in this type of support;
- Support in the elaboration of business and marketing plans;
- Intellectual propriety and patent registration: provided by CEDINTEC, and CTCP, Sanjotec's founding partners;
- Applications to QREN programs;
- Investment support and advice: Finicia, Venture Capital, Business Angels; MicroCredit;
- Data centre services.

2.2.2 Firms' acceptance process in Sanjotec

For a firm to be accepted by Sanjotec the following two main steps must be accomplished:

1. Business Idea Development

Completing the Data Submission Ideas / Project;
Work session with Sanjotec's experts.

2. Project Validation

Assessment of the project's technological and innovative potential;
Approval by Sanjotec's Operational Director;
Contract.

2.3 Main goals to be attained during the internship

The main tasks that were defined for the internship are listed in Table 1.

Table 1 - Internship Plan

Month Tasks	2014								
	December January	February	March	April	May	June	July	August	September
Review of Literature									
Start of the Internship									
Integration in the institution									
Learn about the model adopted at Sanjotec and the type of support given									
Understand tenants' needs									
Organizing specific programs and training needed to complement the entrepreneurs' lack of skills									
Establishing and developing networks: promoting cooperation									
Promoting the scientific and technological achievements									
End of Internship									
Analysis of the information collected									
Development of a SWOT summarizing the findings									
Identification of strategies to follow in face of the Strengths, Weaknesses, Opportunities and Threats identified									
Conclusion of the report									

3 Sanjotec' SWOT analysis

3.1 Methodology

Qualitative methods involve reporting and analysing a set of characteristics comparing them but not in terms of measurements or amounts (Thomas, 2003).

In the present analysis we follow a case study approach, which allows understanding a phenomenon's uniqueness through its careful examination in its real-life context purpose (Guest *et al.*, 2013). A specific case – Sanjotec- will be studied in detail, so that a comprehensive understanding of the organization is possible (Silverman, 2013).

In this particular study, at Sanjotec, the researcher is able to access people's routines, without being necessary to directly inquiry the agents. Thus gathering of most information is based on the observation of occurring events, not requiring the intervention of the researcher. Within this research context, the main focus will be on understanding the interactions between agents, through the close proximity to them (Silverman, 2013).

Guest *et al.* (2013) list different sources for data collection. In this study, the selected methods are the researcher's observation of the organization's characteristics, the context, and processes; and the analysis of documents or internet-based related issues.

During the period February 2014- July 2014, informal interviews were also implemented in order to understand the different perspectives of the actors involved. These included talks with tenants, potential tenants, colleagues and stakeholders. However, it should be considered that while studying an organization, there is a great dependence on the gatekeepers, which can limit the investigation (Silverman, 2013). In this particular case study, the gatekeeper, Alexandre Rios, the operational manager, not only helped and shared his vision and perception of the existing gaps, but also gave access to useful information and people in the network.

Trustworthiness must also be considered along the analysis because there is always potential for a researcher bias: people tend to say what they think the researcher wants to hear, painting positive pictures of most situations (Bowen, 2005). That is why daily and permanent contact, even by informal gathers like lunch, is crucial to understand without limitations true opinions and points-of-view.

To best summarize the collected information and systematize the ongoing study, a SWOT analysis was implemented.

SWOT analysis comprehends both an internal analysis of (S)trengths and (W)eaknesses, as well as an external analysis of (O)pportunities and (T)hreats (Thompson *et al.*, 2012).

SWOT analysis is a well-known and essential instrument to assist in the evaluation of an organization's overall condition that relies on the examination of internal resources and capabilities to compete in the markets. This tool also helps understanding in which degree the organization is able to seize opportunities and defend itself against external threats (Thompson *et al.*, 2012).

Strengths are attributes that help a firm to build competitive advantage according to the quality of its resources and capabilities, while *Weaknesses* are competitive liabilities and deficiencies, *i.e.* characteristics that an organization lacks or is considered a disadvantage in face of the competition (Thompson *et al.*, 2012).

Opportunities' attractiveness must be ranked according to the organization capacity to embrace them. Therefore, not all market opportunities must be pursued, because they might even be too much or too many, or even very brief or lasting (Thompson *et al.*, 2012). It's also necessary to identify the possible *Threats* to future profitability and well-being, to be able to evaluate what proper strategic initiatives must be taken to minimize its impact (Thompson *et al.*, 2012).

This analysis should also be used as a support to build a strategy aiming at increasing internal strengths, overcoming weaknesses, capturing opportunities and building shields to be prosper in face of the threats detected (Thompson *et al.*, 2012).

3.2 SWOT analysis

The participation in the organization helped gathering a deep understanding of Sanjotec's reality and allowed the compilation of information acquired through daily contact with Sanjotec's entrepreneurs and other stakeholders in both formal and more informal ways.

To be part of the complex network in which Sanjotec is embedded was crucial to arrive to this particular vision of Sanjotec's Strengths and Weaknesses, but also to be able to

identify Opportunities and Threats. Thus, based on the perception and work developed during 6 months of continuous commitment and integration in the Park management, it was possible to build a SWOT analysis to enrich and better document this case study.

Main findings are summarized in the following table.

Table 2 – Sanjotec’ SWOT analysis

STRENGTHS		WEAKNESSES	
Tenants of the Park			
• High occupancy rate and high “quality” of the tenants (in terms of profile/characteristics) • Acquisition of business cards/ magnets and reliable players • Relatively small % of firms that have left the Park • Consistency with the Park’s strategy		• High occupancy rate	
Offer			
• Reliable basic services • Permanent mentoring		• Advanced support services (few intern resources) • Lack of skills’ training • Non-customized support	
Location			
• Strategic location • Shared strategies between SP/Region		• Peripheral location • Ability to attract high-skilled workers	
Infrastructures/ Resources			
• Maximization of the space to rent • New building • Modern and well equipped conference centre, meeting and training rooms • Restaurant		• Signs of deterioration of the Headquarters building • Not leasable big empty spaces • Budget restrictions • Lack of a physical space for people to eat the food they bring from home	
Organization and Management			
• Fully committed team • Synchronized team • Gatekeeper		• Small team • Lack of “departmentalization”:	
Promotion and Communication			
• Engagement through direct/informal contact • PortusPark Newsletter/Website		• Lack of info about the SP and its offer • Low international presence • Organization of conferences and seminars • Informational campaigns • Mass media concerns • Weak online presence	

Strategy	
• Management of the Park's operations • Building/infrastructure preservation • Specialization in limited sectors, but not in a high degree of confinement	• Lack of future/long-term strategy • No strategic thinking • No systematized processes • Lack of tenants cyclic evaluation of needs/satisfaction levels
Technology-transfer	
• Cooperation with the Scientific environment (UA, ESAN,..) • Support on Industrial Property (GAPI- CTCP)	• Weak science based and local research capabilities
NETWORKS	
Internal Networks	
• Experience sharing • Cafeteria	• Networking among tenants is still incipient • Lack of interaction among employees of different firms
External Networks	
• Access to a variety of stakeholders with useful experience and skills • Regional industrial proximity • Capable founding partners • Partnerships with external entities	• Low development of links with financial actors/institutions. • Low development of international networks • Need to develop more partnerships in face of Sanjotec's expansion
OPPORTUNITIES	THREATS
• Dynamic ecosystem • SJM is an industrial municipality • Council taxes' incentives • Horizon 2020 • Collaboration opportunities among creative, technological and social innovative firms in the Sanjotec's centres, as well as with the more traditional industries well established in the region. • Cooperation/collaboration with other Science Parks. • Living Lab new paradigm	• Entrepreneurs' unwillingness to learn • With the creation of other centres, it is more difficult for the Sanjotec team to attend distinct needs (creative, technological and social) • Competition between Parks and similar infrastructures in the region • Low region's attractiveness • Lacking an actively engaging social environment, and an appropriate offer in terms of public transportation. Moreover, housing has rather high costs • "Competition" between tenants may intensify over time • Geographical distance from the partner university and few scientific facilities • Basic services might be more valued than advanced support services

In the next subsections these issues will be further developed in the two complementary analysis of this tool: internal and external.

3.2.1 Internal analysis: Strengths and Weaknesses

To better present the gathered conclusions, nine categories were created to compile, systematise, and facilitate understanding: Tenants of the Park; Offer; Location; Infrastructures/Resources, Organization and Management; Promotion and Communication; Strategy; Technology-transfer; and Networks.

Tenants of the Park

To help firms overcome the so called ‘liability of newness’ (Stinchcombe, 1965) that have been discussed in literature (Storey and Tether, 1998; Fonts and Coombs, 2001), instruments like Sanjotec focus on attending to their tenants interests and on suppressing their liabilities in order to help them build legitimacy. At the same time, the Park also benefits from the firms’ growth, managing to enrich its portfolio and build reputation among potential new tenants.

Incubators want their firms to leave after some time of being nurtured (Aernoudt, 2004). However, Sanjotec offers much more than an incubator program, which is a key element (Chan and Lau, 2005), but only one element of a Science Park. Sanjotec wants to retain its firms within its ‘walls’, thus being interested in building an interesting portfolio with both mature and recent firms, as a typical Park tend to have (Westhead and Batstone, 1998; Jimenez-Zarco *et al.*, 2013).

STRENGTHS

- **High occupancy rate** which is a good indicator of the success of the Park. In fact a high number of tenants provides credibility and enhances Sanjotec’s reputation among potential tenants.
- **Only a small % of firms have left the Park:** in 5 years, only 11 firms left Sanjotec. In most cases, it was due to their inability to survive. However, in addition to these 11, 3 more firms left because they were transferred to Sanjotec’s Creative Industries Centre.
- By analysing the profile and characteristics of Sanjotec’s firms, we observe a **mix of start-ups and more mature firms:**

- In 2013, more than 70% of the firms' employees had **higher education** qualification degrees. Furthermore, most of the human resources are young people (40% of Sanjotec's employees are under 30 years old).
- In 2012, firms were already capable of **exporting 40%** of their sales volume.
- **Acquisition of business cards/ magnets:**
The firm CreativeSystems (CS) is in Sanjotec since the incubator was created, in 2008, and is a pioneer in RFID systems for over 10 years with several projects developed in Europe, Asia and Africa. Recently, it has also gained a location in Silicon Valley. CS develops integrated solutions for data flow automation and optimization, supported by expert consulting in innovation, operational management and interactive experiences.
- **Acquisition of reliable players**
Sanjotec has also been nurturing more mature and well recognized firms, with its presence well established in national and international markets, such as Tecmacal, Cadtech, KellyServices, Tech4Home, and Flymaster.
- **Consistency with the Park' strategy:** firms who are not congruent with the Park's strategic focus do not meet the criteria to be accepted in the Park. Moreover, firms already established in the Technology Centre, such as ERT, ShoesCloset and DigitaLab migrated to Oliva Creative Factory (the Creative Industries Centre), because their core business relied on Creative Industries.

WEAKNESSES

- **High occupancy rate** can also be seen as a weakness, because it reduces flexibility for older tenants that might need to expand facilities. New tenants do not have that much choice as well, because there are few rooms available and no alternatives in terms of dimension. Thus, firms ended up facing the limits and caveats described by Sternberg (1990) in result of a 100% occupation of the available space. This situation lead to a new scenario of maximization of the leasable area, in which rooms that were originally created as management offices for administration purposes ended up rented to new tenants.

Services/ Offer

In the literature it is almost an universal truth that incubators and Science Parks must provide a mixed offer that will range from physical resources, to services and networking (Aernoudt, 2004; Bergek and Norrman, 2008; Bøllingtoft and Ulhøi, 2005; Chan and Lau, 2005; Hacket and Dilts, 2004; Peters *et al.*, 2004; Philips, 2002). Sanjotec offers this mix. The strategic networks established are clearly the central strength of the Park's offer. However, the advanced services could be expanded, to allow tenants to ascend more quickly on the learning curve (Bruneel *et al.*, 2012). Basic services are also seen as crucial since most Sanjotec's entrepreneurs argue that they mostly value the capacity to fully focus on their business and to be able to forget trivial issues such as surveillance, cleaning, and so on, which is in line with the conclusions gathered by Bakouros (2002), Chan and Lau (2005), and Westhead and Batstone (1998) on the perception of this component of the offer as highly beneficial, allowing low fixed costs (Schwartz, 2011; Tamásy, 2007).

STRENGTHS

- **Sanjotec delivers convenient and reliable basic services** that allow tenants to focus on their core business;
- **Permanent mentoring:** Sanjotec offers support and guidance to both new and old tenants, helping them to define and adapt their strategy in face of their ever-changing needs.

WEAKNESSES

- Limited range of **advanced support services**: there are few intern human resources available to offer consulting services to firms. However, access to know-how and experts is possible through Sanjotec networks and close partners.
- **Lack of skills' training** and other activities oriented towards increasing entrepreneurs' management competences, through courses and workshops in distinct areas, such as marketing, Industrial Propriety and language courses. It is critical to develop the business skills of the technical entrepreneurs, through business education (Ganotakis, 2012; Oakey, 2003).

- **Non-customized support:** because of its high occupancy rate, Sanjotec has a portfolio of different kind of tenants, with distinct needs and state of maturation and should pay attention to their specificities.

Place/ Location/ Region

To facilitate technology-transfer and to establish links with universities is one of the major goals of Sanjotec. However, the organization was not founded with this main purpose. Instead, also in line with many other incubators created to promote regional growth (Bollingtoft and Ulhoi, 2005), this was Sanjotec's original goal. The surrounding environment is a key to success (Tamásy, 2007) and each location has its own particularities which impact on the characteristics of the SP (Druilhe and Garnsey, 2000).

On one hand, São João da Madeira can be seen as a good strategic location, as enlisted in the following strengths in this analysis. However, Sanjotec's location can also be considered a weakness, because even if it is close to several interesting geographic locations, it is not located in a metropolitan area or close to a university. Instead, São João da Madeira is an industrial city.

STRENGTHS

- Strategic location provides quick and comfortable access to:
 - 30-minute drive from the **airport**;
 - **Hotel ****** a 5-minute walk away from Sanjotec, and possibility of 2 accommodation options in the city;
 - **Mountains, beach, river, city, commerce**, all within a radius of 30km;
 - 40 km from Porto, 50 km from Aveiro and 290 km from Lisboa.
- **Shared strategies between the Science Park and the region**, namely with all the Living Lab potentialities, a real time laboratory that has been allowing interactive testing of new tech applications, promoting the involvement of local community.

WEAKNESSES

- Sanjotec ends up without a very strategic location, because it is not located near a university and São João da Madeira is a more peripheral region, thus being difficult to attract people to stay and work in the city.

Infrastructures / Resources

It's considered that the core offer of Science Parks and incubators is, after all, the "hardware", *i.e.*, the rental of physical resources and the flexibility that comes within and are usually highly valued by tenants (Bruneel *et al.*, 2012; Schwartz, 2011; Tamásy, 2007). Thus, the following conclusions can be retained:

STRENGTHS

- **Maximization of space to rent:** Given the lack of available space to rent, and the restrictions in terms of the rentable space, Sanjotec tries to maximize the utilization of empty spaces, renting corridors and even decreasing the administration offices. This way, it was possible to convert floor 0 (which was constructed to be used for administration purposes) into a profitable area.
- **New Building:** The construction of the new building will contribute to a better organization, but most of all, it will give the opportunity and flexibility for firms to grow and expand according to their needs. With the new building, the mature firms will be able to move and implement their R&D centres, while the main headquarters will specialize in harbouring start-ups.
- **Modern and well equipped conference centre and meeting rooms** which give the opportunity to host events and organize workshops of value for tenants.
- **Well-equipped training rooms** are essential to capture external entities capable of promoting training sessions to empower people. These courses might contribute to align the offer according to the specific recruitment needs of Sanjotec's firms. Presently, ATEC has been promoting courses of technical specialization as well as University of Aveiro, in subjects that were found strategically relevant to the region.

- The existence of a **Restaurant** operating in the facilities to serve tenants is essential to stimulate intern networking.

WEAKNESSES

- In spite of being only a few years old, **the headquarters building** is already evidencing a number of damages, like cracks in walls and damages caused by moisture, conveying a bad image to potential and present tenants.
- **There are big empty spaces** that do not offer any renting possibilities, because the building was originally built with more aesthetic than practical concerns, like large corridors and excessive and unnecessary wide open spaces.
- **Budget restrictions:** financial resources to ensure the Park's development and maintenance in terms of infrastructure, and to invest in the promotion of tenants' skills are limited, being necessary to rely on partners, mechanisms and programs of financing support.
- **Lack of a physical space for people to eat food they bring from home.** With current full capacity, it is not possible to install a microwave and arrange a 'chill-out' space for lunch-time.

Organization and Management

Tenants' needs change and evolve. Thus, firms in their earlier stages demand much more support from the incubator management team (McAdam and McAdam, 2008), which should focus their efforts in supporting new firms that, as the literature sustains, usually lack management skills.

Alexandre Rios, the Parks' manager, performs the role of 'broker', commonly identified in literature (Löfsten and Lindelöf, 2003, 2005; Westhead and Batstone, 1998), devoting his time to closely observe and advice more than 40 Sanjotec's firms.

STRENGTHS

- **Small, but fully committed team**, with know-how, experience and skills to capture, assist and retain firms.

- **Small but “synchronized” team.** All collaborators are aware of what is happening, contributing and assisting each other in the processes. Hierarchy is not a barrier because all collaborators can assist, are up to date, and there is a fluid and consistent flow of information.
- Alexandre Rios, the **gatekeeper**, is an essential part of Sanjotec, providing mentoring and support in the development of important links and networks.

WEAKNESSES

- **Small team:** the Park has been attaining a large dimension and so it is no longer feasible to maintain the current resources. More experienced and skilled personnel are necessary for the Park to be able to respond efficiently to the tenant’s needs and be able to monitor their developments.
- **Lack of “departmentalization”:** there is no clear definition of employees’ performing functions. Multitasking and versatility is required, which might also be seen as strength. All collaborators need to do almost anything, from strategic thinking and project management, to more operational tasks that imply managing the daily routines in the Park.

Promotion and Communication

To help Sanjotec become an excellence innovation centre, current promotion and communication efforts should be analysed, to understand what has been done well and what is currently lacking in order to be able to build the right strategy and rethink the marketing strategy.

STRENGTHS

- **Presence of strong levels of engagement through direct/informal contact (strong public relations function in the Park).** The team joins efforts to inform tenants to attend events through mailing, phone calls and informal meetings, at breakfast/lunch, etc.
- **PortusPark newsletter/website.** Sanjotec has the opportunity to insert news into the newsletter that is distributed across Parks and beyond. The website helps

promoting and building reputation and visibility, through institutional news, but also through news on the achievements of Sanjotec firms. Consequently, it helps to assure that all Parks are aware of what is happening inside the network.

WEAKNESSES

- **Lack of information about the SP and its offer.** There is a need to expand and invest in the creation of a ‘brand’ or visual identification of the Park.
- **Lack of an international presence.** Sanjotec shows low participation in consortium projects and is usually absent from fairs/trade-shows.
- **Organization of conferences and seminars** is recurrent, but could be done more often.
- **Running of informational campaigns.** Sanjotec is lacking in terms of advertisements in the mass media, banners placed in the area of the city, posters at universities, and mailing campaigns aimed at selected target groups.
- **Maintenance of close relations with the mass media.** There is a concern on the preparation of press reports, articles concerning projects and activities of the Park as well as spreading science. However, given the lack of resources to allocate exclusively to these marketing functions, this area has been slightly neglected.
- **Weak online presence:**
 - Sanjotec.com is badly placed in **TrafficRank**: 7,252,837th most visited website in contrast with, for example, UPTEC, which has the 21,144th most visited website in the world;
 - Low number of **entries appearing in Web browsers** related to the Park: 9 740 results are found when the term ‘Sanjotec’ is searched on Google;
 - No **English version**, which reduces overseas exposition;
 - No **monitoring of the number of visits** of the website;
 - No **mobile optimization**. The website is not easily seen in mobile devices;

- Low **page load speed**;
- Lack of possibilities of **virtual visiting**. There are also few pictures and limited explanation/illustration of incubation conditions;
- No option available for **booking halls online**.
- **Lack of presence in social networks**. Sanjotec only has a LinkedIn account (and does not use it).

Strategy

Sanjotec main concerns are on operational issues, because it encompasses a small and efficient team, and there is always low time available for long term plans.

However, the formulation of the right strategy is crucial to establish priorities.

STRENGTHS

- Management of Park's Operations and Building/infrastructure preservation is a central concern and it has been subject to continuous monitoring.
- Specialization in limited sectors: Robotics, Industrial Automation, Biotechnology, Chemistry, Design, and Information Technologies. This strategic specialization allows focusing, alignment and orientation, assuring the right connections with distinct industrial actors.

WEAKNESSES

- **Lack of a future/ long-term strategy** and structures alignment with priorities at a national and international level in order to help developing the Park.
- No strategic thinking on **shaping future relations with particular entities in the environment**. There is a need for continuous focus in strategic network development, involving industrial experts, investors, business men, researchers, managers, marketing specialists and inventors.
- Lack of a cyclic evaluation to **study the degree of achievement of goals and examine the degree of satisfaction of tenants**. Currently, what is done is only a generic analysis of several indicators (sales volume, exports, employment

creation, human resources, and wages level) with the help of PortusPark in this process.

Technology Transfer

Technology transfer- the transfer of research and scientific knowledge into commercializing products (Fontes and Coombs, 2001) is also a crucial point of a technology-oriented incubator such as Sanjotec.

In fact, as the UKSPA definition points out, and as previously discussed, SP must have formal and informal ties with research institutions. Sanjotec has two universities as its founding partners, as well as close links with other research institutions. The links with universities assure, theoretically, the ideal model of incubation (Chan and Lau, 2005).

STRENGTHS

- Cooperation with the scientific environment:
 - Universidade of Aveiro is a founding partner and a crucial link in Sanjotec's network, helping to address demands in terms of the firms' needs.
 - ESAN partnership –The School of Design, Management and Production Technologies Northern Aveiro is within the “Entre-Douro-e-Vouga” area (EDV), assuming a strong regional component. EDV is one of the best positioned national regions in terms of international value and exporting orientation, namely in moulding, car components, metalworking, footwear, cork industry and food sectors.

This unit designs education proposals to respond to the local education needs through Technological Specialization Courses (CET). ‘Work Organization and Planification’ is currently running in Sanjotec, which helps improving regional EDV capabilities.

- Access to the Office of **Support to Industrial Property** GAPI- CTCP, a structure that aims to promote industrial property (IP) in the footwear sector,

leading to an increase in the competitiveness through innovation and differentiation.

WEAKNESSES

- Weak Science Base / Local Research capabilities.
- In spite of Sanjotec being located between UPorto and UAveiro, taking advantage of being “in the middle” of this two institutions, in fact is not physically “glued” to any superior research institution (the closest is a regional unit of UA: ESAN)
- Geographical distance ends up constraining significantly the potential to explore technical opportunities, thus having a limited role as a ‘bridge builder’ (Kakko and Inkinen, 2009) between academic and economic spheres. These limitations and the characteristics of these relationships with universities end up reducing the access to resources and information, as referred by Löfsten and Lindelöf (2002).

NETWORKS

The presence of other actors ends up being an essential feature to guarantee the NTBFs survival and growth (Fontes and Coombs, 2011). Networks must be developed, not only among tenants, but also with external actors (Hansen *et al.*, 2000).

Internal Networks

Collaboration among tenants has the potential to lead to interesting synergies and to boost innovation (Bollingtoft and Ulhoi, 2005; Soetanto and Jack, 2013). In fact, not only external networks are relevant since, sometimes, the most interesting links might be established with neighbours.

STRENGTHS

- **Experience sharing.** There is openness to collaborations among firms, proven by currently win-win relations that are nurtured in reciprocal interest. Firms at the Park work together in different projects, exploring cooperation possibilities.

- **Cafeteria** is the place where people across firms find the place to interact and get to know each other, with an important contribute in the development of informal links, which is in line with Tamásy (2007) findings. Therefore, the visible results of partnerships that emerged from informal networking are contrary to Chan and Lau (2005)'s argumentation on networking as a mere political show.

WEAKNESSES

- **Networking among tenants is still incipient and needs to be developed and promoted both at a formal and informal level.** Some firms work together in different projects. However, most of them do not know who their 'neighbour' is and what he/she is doing.
- Firms' collaborators do not interact with other firms' people, because usually the ones who tend to network more are the managers of the firms who attend to the promoted events. In this sense, there is **lack of cohesion and community**.

External Networks

As Storey and Tether (1998) advocate, NTBFs have an important role in the enhancement of the industrial fabric and, in the particular case of Sanjotec, NTBFs end up benefitting from the existent industrial links. Besides, it has been found that external networks are also opportunities for firms to learn and acquire credibility (Bruneel *et al.*, 2012).

STRENGTHS

- Sanjotec is expanding the network of cooperation with the environment, gaining **access to a variety of stakeholders with useful experience and skills** that complement tenants' needs and are important sources of resources and advice, as Hansen *et al.* (2000) emphasizes.
- **Regional industrial proximity** allowed the development of links in sectors such as footwear and the automotive sector.

- **Founding partners** are important links not only in the promotion of common events, but also by offering complementary skills and shaping relations with key entities from the environment.
- **Cooperation with CTCP** assures access to GAPI and links with the footwear industry.
- **Collaboration with UA** helps to support firms R&D activities and promoting training courses and the qualification of human resources. Furthermore, the link with the university helps to find opportunities and aids the process of testing ideas (Löfsten and Lindelöf, 2005).
- **Entrepreneurship Club of SJM** helps co-organizing initiatives oriented towards the entrepreneurial community and assures the access to relevant industrial links.
- **PortusPark network** assures that all Parks in the northern region are strategically connected and assures links with other important entities.
- Sanjotec establishes **partnerships with external entities that provide services and know-how** required by tenant firms. Plater, for example, is an on-Park firm that provides accounting services to tenants. Kelly Services, also a tenant, assists in the needs at a recruitment level, while Nonius is responsible for the internet and other technical support. There is also a lawyer that monthly provides general juridical advice. Besides, Sanjotec offers discounts in services of Safety and Health at Work through its partner Previsaude. A partnership with Microsoft ensures free software, support, and visibility to help startups, granting free software use to Sanjotec's firms during 3 years.
- **Multiple stakeholders** from both public and private sectors enable the creation of value and synergies through combination of resources. However, it is necessary that Sanjotec keeps gathering the right players, attending to its firms' characteristics and innovative levels (Soetanto and Jack, 2013).

WEAKNESSES

- Even if there is a visible effort to establish partnerships, the number of cooperating firms, scientific units, independent experts, consulting firms and

financial institutes is still low and has to grow to be in line with Sanjotec's expansion.

- Lack of development of links with **financial actors/institutions**, with the majority of firms facing financial constraints (Aernoudt, 2004).
- Lack of development of **international networks**. Currently, there are only formal links acquired through IASP and ENOLL.

After the internal analysis, we must consider the environmental factors that Sanjotec faces. A summary of the Opportunities and Threats will then be presented in Table 3.

3.2.2 External analysis: Opportunities and Threats

As Tamásy (2007) argues, environments that seem beneficial at first may lead to disappointing results, but it is also possible to succeed in spite of a less favourable environment by taking advantage of opportunities. Thus, Sanjotec must closely pay attention to the identified opportunities in order to be alert and succeed even in bad scenarios.

Sanjotec must also be aware of the external threats, in which the limited access to high skilled workers needs to be taken into serious consideration. It is not easy to capture and seduce people to work in São João da Madeira, and this is a critical factor for the success and growth of a Science Park (Phan *et al.*, 2005).

Then, the Park must be aware, in order to be able to react and evolve according to the changes in the surrounding environment, to be able to constantly create more value and better serve its tenants, as endorsed by Phan *et al.* (2005).

Table 3- Opportunities and Threats

OPPORTUNITIES	THREATS
• Dynamic ecosystem: Sanjotec takes advantage of a strong local industrial structure and know-how on distinct sectors, which allows access to several actors, infrastructures, and know-how to support innovation and entrepreneurship. • SJM is an industrial municipality with one of the highest rates of firms <i>per</i> square meter at a national level. • Municipal taxes' incentives increase the region's attractiveness. • Sanjotec must keep attention to opportunities that may arise from Horizon 2020. • Creation of synergies and collaboration opportunities among creative, technological and social innovative firms in Sanjotec's centres, as well as with the more traditional industries well established in the region. This will help to build an effective network with non-redundant contacts (Burt, 1992). • Cooperation/collaboration with other Science Parks. Sometimes, firms that do not have a 'common technological base' might need to be reallocated to another Park more capable of giving the proper assistance and support, as defended by Scilitoe and Chakrabarti (2010). • Living Lab new paradigm: SJM-ILL offers an opportunity to stimulate achievements of joint interest within actors of the local community.	• Entrepreneurs' unwillingness to learn: Sanjotec tenants often argue that they do not have time to attend to events because they tend to see these activities as a waste of their productive time. • With the creation of other centres, it is more difficult for the Sanjotec team to attend to the distinct needs (creative + technological + social). Even more considering that Sanjotec's team is very small. • Competition between Parks (UPTEC, UA's incubator, FeiraPark,...) and similar infrastructures in the region such as Coworking facilities. • Low region's attractiveness constrains the ability of firms to attract and retain qualified staff. • SJM is not seen as an attractive place to live, lacking an actively engaging social environment, and an appropriate offer in terms of public transportation. Moreover, the cost of housing is rather high, as well as the difficulties in terms of renting flexibility. • "Competition" between tenants may intensify over time, if there is an increase in the number of firms acting in the same field, which may cause conflict. • Geographical distance from university and few scientific facilities in the region affects innovation and technology-transfer capabilities. • Basic services might be more valued than advance support services, and thus the effort made to enrich the offer may turn out to be in vain.

3.3 Sanjotec's approaches and strategies

After understanding Sanjotec's model, and considering the knowledge gathered through the SWOT analysis, the formulation of fitting strategies is necessary to maximize most of the strengths, minimizing the weaknesses, taking advantage of the opportunities detected and still be aware of potential threats that need to be well managed and controlled.

In fact, in this research, the SWOT method is the main tool and was used to gain insight into the Park's Strengths, Weaknesses, Opportunities, and Threats. However, this survey is not the final contribution. The information produced by this method will then be used to define strategic approaches, in terms of Sanjotec's activities, redefining its offer and assisting in the creation of links between different stakeholders.

The strategic approaches are organized in discussion organized around 8 topics. In each topic general conclusions are presented, followed by a table that will reunite more specific actions that were developed through this internship and should/ still need to be implemented in the near future.

3.3.1 Tenants of the Park

Regarding tenants' selection, it is necessary to develop precise criteria to standardize and speed-up the admission process while providing reliability.

After the selection, there must be a monitoring procedure, consisting on a complex assignment of the business plan in several aspects, such as technology, marketing, finance, and law. It should also be given a greater emphasis on **recruiting firms from sectors heavily rooted in the region**, to increase the industrial innovativeness of the region.

Implemented initiatives:

- Systematization of the admission process by the elaboration of a new graph and writing proceedings, to increase not only intern alignment, but also external perception of Sanjotec's model.
- Sanjotec was actively engaged in the organization and idealization of the "Call for ideas on Social Innovation" in which people from the Porto Metropolitan

Area were called to submit their entrepreneurial ideas to help solve social and environmental problems in a sustainable way. The Social Innovation Campus- the second phase of the Contest- took place in Sanjotec and lasted two days, on the 4th and 5th of July. It was the prize to empower the 10 finalists of this Call, enabling social entrepreneurs to receive mentoring to help them developing / optimizing the business plan; and to help in preparation and presentation of the idea in a "elevator pitch".

- Establishment of contacts with Heliotextil to create a R&D Centre at Sanjotec (in negotiation).
- Promotion of initiatives with ERT textile to further explore its involvement in the ecosystem (ERT Innovation Workshops were hold with different region stakeholders).

Future strategic approaches:

- Delivery of a Beginners ‘Entrepreneurial Kit’, in which a Business Canvas Model template will be included, an entrepreneurship guide, flyers with Sanjotec’ services, and a document with useful links and information;
- Further evaluate other possibilities of renowned firms with strategically interest to create an R&D Center at Sanjotec, turning them into a magnet card for the Park.

3.3.2 Education/ training

More emphasis should be given in the development of a **talent pool** development through training and seminars. In fact, NTBFs performance can be enhanced through the increase of management and technical skills of the entrepreneurs (Ganotakis, 2012). Thus, it is necessary to complement the technical skills with education in managerial competences (Oakey, 2003; Storey and Tether, 1998).

Implemented initiatives:

- Establishment of a partnership with a Language School- ‘Escola Inglesa’- to develop an English Advanced Course oriented towards the specific need of Sanjotec’s entrepreneurs.

- Internationalization Session- ‘The Dubai market’: A practical session oriented by an expert that explained to Sanjotec’s entrepreneurs the characteristics of the Dubai market.
- ‘Roadmap for social economy’: This workshop aimed to share examples of social innovation business models and to explain how corporate social responsibility can help jumpstart businesses.
- Workshop: ‘How to create a Business?’: workshop promoted to help new entrepreneurs building basic competences in marketing, finance, business plans, and other legal and tax issues.

Future strategic approaches:

- Development of a partnership with a university to create a training program: enrolment into classes to help building management skills, distributed over a number of months, which will give entrepreneurs enough flexibility to attend. As Löfsten and Lindelöf (2002) point out, formal links with universities can be of relevance to create business programs to aid entrepreneurs.
- Coaching sessions:
 - Beyond the sessions with the in-house mentor, it would be positive to bring external experts from time to time, such as specialized lawyers, technology transfer specialists and marketing and financial experts, as well as business professionals.
 - Creation of a program to promote learning and sharing of experiences, in which Sanjotec more experienced and successful entrepreneurs will assist and mentor entrepreneurs in need. Therefore, a voluntary exchange of know-how will take place, in which seniors explain their past experiences and perpetrated errors, through a number of sessions.
 - Cooperation with mentors from local/regional businesses who have achieved success and are available to share their knowledge.

3.3.3 Services/ Offer

Basic Services should never be neglected, but instead be a central concern. These services are usually considered critical in literature, since they free entrepreneurs from trivial concerns, allowing them to focus on their core business because they know they can completely rely and trust in the Park services.

Customization of the offer according to the needs of the firms (that are in different life-stages) it is also a requirement. It might be relevant to add services with great demand, or eliminate some that do not bring value. Either way, a reallocation of resources will contribute to service portfolio optimization.

Implemented initiatives:

- Social Innovation Platform i4s:

A new service will be offered to help firms tracing a plan of social responsibility, in a ‘win-win’ logic, also by their integration in the innovation processes.

Future strategic approaches:

- Implement satisfaction surveys as a usual routine to promote continuous improvement.

3.3.4 Place/ Location/ Region

Considering the strategic location that in certain aspects, as previously discussed, ends up not being so strategic after all, there is a crucial need to identify ways to attract human capital to the city.

Implemented initiatives:

- Implementation of a direct circuit to Porto (Dragon Stadium –Sanjotec) because many collaborators live far away from São João da Madeira. Thus, it is essential to turn public transportation into a viable and economic choice to attract more people to work for the firms in the Park.

Future strategic approaches:

- Creation of partnerships to facilitate housing rental, with better conditions for collaborators from Sanjotec's firms, and by offering a portfolio of possible choices.

3.3.5 Infrastructures

To build attractive spaces to inspire, motivate, and enhance creativity of knowledge workers is a fundamental concern.

Implemented initiatives:

- Decorate existent spaces to be more engaging and dynamic and, therefore, increase attractiveness of the Park as a workplace.

Future strategic approaches:

- Create leisure areas (Ping-Pong tables, board games, ...);
- Install a TV in the restaurant to attract more tenants to eat lunch in-doors and increase internal networking;
- Provide a microwave in a common place for people who bring food from home.

3.3.6 Organization and management

Management skills should not be neglected. Thus, the team should be subject to continuous learning and professional development.

Implemented initiatives:

- Attending seminars and other relevant courses to ensure competences' growth and continuous learning, *e.g.*, Strategic 2020 Forum for Social Innovation promoted by Porto Metropolitan Area; or the TecParques Iberian Meeting.

3.3.7 Promotion and communication

Initiatives should be undertaken to create awareness and enhance Park's branding to attract potential tenants and promote in-house firms at the same time. Thus, it could be valuable to integrate Sanjotec marketing efforts with entities from its environment to help building media reputation. Moreover, an interesting approach could be expanding and improving website functionalities, increasing relevance in search engines.

Implemented initiatives:

- Online social presence reinforcement: creation of Sanjotec Facebook (~900 likes presently).
- Translation of the Website to the English language in order to increase overseas exposition and ease cooperation in international projects.
- Participation in international projects and elaboration of consortium proposals to Horizon2020, e.g. Human Canvas, Expanded D+.
- Creation of a Google My Business Account, which allows the identification of the Business Center in Google maps, among other features.
- Organization of conferences and seminars.

Future strategic approaches:

- Implementation of a SEO (Search Engine Optimization) strategy to increase online exposition in search engines which will lead to more awareness among potential tenants.
- Monitor website visits to understand what content creates more public interest.
- Possibility of external and internal entities booking halls through ERP.
- Increase awareness and access to the Park's facilities, by promoting initiatives in which the public is invited to visit and understand the Parks' concept.

3.3.8 Strategy

A serious analysis should be made in order to list all opportunities of development and define future directions. However, it should also be paid attention to strategy execution, monitoring and continuous adaptation.

Implemented initiatives:

- SWOT Analysis.

Future strategic approaches:

- Identification of resources: inventory's analysis and reallocation of resources, to increase efficiency.
- External environment analysis of all stakeholders involved (competitors, tenants, potential tenants, research institutes, partners...).
- To increase effectiveness in the cooperation with external entities it is essential to create a plan to identify opportunities of collaboration with environment actors.
- Analysis of regional documents of strategic character.
- Creation of an implementation plan with recommendations along with key dates.

3.3.9 Networks – cooperation with the environment

As Soetanto and Jack (2013) argue, SP managers need to look for tailored actors to satisfy the firms' needs, and they must be able to recognize their gaps and limited skills by seeking other actors more suitable to help and putting them in contact with the firms (Scilitoe and Chakrabarti, 2010).

A local learning environment and an entrepreneurial atmosphere should be developed, leading to a key 'marriage bureau' (Storey and Tether, 1998), through the combination of skills with other capable players.

Wallen Mphepö, Chief Technology Officer of a new wearable fashion tech company, iShuu.com, who contacted Sanjotec and asked to visit the incubator, left his testimony on the importance of networks found at Sanjotec:

"The tech ecosystem in Sao Joao da Madeira might just be the best place for our product to flourish. So now we are just looking at the various ways we can make that happen."

"(...) the trip to Sao Joao da Madeira exceeded all expectations. From the impressive Sanjotec Centre to the comprehensive shoe design, manufacturing and distribution ecosystem in the city. As well as how streamlined and efficiently run things are over there, starting from concept idea to design all the way to manufacturing. (...)

(...) "Really glad to have met you. I can foresee our collaborations resulting in some truly ground breaking work."

Sanjotec led Wallen into the right direction, giving access to critical actors, not only from the traditional shoe sector, but also to designers at the Creative Industries Centre and even arranged some meetings with firms from Sanjotec who develop Apps and mobile solutions. Wallen is now considering the possibility to reallocate to S. João da Madeira.

Thus, it is crucial to develop partnerships to foster effective networks among firms (even with different backgrounds, and distinct industrial sectors), technical research centres, industrial experts, investors, business men, managers and investors. Valuable networks must indeed be carefully built and customized, as Peters *et al.* (2004) and Soetanto and Jack (2013) sustain, in order to fully embrace the potential of NTBFs in the economy.

Implemented initiatives:

- Monthly Breakfast Meetings

Community breakfast to enable B2B Matchmaking and foster the sharing of ideas and experiences between entrepreneurs of the different sectors. This initiative was implemented with the goal of promoting informal meetings to discuss current issues, new business prospects and networking among participants. On June 26th, in the first edition of Monthly Breakfast Meetings, “Portugal Sou Eu” program was introduced to our entrepreneurs. Then, Adira and Molaflex pitched and shared their experience with the audience. After presentations, a moment of networking followed, with time for questions & answers, and exchange of contacts.

On July 17th, the second edition took place, this time oriented towards “Russian Markets”, in which four Russian CEO’s were the speakers: Victor Kovshevny, Igor Khaustov, Yves Djoy, Sergey Aryamov. This session was oriented towards explaining how to interact with this market in the present context of political uncertainty, and also offered an opportunity to discuss the influence of Russia in trade with neighbouring countries.

- **Entrepreneurs Club Meeting**

This meeting reunited over 130 entrepreneurs from traditional, technological, cultural and creative sectors, in which about 50% already represent the new generation of entrepreneurs supported by Sanjotec. Relevant speakers shared their internationalization experience and discussed supporting financing options available for firms.

Sanjotec should act as an intermediation agent, organizing events, such as cyclic meetings to promote networking, like seminars, and conferences to enhance all kind of competences, but also social/sport initiatives to get people to know each other through leisure. It must create higher integration and promote interactions between Science Parks. The creation of platforms of knowledge exchange between Parks to optimize the Parks' operations could be interesting.

The development of Scientific Networks is a particular case that needs to be reinforced through permanent integration of research institutions into the network, as well as strategic partnerships. Therefore, the creation and enhancement of synergies between higher education institutes and firms can be achieved by supporting activities to promote contact with graduates.

Implemented initiatives:

- **Open Day**

In face of the current problems experienced by its tenants in recruiting talents, Sanjotec planned an Open Day oriented towards students in technical areas, such as IT and automation engineering. Thus, Sanjotec welcomed University of Aveiro senior students to try to establish and develop a bridge between the academic and the business fields, as advocated in literature.

Students had the opportunity to get to know the installations and had the chance to meet and present themselves to the recruiting firms through a tech-challenge after the firms' pitch.

- Establishment of closer links with universities recruitment departments, and registration in universities' portals to publish recruitment opportunities to help

firms in need of qualified human resources (U.Minho, U.Porto, U.Aveiro, U.Coimbra).

Future strategic approaches:

- Develop international/national collaborative activities to better assist firms in research development;
- Creation of a portal in which graduates and other people can register and get access to new job opportunities;
- Enhance communication links, through the improvement of ERP features, and/or creation of a platform for exchange, networking and cooperation.

4 Conclusions

This internship opportunity was valuable at many levels, helping to achieve new insights into innovation issues, but also to closely live and be truly immersed in the reality of the organization where the internship occurred. It was possible not only to understand the problems faced in a daily basis by the management team of a Science Park, but also to learn how to insert long-term strategic concerns into the equation, considering a very small and focused team.

Sanjotec is concentrating efforts into building a brand for the Science Park, and getting a more sustained reputation, despite the difficulties it has to manage. For example, the organization faces a serious constrain due to the distance to universities when it aims to attract new entrepreneurial projects that emerge from recently graduate students. Thus, Sanjotec ends up harbouring more structured projects, sometimes more mature than those who came directly from scientific research. Moreover, as a SP, Sanjotec wants to capture new firms, as much as to harbour R&D units of well-established firms in the market. After all, it can be concluded that an SP is critical to ensure legitimacy to NTBFs. However, it should also be considered that the Park also benefits from the reputation of tenant firms.

A critical aspect that emerged from the implemented SWOT analysis was the need to attract young people to São João da Madeira and enhance the innovative potential of the region. In fact, it is rather difficult for firms in Sanjotec to recruit recent graduate students. The solution to this problem involves the increase of Sanjotec's reputation, but must of all, requires other actors' intervention to increase the region's attractiveness in several aspects, as previously discussed.

Another key element that emerged from the SWOT analysis was the identification of a lack of engagement in training initiatives should be a concern for the organization. More workshops and educational events must be promoted to enhance entrepreneurs' skills, trying to convince them to trade "productive time" for an investment in the firm's future.

It has been noted that there is visible trust from the tenants of Sanjotec concerning the offer of basic services. However, networking and collaboration with other actors is also

essential to create value. At this level, Sanjotec has well developed networks, being able to attend to a particular need or problem that a firm faces, has documented with Wallen's experience testimony.

Thus, it can be concluded that Sanjotec performs the role discussed in the literature, being an intermediary, the 'bridge' that manages environmental dynamics, maximizing opportunities and minimizing threats for the involved firms.

Sanjotec focus its competitiveness on the constant adaptation of its offer, permanently developing new links in the network. The constant presence of a mentor is here a critical element. After all, in the particular case of Sanjotec, it is the Park's manager - Alexandre Rios -that plays the key role of 'putting the pieces together' and envisions the fitting possibilities. Also, he is valued as a mentor in whom entrepreneurs can trust to help and quickly mobilize resources when needed.

In sum, to be embedded in this community allowed a deep understanding of entrepreneurs' concerns, daily problems, needs and even expectations through the many experiences lived, such as having lunch together, cafeteria conversations, informal and more formal events promoted, and even knowledge acquired *via* visits to firms. It was possible to closely see the links already established and to identify that much still needs to be done to encourage internal networking, such as the creation of initiatives and events to bring people together.

In line with this conclusion, a new initiative - Monthly Breakfast Meetings – was implemented to bring more value to Sanjotec's offer. New friendships, new partnerships and win-win relations have been made in the two editions that already took place in Sanjotec. So, the seed has been planted for more strategic actions to come. The SWOT analysis was only the first step towards a long-term improvement of the organization.

Strategic options should be pondered, aiming at the implementation of activities, or development of networks that not only take into consideration tenants' interests, but also bring value to the Park.

Finally, it should be mentioned that a research participation bias may exist. There was an effort to minimize it by not allowing entrepreneurs to be aware that they were being studied. There was a clear concern in promoting their spontaneous acting, which stimulated them pointing both good and bad things about Sanjotec, in face of the

informal environment in which interactions took place. However, the researcher judgment may be compromised to a certain degree due to the deep involvement with the organization for a long period of time.

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Appendix

Table 4 - Technology-based firms in Sanjotec

Technology-based firms in Sanjotec	
1	Abotoa, Lda
2	Adventech-Advanced Environmental Technologies,Lda
3	Agicore - Engenharia, Lda
4	Asidek - Sistemas para Engenharia de Desenho e Fabricação, Unipessoal, Lda
5	Coisas da Web - Soluções Digitais, Lda.
6	CreativeSystems, S.A.
7	Desicad- Projecto e Desenvolvimento de Sistema Mecânicos, Lda
8	Dinâmica Virtual-Serviços de Engenharia, Lda
9	Dinis Coelho, Lda
10	DR9 Productions
11	DreamDomus-Domótica e Projectos de Engenharia, Lda
12	EPL-Soluções Industriais, Lda
13	Easysoft, Lda
14	Flymaster Avionics, Lda
15	Geekdoit-Systems, Design and Delivery, Lda
16	Gofox-Tecnologias de Informação Unipessoal, Lda
17	Kelly Services
18	Laborsano-Gestão e Serviços, Lda
19	Ifaxnet Portugal- Unipessoal, Lda
20	Ilotech Portugal, Lda
21	Livetech-Consultadoria em Novas Tecnologias, Unipessoal, Lda
22	LMEG- Laboratório de Metrologia de Gases, Lda
23	N3i- Núcleo de Inventores, Investigadores e Investidores
24	Nonius, Lda
25	Oneasit Solutions, Lda
26	OPENCLOUD-Unipessoal, Lda
27	Plater - Serviços de Apoio à Gestão, Lda
28	Protocale, Lda
29	Prismeira-Quadros Sistemas e Serviços, Lda
30	SMT- Smart Manufacturing Technology, Lda
31	Spawn Studios, Lda
32	Systems4You, Lda
33	Spin.Works, Lda
34	Tech4Food, Lda
35	Tech4Home, Lda
36	Tecmacal - Gabinete Investigação, Criação & Desenvolvimento, Lda
37	Truncatura – Desenvolvimento de Programas Informáticos, Lda
38	Ubiwhere, Lda
39	VIHU-Equipamentos de Vigilância, Lda
40	Zenithwings, Lda

Table 5 - Firms that left Sanjotec

Firms that left Sanjotec

1	Cool Advance, Lda
2	Procinfa, Lda
3	McLaren, Lda
4	I9tech, Lda
5	Delic, Lda
6	CCPartners, Lda
7	Urban Brand, Lda
8	Self Energy, Lda
9	Endu, Lda
10	Simple Gray, Lda
11	Polisport, Lda

Table 6 - Creative Industries Centre (OCF) firms

Oliva Creative Factory firms

1	Mymi, Lda
2	André Rocha - jewellery and photography, Lda
3	Feltrando, Lda
4	Exerlife, Lda
5	Dezainers from Space Unipessoal, Lda
6	Vanguardpassion,
7	Squatter factory, Lda
8	Dimensão Elementar , Lda
9	Happiness Announce Unipessoal, Lda
10	Shoes Closet, Lda
11	My Way, Lda
12	More Me, Lda
13	Outside the box, Lda
14	MHCDesign, Lda
15	ERT Innovation & Creative Centre
16	Digitalab, Lda
17	Sétima Cor, Lda
18	Hugo Costa Design, Lda
19	Chatelles, Lda
20	Bela7, Lda