
Entrepreneurs' perceptions of business incubator services in Brazil and Portugal

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Abstract: Business incubators (BINC) play an important role in entrepreneurial ecosystems, providing relevant services to support the creation and growth of start-ups. The goal of this paper is twofold: first, to provide a literature review focused on the particularities of BINC and second, to present an empirical study of Brazilian and Portuguese BINC, Brazil and Portugal being the two places where we designed profiles for entrepreneurs. The results suggest that entrepreneurs' perceptions are connected with the requirements of each incubation phase for each firm and register some differences not only between traditional and technological BINC but also between the countries studied, mainly based on the type of services used by entrepreneurs in the different incubation phases.

Keywords: entrepreneurs; business incubation; perceptions; services; Brazil; Portugal.

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1 Introduction

Most incubator research focuses on the incubators' facilities – mainly infrastructures (Hurley, 2002; Theodorakopoulos et al., 2014) or business-incubator profiles (Hackett and Dilts, 2004; Ratinho et al., 2013; Al-Mubarak et al., 2015) – and overlooks the fundamental importance of the incubation process (Soltanifar et al., 2012). Despite the proliferation of business incubators (BINC), their effectiveness and value contributions are disputed (Autio and Klofsten, 1998; Schwartz, 2013; Gerlach and Brem, 2015). Some approaches have cited the difficulty of evaluating the actual value of incubation and networking activities for start-ups (Aerts et al., 2007; Al-Mubarak and Busler, 2014; Hong et al., 2016), as well as the lack of compromise on measuring the value dimensions related to incubators (Ahmad and Ingle, 2011; Hackett and Dilts, 2004; McAdam et al., 2006; Al-Mubarak et al., 2015).

For the purpose of this study, how should we define BINC? We can identify several definitions in the literature. Smilor and Gill ['quote text', Qian et al., (2011), p.1] provide a useful early definition of BINC as

“An apparatus for the maintenance of controlled conditions for cultivation to incubate fledgling companies [which] implies an ability or desire to maintain some kind of prescribed and controlled conditions favorable to the development of new firms. The incubator seeks to give form and substance – that is, structure and credibility – to start-up or emerging ventures.”

According to the European Commission Enterprise Directorate General (2002), the expression BINC can be used to describe a wide range of organisations that help entrepreneurs to develop their ideas, from inception through the commercialisation and launching of a new firm. Additionally, the US National Business Incubation Association [Wolfe et al., (2001), p.4] has proposed the following definition for BINC: “[BINC] provide hands-on management assistance, access to financing and orchestrated exposure to critical business or technical support services. They also offer entrepreneurial firms shared office services, access to equipment, flexible leases and expandable space – all under one roof.” The Centre for Strategy and Evaluation Services and the European Commission Enterprise Directorate General (2002, p.9) describe a BINC as

“An organization that accelerates and systematizes the process of creating successful enterprises by providing them with a comprehensive and integrated range of support including: incubator space, business support services and clustering and networking opportunities, by providing their clients with a wide array of services and enabling overheads to be reduced by sharing costs, business incubators significantly improve the survival and growth prospects of new start-ups.”

An important element of the definition of BINC is the specification of a physical space. However, modern BINC spaces frequently include virtual incubation and use information and communication technology (ICT). They are also sometimes integrated into science parks and may be close to universities, providing a catalytic incubator environment for the transformation of ‘pure’ research into production (European Commission Enterprise Directorate General, 2002) and reinforcing the influence of the business environment (Singh and Agrawal, 2017).

Additionally, BINC could be considered “a complex system whose success depends on external factors such as the macroeconomic situation, the legal system in which the incubator operates and the entrepreneurial culture in the country in which the incubator is located” [European Court of Auditors, (2014), p.16] and are influenced by new incubation models, such as accelerators (Pauwels et al., 2016). Nevertheless, internal practices also influence the incubator’s success. Additionally, the success of BINC implies that they do not need to be seen as property-based initiatives (Westhead, 1997) and their managers and university technology transfer offices need to become more proactive and encourage the involvement of universities in the technology transfer process (Westhead and Storey, 1994). The success and results of a BINC depend on its internal organisation. It is possible to identify five subjects that must be considered: regional synergies, board of directors, brand and visibility, premises (identifying services and delivering these services efficiently) and human resources (a highly specialised and qualified team is essential).

This study aims to fill a gap registered in the literature and in empirical studies, i.e., to determine entrepreneurs’ perceptions and their importance to business incubation. Most of the literature has focused on two broad categories. The first category focuses on the theory of incubators and on the incubator model, discussing aspects such as how incubators are formed, their goals and planning and how they are managed (Ahmad and

Ingle, 2013; Becker and Gassmann, 2006; Tavoletti, 2013). The second category of studies assesses incubators with respect to the same factors that outline success indicators, such as economic and technological goals in supporting entrepreneurs and small businesses, the creation of new firms and jobs and the establishment of an entrepreneurial society (McAdam and McAdam, 2008; Al-Mubarak and Schrödl, 2011; Al-Dajani et al., 2014). It is also possible to find some approaches that associate BINC with innovation processes and with the region, considering that before setting up an innovation-based incubator, it is essential to analyse the region and confirm the presence of clear preconditions, which, if absent, would hamper the incubator's success. These preconditions include endogenous regional development, the existence of specific local and global market demands, a real need to fill gap(s) in the service supply chain, the existence of a wide and active territorial partnership and the existence of highly specialised local expertise (European Union, 2010; Bring, 2016; Serpe et al., 2017).

Nevertheless, several studies, although not comprehensive, have been used to explain entrepreneurs' perceptions of incubators' performance. Hackett and Dilts (2004) methodically reviewed 26 empirical and nine non-empirical studies on business incubation. Although this study did not test any hypotheses, it provided rich descriptive data on five primary-research orientations that have so far guided research in the business-incubation industry. Autio and Klofsten (1998), in a case study, proposed two categories of incubation studies, configuration-oriented and process-oriented studies; the latter focuses on the business-incubation process and relates mostly to active hands-on support for small and medium enterprises. A literature review provides some clues about the role of BINC in economic development. However, there is still relatively little research that examines the importance of entrepreneurs' perceptions about BINC, especially when comparing two economies with different levels of economic maturity, such as Portugal and Brazil. And even within each of these countries, the studies focusing on this topic are in their infancy (Carvalho and Galina, 2015). The lack of research in this field motivates us to develop an empirical study on this topic. Thus, this paper provides a cross-country analysis comparing Brazil and Portugal. This topic, particularly within these two countries, is understudied and recent contributions are scarce in the literature. Additionally, most comparisons focus on countries at the same developmental stage.

2 Problem investigated

2.1 Incubation process

Following the inherent concepts of BINC, it is important to analyse the incubation process. This process considers the phases of the business process, such as formulation of the business plan or canvas model; identification of business potential or business model; planning of business activities and identification of funding resources; development of a market study; entry into the market (concept market test); and the adjustments required to adapt the business model, cost structure, marketing plan, etc. The activities and actions included in these phases can ensure business sustainability and also plan for and consider the requirements for growth and internationalisation.

Hackett and Dilts (2004) propose the following conceptualisation of the incubation process:

- Incubation as a mechanism for new venture creation – a step-by-step/staged process that awards legitimacy, opens network access and heightens community support for entrepreneurs.
- Incubation as a mechanism for resource allocation – a mechanism of awarding a stock of tangible and intangible resources to client firms that results in client firm growth, in addition to other benefits.
- Incubation as a socio-political game – a socio-political mechanism of creating an environment and perception of reduced risk and security within a bounded physical space.
- Incubation as a co-product of incubator-incubation dyads – a process of coproducing developmental assistance in independent incubator-client dyads.
- Incubation as an outcome of network behaviour – a system of increasing client firms' network density.
- Incubation selection as a predictable and controllable process – a process of selecting 'weak but promising' firms for incubator induction.

According to the model proposed by Hackett and Dilts (2004), if an incubator is organised correctly, this necessarily produces profitable and innovative ventures, or at least increases their chances for survival. Nevertheless, it is possible to find differences among incubators concerning the creation of firms and these differences can be explained by different factors, such as the human capital of the region/country. The incubation process is always a dualistic one; it addresses the entrepreneur on the one hand and the incubator on the other. The most important task in that sense (if the mechanism of support is working properly) is to feed the machine with high-quality, educated, knowledgeable human material – also known as entrepreneurs.

The incubation process includes, in general, three phases: pre-incubation, incubation and post-incubation. Each phase requires different services to be offered according to a firm's objectives and stage of life (European Court of Auditors, 2014; European Union, 2010):

- Pre-incubation/business idea: the aim of this phase is to convert innovative ideas or projects into a potentially commercial business. This phase is regarded as a process to attract potential clients for the next phase. It also implies evaluation of the innovation, preparation of a business plan and training. The most often applied services are the following: training on managerial issues and on more specialised topics (i.e., intellectual property rights law and administration), orientation in defining the business idea and business model, innovation assessment through internal competencies and an external committee and business plan (or canvas with financial forecasts) (Voisey et al., 2013).
- Incubation/start-up: in this phase, entrepreneurs use the infrastructures, facilities, services and other resources that are necessary to support and develop their activities. The activities included in this phase are access to finance, coaching, mentoring and training, physical hosting, labs and workshops, commercialisation, advanced business planning and associating with business partners.

- Post-incubation/disincubation/sustainable SME: the aim of this phase is to maintain the company and create the conditions to support its establishment outside of the incubator infrastructure. This final phase of the process implies business development, internationalisation, clustering and networking (Wen-Hsiang and Chiu-Ching, 2015).

According to the aim of this research, the problems investigated are based on incubators' perceptions of services provided by BINC in different phases of the incubation process. The primary objective of this research is to assess entrepreneurs' perceptions of business-incubation services in Portugal and Brazil. The motivation of this objective is linked to the scarcity of literature on this topic, mainly when considering two countries in different stages of development, such as Portugal and Brazil. To achieve this primary objective, this study sought to answer the following question:

- What is the incubated company's perception of the services provided by BINC?

This research question allows the following objectives to be proposed:

- design the entrepreneurial profile of entrepreneurs
- understand the incubated company's perceptions of the services offered by BINC in the pre-incubation and incubation phases.

Enable understanding of the needs of each incubation phase (more- or less-used services) and the strengths of incubators (best-or worst-evaluated services).

2.2 BINC and business services

The discussion of the importance of BINC to entrepreneurial ecosystems is controversial. Some approaches question whether they are effective infrastructures or a waste of public resources (Tavoletti, 2013). BINC are important in providing tangible resources, such as infrastructures to support growth and increase the survival rates of nascent businesses. They also afford intangible resources, such as business services and networks that are critical to minimising risks for companies as they go through the valley of death in the first year (Pellinen, 2014).

The literature recognises the role of BINC in the promotion and creation of new technology-intensive firms (Lofsten and Lindelof, 2003). Nascent technology-intensive firms, in general, reveal a lack of business skills that limits their chances for survival. The first generation of BINC were limited mainly to providing infrastructure. However, the survival rates revealed that start-ups needed other complementary resources. The second generation of BINC provided knowledge-based services and offered much more than just a physical arrangement for start-up companies (Qian et al., 2011).

Several authors (Grimaldi and Grandi, 2005; Hansen et al., 2000) argue that business support services such as coaching and training are essential elements of learning within BINC. Coaching is identified as a crucial element, providing one-on-one support initiatives to accelerate tenant learning and skill development (Mian, 1996). Additionally, training was revealed to have a positive influence on tenants' performance (Knopp, 2007). Some studies (European Court of Auditors, 2014; Robinson and Stubberud, 2014) that evaluated BINC have concluded that their core

activity is the provision of business support services to clients. In fact, an extensive assortment of services can be offered to entrepreneurs, such as rental of physical space, mentoring, training, consulting in several areas, networking, access to financing, etc. Nevertheless, incubation support cannot be presented as a simple list of available services. The most effective incubators supply individual services, tailor-made for each entrepreneur, in combination with other entrepreneurial support programs (e.g., lectures given by invited speakers) targeted to the needs and specificities of nascent entrepreneurs.

Also, important are the qualifications and experience of BINC staff. They must already have or acquire useful and specific skills and expertise to assist companies in a more effective manner.

2.3 Entrepreneurs' perceptions of business services

Entrepreneurs' perceptions can support the measurement of the impact of incubation processes that are based on providing access to quality services and business incubation investments; nevertheless, this is a complex task. Hackett and Dilts (2004) argue that this task implies collecting and analysing a massive range of data to determine whether the survival rate of new businesses would be different had companies not been incubated. The most popular measures used to rate the success of BINC are graduation and survival rate, jobs created, sales growth and profitability (McAdam et al., 2006).

However, it is not possible to find a consensus about how to define a successful incubator (McAdam et al., 2006). In addition, such a definition must consider two perspectives: both the incubator and tenant views (Hansen et al., 2000; Scillitoe and Chakrabarti, 2010). For a BINC, success depends on the integration between its management model and its capacity to fulfil expectations (Hansen et al., 2000). Some studies suggest that shared services (Mian, 1996; Scillitoe and Chakrabarti, 2010; Fernández-Fernández et al., 2015) and infrastructures (Bergek and Norrman, 2008; Roig-Tierno et al., 2015) are the elements most appreciated by tenants.

Sometimes, the value attributed to an incubator depends on expectations of the incubation process and services available during business incubation. Furthermore, the results of empirical studies depend mostly on the chosen explanatory criteria of performance. Most studies select internal and external explanatory criteria with respect to incubator performance (Bergek and Norrman, 2008; Hackett and Dilts, 2004). The internal factors influence external criteria. The external factors include: the type and characteristics of the project, the human capital and the environment. The internal criteria include the experience of incubators and their managers, the selection process, the services provided and the relational capacities of the incubator staff.

3 Methodology

This study analysed BINC in Portugal and Brazil and aimed to identify the differences and similarities in entrepreneurs' perceptions of services offered by BINC during the pre-incubation and incubation phases.

3.1 Subjects

The subjects of this research are companies in the incubation process. To access these companies, we selected four BINC and the selection criteria considered the importance of these BINC in each country.

A questionnaire was sent to companies (Table 1). During this phase, as much information as possible was collected, as opposed to using guesses or elaborate models to predict the future – we explored the ‘what’ and ‘how,’ rather than the ‘why.’

The questionnaire was tested previously in September 2014 and some questions were adjusted, mainly to adapt the content to the understanding of the entrepreneur. The final questionnaire had two parts of questions: the first one raised information about the profile of the entrepreneur and incubated companies; the second part evaluated entrepreneurs’ perceptions of business-incubation services in Portugal and Brazil at three moments: pre-incubation, incubation and post incubation, making a total of 60 questions (answers on a 10-point scale: 1 to 10). The criteria of BINC selection were based on certain attributes considered relevant to the study:

- geographical location [Portugal (Lisbon metropolitan area) and Brazil (São Paulo state)]
- BINC with different target markets (technological or traditional)
- ages (different ages of BINC)
- linkage with either the local economy or Higher Education Institutions (HEI).

Table 1 presents the selected BINC in relation to the selection criteria.

Table 1 BINC and selection criteria

<i>BINC</i>	<i>Geographical location</i>	<i>Type</i>	<i>Age (10+ years) (3 to 9 years) (0 to 2 years)</i>	<i>Linkage with local economy and HEI</i>
CIETEC	São Paulo – Brazil	Technological	More than 10 years (founded in 1997)	HEI
Supera	Ribeirão Preto – Brazil (São Paulo State)	Technological	More than 10 years (founded in 1997)	Local economy and HEI
Incubcenter	Oeiras – Portugal (Metropolitan area of Lisbon)	Traditional	(0 to 2 years) (founded in 2013)	Local economy
DNA Cascais	Cascais – Portugal (Metropolitan area of Lisbon)	Traditional + technological	(3 to 9 years) (founded in 2009)	Local economy and HEI

Centro de Inovação, Empreendedorismo e Tecnologia (CIETEC) is the most important BINC in São Paulo and the largest in Latin American and thus, its inclusion in the study was mandatory. Similarly, DNA Cascais (Agência DNA Cascais) is one of the largest BINC in the Lisbon metropolitan region (Lisbon had approximately six BINC during this period of time). However, this study aimed for diversity and to complement this aim, we selected smaller BINC in São Paulo state (SUPERA – Parque de Inovação e Tecnologia

de Ribeirão Preto) and in Lisbon (Incubcenter – Incubadora Empresarial de Oeiras). Table 1 presents the selection criteria. According to this distribution of BINC during the research period, we consider these BINC to be illustrative of the realities of these regions. We sent 97 requests to incubators, with the support of BINC directors, between November 2014 and January 2015. CIETEC and DNA Cascais directors selected the incubators to guarantee the presence of different profiles in the sample. They believed, according to past similar experiences in this context, that sending inquiries to all incubators results in few answers and does not guarantee the inclusion of diverse profiles in the sample. Table 2 presents the number of inquiries sent and received and the response rate.

Table 2 Inquiries sent and received

<i>BINC</i>	<i>Total number of incubators</i>	<i>Number of inquiries sent</i>	<i>Number of inquiries received</i>	<i>Answer rate (number of inquiries received/number of inquiries sent)</i>
CIETEC	109	15 (selected by BINC director)	10	67%
Supera	37	37	9	24%
Incubcenter	10	10	3	30%
DNA Cascais	60	10 (selected by BINC director)	6	60%
Total	216	72	28	38.8%

3.2 Study designs

The research was developed according to the following three phases:

- 1 Analyses of entrepreneurs' profiles considering a set of variables such as age of principal manager, professional occupation, professional experience, gender, qualification, nationality, past firms founded, firm lifetime (in months), number of partners, number of employees (excluding partners), motivations for creating this business, conditions of creating a new business and influence of family and friends on the entrepreneurial profile.
- 2 Comparison of entrepreneurs' perceptions of services provided by the BINC in Portugal and Brazil. The data collected used a scale with ten items (1 to 10) and the description of the sample is provided in Table 2. The comparisons were prepared using the median.
- 3 Correlation between the perceptions of entrepreneurs in the pre-incubation and incubation phases. This correlation was estimated considering the median obtained from each item (services provided by BINC) because the service was available in both the pre-incubation and incubation phases. Post-incubation, we did not have a sufficient number of companies to develop the statistical analysis. Because we have only one company in the post-incubation phase, we opted to study only the perceptions of entrepreneurs in the pre-incubation and incubation phases.

A summary of the phases with the study questions, variables and methods of analysis used is presented in Table 3.

Table 3 Study phases questions

<i>Analysis dimension</i>	<i>Variables</i>	<i>Methods</i>
Phase 1 entrepreneurs' profile	<ul style="list-style-type: none"> • Age of principal manager • Professional occupation • Professional experience • Gender • Qualification • Nationality • Past firms founded • Firm lifetime (in months) • Number of partners • Number of employees (excluding partners) • Motivations for creating the business • Conditions of creating a new business • Influence of family and friends on the entrepreneurial profile 	Statistics descriptive
Phase 2		
Difference in perception between technological and traditional companies	<ul style="list-style-type: none"> • Perceptions obtained through the answers of the entrepreneurs to the questionnaires as described in Item 2.1; <i>pre-incubation phase</i> 	Non-parametric tests radar chart (only incubators from Portugal) ¹
Difference in perception of services used in pre-incubation in Brazil and Portugal	<ul style="list-style-type: none"> • Perceptions obtained through the answers of the entrepreneurs to the questionnaires as described in Item 2.1; <i>pre-incubation phase</i> 	Radar chart with median
Difference in perception of services used in incubation in Brazil and Portugal	<ul style="list-style-type: none"> • Perceptions obtained through the answers of the entrepreneurs to the questionnaires as described in Item 2.1; <i>incubation phase</i> 	Radar chart with median
Phase 3		
Relationship in the perception of the services used in pre-incubation and incubation for incubated companies both in Brazil and in Portugal	<ul style="list-style-type: none"> • Perceptions obtained through the answers of the entrepreneurs to the questionnaires as described in Item 2.1 • Matching the results obtained in pre-incubation and incubation phase 	Spearman rank correlation

Note: ¹In Item 3.2, this choice is justified.

4 Empirical results

The results are presented in three parts, as described in the methodology. First, we present the profile of the entrepreneurs. Second, we present the perceptions of services supplied by the BINC included in the study, considering both traditional and technological BINC in Portugal, to determine whether we have differences in results due to the BINC typology. Then, the study also provides a comparison between Brazil and Portugal. Finally, it presents the correlations between the entrepreneurs' perceptions in the various incubation phases.

4.1 *Entrepreneurs' profile*

To achieve our research objective, it was important that the entrepreneurial profile of the respondents was designed according to a set of variables: age of principal manager, professional occupation, professional experience, gender, qualification, nationality, past firms founded, firm lifetime (in months), number of partners, number of employees (excluding partners), motivations for creating the business, conditions of creating a new business and influence of family and friends on the entrepreneurial profile.

In summary, the entrepreneurs' profile reveals the following characteristics:

- There is no standard for the age of the main manager, who is 39 years old on average.
- The majority of respondents are entrepreneurs.
- They have more than ten years of experience, but have never opened a business before.
- The vast majority of respondents are male and have at least higher education.
- Half of the companies have existed for more than three years and have more than three partners.
- Only 30% of companies have employees.
- The main motivation for creating their own business was the identification of an opportunity in the market or they had a good idea that was easy to transform into a business, in addition to a willingness and motivation to work hard.
- There is a great possibility that family or friends influenced their business options (85% of respondents have relatives or friends who are business owners).

The results are similar, with some caveats, to those found in the literature review; they reinforce the importance of education, professional knowledge and experience and family and friends to the start-ups' entrepreneurial success (Jo and Lee, 1999; Politis, 2008).

4.2 *Perceptions of services*

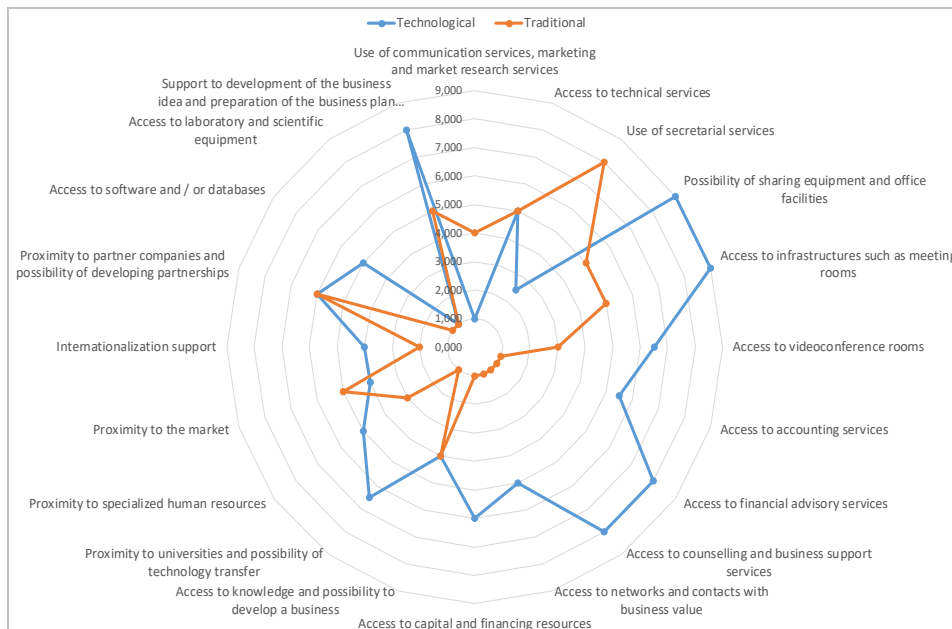
This section presents the entrepreneurs' perceptions of services provided by the BINC.

To analyse perceptions, four questions are considered and answered. The first question is *whether there is a difference in perception between technological and traditional companies*. The sample of the companies of Portugal contained technological

and traditional companies. The sample of Brazilian companies is only technological. To understand if there are differences in perceptions between technological entrepreneurs and traditional entrepreneurs in the different phases of the incubation process, we tried to develop adequate statistical tests despite the eventual differences. The comparison of technological and traditional companies in the pre-incubation phase in Portugal suggests significant differences between these companies.

Figure 1 presents the dimensions of these differences in the results. For the development of this figure, the median data for each item evaluated (20 questions on perception at pre-incubation) were organised into two columns, one referring to the technological firms and the other traditional firms. Based on these data, the radar chart presented in Figure 1 was constructed. In general, technological firms give higher scores than traditional firms to the services provided in the pre-incubation phase.

Figure 1 Differences between traditional and technological entrepreneurs' perceptions in Portugal (see online version for colours)



Note: Pre-incubation phase.

The results propose that both types of companies (traditional and technological) used the services supplied by BINC during the incubation process. However, perceptions were different according to the typology. The technological companies provided a better evaluation (median higher than 8.0) of the following services:

- possibility of sharing equipment and office facilities
- access to infrastructure such as meeting rooms
- access to financial advisory services
- access to counselling and business support services

- support for development of the business idea and preparation of the business plan or canvas.

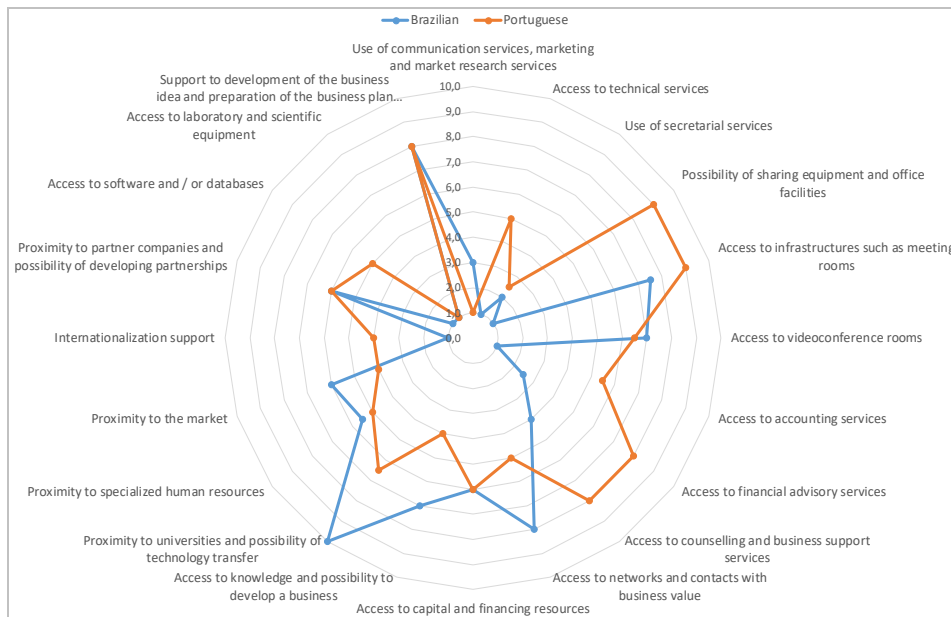
Traditional firms reveal a median higher than 8.0 only for ‘use of secretarial services’. This result suggests that traditional firms request other services or have a lower need for the services supplied by BINIC; or this may reveal some dissatisfaction with the services provided by the BINIC.

The second question is *whether there is a difference in perception of services used in pre-incubation in Brazil and Portugal*. Based on the previous results and considering that all Brazilian companies are technological, we decided to study only technological companies in Portugal and Brazil.

The services receiving strong evaluations are proximity to universities and possibility of technology transfer; access to infrastructures such as meeting rooms; and support for development of the business idea and preparation of the business plan or canvas.

To address eventual differences, we present results considering separated samples. Figure 2 illustrates the pre-incubation phase. Figure 2 was constructed using the same rationale as Figure 1.

Figure 2 Perceptions of services used in pre-incubation in Brazil and Portugal (see online version for colours)



Based on the median values, Portugal and Brazil present a low correlation. This means that perceptions of services were not similar among companies in both countries. For Brazilian entrepreneurs, the best-assessed service was the proximity to universities and the possibility of technology transfer, while for Portuguese entrepreneurs, the best-assessed service was the access to infrastructures such as meeting rooms.

To highlight services with better evaluations, we considered median values higher than 8.0, i.e., services for which at least 50% of respondents gave grades higher than eight. The literature reveals that the value attributed to an incubator depends on the

expectations of the incubation process and the services available for business incubation (Bergek and Norrman, 2008; Hackett and Dilts, 2004).

In the pre-incubation stage, the service valued in both countries was support for the development of the business idea and preparation of the business plan or canvas. Similar results were suggested by other studies applied to this phase of the incubation process (European Union, 2010). Access to infrastructure also registered as similar. Nevertheless, it is noteworthy that Portuguese technological companies request more services related to counselling in business and Brazilian companies focused more on networks, proximity to universities and the possibility of technology transfer.

The third question is *whether there is a difference in perception of services used in pre-incubation in Brazil and Portugal*. Regarding the incubation phase¹, the most widely used service by both countries was access to infrastructures such as meeting rooms. Among the other services, we again see differences in the perceptions of these two countries. Figure 3 illustrates the differences. Figure 3 was constructed using the same rationale as Figure 1.

Figure 3 Perceptions of services used in the incubation phase in Brazil and Portugal (see online version for colours)

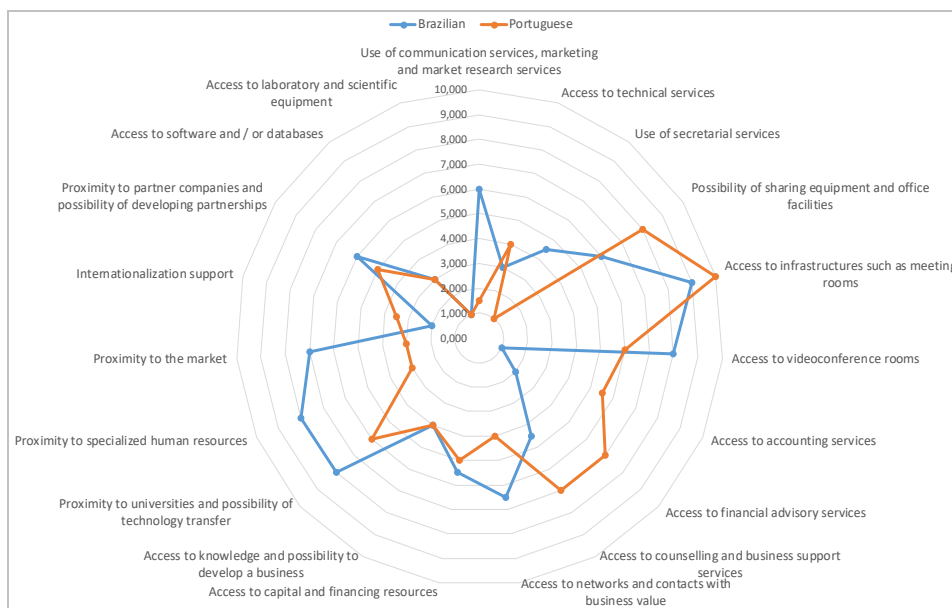


Figure 3, which is related to the incubation phase, also reveals differences between the countries studied. For Brazil, the best-assessed services were access to infrastructure such as meeting rooms, proximity to universities, the possibility of technology transfer, proximity to specialised human resources and access to videoconference rooms. For Portugal, the best ratings were for access to infrastructure such as meeting rooms, the possibility of sharing equipment and office facilities and access to videoconference rooms.

The fourth question is *whether there is a relationship in the perception of the services used in pre-incubation and incubation for both incubated companies in Brazil and in*

Portugal. To answer this question, the median values obtained for the perceptions evaluated in each of the pre-incubation and incubation phases were used and a separate correlation was performed for each of the study countries (Brazil and Portugal).

Considering that a median-based distribution does not necessarily follow a normal distribution, to calculate the correlation we decided to use the Spearman rank correlation. All correlations were significant, with p-values less than 1%. All correlations are positive. Brazilian and Portuguese companies reveal a positive correlation (0.769978402 and 0.946949296, respectively) in pre-incubation and incubation. We observed that the correlation between the pre-incubation and incubation phases is relatively high, indicating that services evaluated in one phase tend to be better evaluated in the next phase.

5 Discussions

This study suggests that entrepreneurial profiles are similar between the two countries studied and, in general, incubators reveal the same expectations about the shared services (Mian, 1996; Scillitoe and Chakrabarti, 2010) and infrastructures (Bergek and Norrman, 2008) that are most appreciated by tenants.

Additionally, the results suggest that the entrepreneurs' perceptions are connected to the requirements of each incubation phase for each firm and some differences between the two countries were detected.

Considering that Portuguese BINC include technological and traditional companies, first we compared the perception of services provided in Portugal. Approximately, 43% of Portuguese companies are traditional and remain in the pre-incubation phase. The comparison between traditional and technological companies in Portugal reveals some differences in median (Figure 4). It stands that traditional companies value the use of secretarial services, while technological companies present a median above 8 for different services, such as the possibility of sharing equipment and office facilities, access to infrastructure such as meeting rooms, access to financial advisory services and support for development of the business idea and preparation of the business plan or canvas.

These differences may have different explanations. On the one hand, they could be related to BINC that accept traditional and technological companies but do not offer tailored services designed according to the demands of each company. In fact, traditional companies could request differentiated services that are more focused on their business models and relations with the market. On the other hand, the traditional companies in our data were in the pre-incubation phase and may not have been mature enough to evaluate or understand the services supplied by the BINC.

Attending to these differences, we decided to consider only technological companies to compare perceptions between countries in the pre-incubation and incubation phases, as the Brazilian sample did not include traditional companies. Two comparisons were then made between Brazil and Portugal. First, we compared the pre-incubation process in these two countries. The aspects considered to be similarly perceived were support for the development of the business idea and preparation of the business plan or canvas and access to infrastructures such as meeting rooms. We also found different perceptions in pre-incubation. Portuguese companies revealed high expectations about the possibility of sharing equipment and office facilities, access to financial advisory services and access to counselling and business support services.

Nonetheless, Brazilian entrepreneurs most value the following services: access to networks and contacts with business value, proximity to universities and the possibility of technology transfer. This result indicates that in the pre-incubation process, supporting the preparation of the business plan is a key. It is important to note that these results are in agreement with the literature review and highlight the importance of the pre-incubation phase in the development and evaluation of the business model (European Court of Auditors, 2014; European Union, 2010).

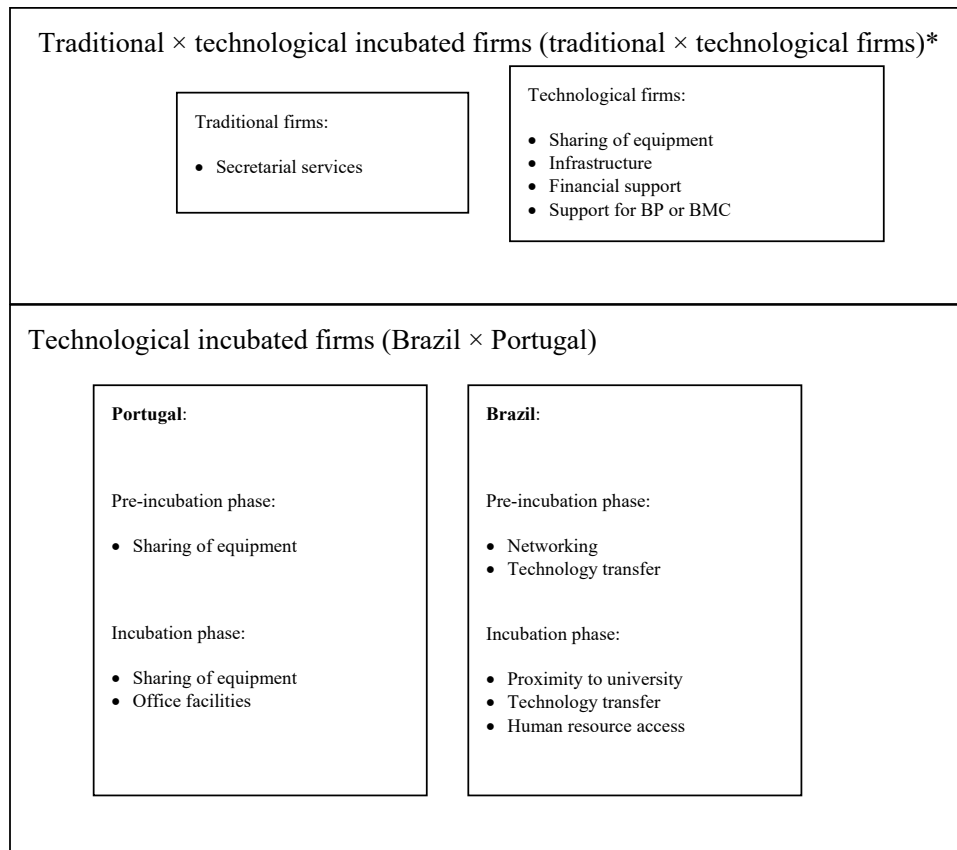
Concerning the incubation phase, there were similar perceptions of access to infrastructures such as meeting rooms. Nevertheless, Portuguese companies reveal more positive perceptions of the possibility of sharing equipment and office facilities. Brazilian firms have more positive perceptions of proximity to universities and the possibility of technology transfer, access to videoconference rooms and proximity to specialised human resources. The results suggest that Brazilian entrepreneurs selected a technological BINC highly connected to the University of São Paulo and expect to enjoy the facilities and networks associated with this location. Portuguese entrepreneurs reveal different perceptions and request more infrastructures during the incubation phase and this tendency is also clear in the literature, mainly from studies carried out in Europe (European Court of Auditors, 2014; European Union, 2010). The comparison between entrepreneurs' perceptions in Brazil and Portugal reveals some differences that could be influenced by external factors, such as the type and characteristics of the project, human capital, environment and development stage as mentioned in other studies (Bergek and Norrman, 2008; Hackett and Dilts, 2004; Farhan et al., 2016). However, surprisingly, different tendencies are observed in both countries. In general (in the pre-incubation and incubation phases), Brazilian firms value more services related to technology development, such as transfer of technology, while Portuguese firms are more interested in services related to infrastructure, such as sharing of equipment. This may be related to the characteristics of each country because Brazilian incubators present few possibilities for equipment sharing, for example. However, they are linked to the most important university in Latin America (University of Sao Paulo), thus enabling technology transfer.

Brazilian and Portuguese companies reveal a positive correlation between the items in the pre-incubation and incubation phases when we consider the median. Brazilian and Portuguese companies reveal correlations of 0.77 and 0.94, respectively. Considering that the coefficients of determination are the squares of correlation, this suggests that the first perceptions of the services provided by BINC could explain approximately 60% of the Brazilian companies' perceptions in the incubation phase, thus determining their perceptions of services provided during the incubation process. In Portugal this correlation is higher, approximately 88%. These results highlight the importance of BINC providing adequate and tailored services to companies in their 'first contact' with entrepreneurs, i.e., the pre-incubation phase.

This study did not test any hypotheses but rather provided descriptive data and the results reveal that, according to the incubation stages, entrepreneurs expect to receive services and support in different areas from the results achieved by the European Union (2010). Additionally, it is important to recognise that the results are consistent with the study developed by the European Union (2010), which reinforces the importance of strategic support in specific consultancies and projects linked with internationalisation and technology transfer. The results also suggest that BINC are more than effective infrastructures or a waste of public resources (Tavoletti, 2013). They provide

knowledge-based services and represent much more than a physical arrangement for start-up companies (Qian et al., 2011). In fact, if BINC only supplied infrastructure, their role would be limited to supporting nascent businesses. Thus, BINC must also provide business support to accelerate learning curves and build external networks. Figure 4 summarises the results, considering the comparison of differences in entrepreneurs' perceptions

Figure 4 Summary of differences in entrepreneurs' perceptions (comparison)



Note: *Portuguese firms only.

6 Conclusions

This study assesses entrepreneurs' perceptions of business-incubation services in Portugal and Brazil. It was conducted with the goal of understanding differences and similarities in entrepreneurs' perceptions of the services offered by BINC and of characterising the entrepreneurial profile of entrepreneurs.

Although it is not feasible to generalise the results because of the methodological nature of this research, the empirical approach made it possible to clarify a number of

considerations concerning the Portuguese and Brazilian incubators that compose the sample.

This study highlights several considerations. The entrepreneurs' profiles reveal, in general, no standard for the age of the main manager; they are mainly entrepreneurs, are mainly male and have at least higher education and more than ten years of experience; however, they have never opened a business before and this could be a motive for them to come to a BINC. Half of the companies have existed for more than three years and have more than three partners; this could justify the fact that only 30% of the companies have employees. There is a strong possibility that family or friends influenced the business option (85% of respondents have relatives or friends who own a business).

The main motivations to start a business are the identification of an opportunity in the market or having a good idea that is easy to transform into a business, as well as being willing and motivated to work hard.

Traditional and technological companies reveal different perceptions about the services supplied by BINC. However, these differences could be associated with the internal organisation of the BINC or with the maturity of the companies. This is certainly an interesting research topic for future studies.

In the pre-incubation phase, there is consensus between Portuguese and Brazilian companies about the importance of support for evaluating ideas and designing business models. However, we identified different perceptions in the pre-incubation and incubation phases that could suggest the following:

- 1 different requirements of the companies
- 2 different understandings of the role of the BINC and different methods of communicating and supporting companies
- 3 the localisation of the BINC and geographical proximity to HEI could influence the expectations of the entrepreneurs about services provided by the BINC.

The Portuguese and Brazilian samples reveal coherence in their evaluations of the pre-incubation and incubation phases and first perceptions are determinant of the future evaluations of services provided by BINC. The results suggest that Brazilian entrepreneurs access the same services and give similar scores at different phases.

Nevertheless, the descriptive methodology provides clues that could be useful in delineating public policies applied to BINC and nascent entrepreneurs, in addition to revealing some similar tendencies in both countries. The managerial implications of this research could be a better understanding of the BINC models, entrepreneurs' profiles and services adjusted to the stages of incubation process. These results could be explored in the future and they raise a set of research questions, including the following: do differences between traditional and technological entrepreneurs determine their pre-expectations about BINC? Do entrepreneurs' profiles influence the incubators' performance? What type of services could accelerate the learning model in the pre-incubation phase?

Further research should aim to expand the sample to apply other multivariate techniques, aim to answer some of the questions proposed by this research and also provide some clues to improve BINC performance and to design adequate public policies to support BINC and early entrepreneurs.

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Notes

- 1 We only considered technological entrepreneurs in Brazil and Portugal.