The role of business incubators for start-ups development in Brazil and Portugal

Luisa Margarida Cagica Carvalho

*Departamento de Ciências Sociais e de Gestão (DCSG),
Universidade Aberta, Lisboa, Portugal, and*

Simone Vasconcelos Galina

*Faculdade de Economia, Contabilidade e Administração,
Universidade de São Paulo, São Paulo, Brazil*

Abstract

Purpose – The purpose of this paper is to present a comparative study about features, services and networks offered by business incubators (BI) to encourage start-ups development in Portugal and Brazil. Recently, these countries have revealed several cases of well-developed entrepreneurial ecosystems and Brazil receive a special position on Latin America; besides comparative studies between European and Latin American countries are scarce.

Design/methodology/approach – This study uses a qualitative research methodology to study the role of BI in creation and growing of start-ups in Portugal and Brazil.

Findings – The results do not reveal particular differences between Brazilian and Portuguese BI, except in international profile of tenants; in Portugal, probably due the market size, most of the firms born global or intend to internationalize.

Research limitations/implications – The BI results depend on the wide services provided, networking platforms and support provided by BI staff individually to their tenants. These remarks provide some clues to develop public policies suitable to entrepreneurial ecosystems.

Originality/value – BI have a special role on supporting start-ups creation and growth and to provide technology transfer. They are also considered as a key element to guarantee entrepreneurial ecosystems in a regional level, this research provide some contributes based on a case study with eight interviews in Portugal and Brazil, and compare for the first time these two countries with similar culture but with different levels of development.

Keywords Entrepreneurship, Business

Paper type Case study

1. Introduction

Some regional studies suggest divergences in economic performance between cities based on the differences of entrepreneurship (Acs and Armington, 2004) and reinforce the role of the entrepreneurship on the creation of social cohesion by empowering people in risk of social exclusion and by solving social problems not covered by the public sector (Jiménez Escobar and Morales Gutiérrez, 2011). Business incubation can also be viewed as a public policy tool (Holtz-Eakin *et al.*, 1994) and facilitator of the territorial cohesion (Jiménez Escobar and Morales Gutiérrez, 2011; Wonglimpiyarat, 2014). Despite the proliferation of business incubators (BI), their effectiveness and value contribution is disputed (Schwartz, 2013). Some approaches referred the difficulty in evaluating the actual value of incubation and the networking activities for start-ups (Aerts *et al.*, 2007), as well as the lack of compromise about the measurement of the value dimensions relating to incubators (Ahmad and Ingle, 2011). In general it is possible to assume the role of the BI as entrepreneurship promoters. However, studies

applied to economies in different level of economic maturity, such as Portugal and Brazil are really scarce. And even in each of these countries the studies focussed on this topic are in its infancy. This lack of research in this field motivates the necessity to develop an empirical study on this topic.

This research provides a cross-country study, involving the comparison of two countries: Brazil and Portugal. This type of research including these two countries is understudied and more recent contributions are scarce in literature that focussed one comparison between countries in the same development stage. Additionally, the research aims to compare BI, considering a broadly approaches that includes services, networks, infrastructures but also other less studied features such as, internationalization support and BI management teams.

2. Literature review
2.1 BI
Literature review about incubators provides two broad categories. The first category focusses on the theory of the management of incubators and discusses aspects, such as, how incubators are formed, incubators aims and planning, and how they are managed (Ali Ahmad, 2013; Tavoletti, 2013). The second category of studies assesses incubators attending to some factors that outline success indicators, such as, economic and technological goals in supporting entrepreneurs and small business, creation of new firms and jobs and establishment of an entrepreneurial society (Al-Mubaraki and Schrödl, 2011; Al-Dajani *et al.*, 2014). It is also possible to find third group of approaches that associated BI with innovation process and with the region, considering that before setting up an innovation-based incubator it is essential to analyze the region and validate the existence of clear preconditions, which, if non-existent, would hamper its success, such as: endogenous regional development, the existence of a specific local and global market demand, a real need to cover gap(s) in the service supply chain, the existence of a wide and active territorial partnership and the existence of a highly specialized local expertise. Additionally, BI managers and university technology transfer offices need to become more proactive and encourage the involvement of universities in technology transfer process (Westhead and Storey, 1994).

The study of BI implies that we understand the variety and evolution of incubation models. Incubation models reveal different features according to the progress of economies and technology. The first generation of incubators based their supply on the infrastructure and proximity to research institutes or technical university environments. Scaramuzzi (2002) referred that these incubators focussed on real state and generally emerge as the result of the new facilities, such as science, technology parks, or technopoles or by readapting abandoned buildings (e.g. industrial complexes). Much of them are dependent of public investments and reveal high fixed cost and financial sustainability problems. National or local programs for innovation, job creation and economic development support much of them.

Virtual incubators are assumed as the "second generation" of incubators. These projects require lower fixed investments, generally use ICT and are non-property based but technology oriented. These entrepreneurs could be also hosted by technological or university incubators, however, they could operate as incubators without walls. Scaramuzzi (2002) argued that this type of incubators allows the evolution of the incubation models and the arrangement of the services is according to incubation phase (e.g. pre-incubation and post-incubation services).

The International Enterprise Centers or International Business Incubators are considered as the "third generation" of incubators. These incubators present a full variety of services directed for development of knowledge-based businesses. And also support incubators in processes of internationalization. This model build strong networks between universities, research centers, venture capital and incubators partners in others countries and international joint ventures. The key success of these incubator models is the networks, and their inclusion in entrepreneurial ecosystems linked with different regions and countries.

At the end, Dot.com incubators were created in consequence of the new economy and they are considered as the "fourth generation" of incubators (Scaramuzzi, 2002). This type of incubators reveals a strong venture capital orientation and shorter incubation periods (a few months instead of two to three years). However, the tenants disclose in general higher levels of risk and mortality rates (Ahmad and Ingle, 2011).

Other model, not identified in the literature inside the models presented earlier is the university incubator. These types of incubators are established in university campus and in partnership with Higher Education Institution (HEI). In general these incubators promotes technological entrepreneurship and technology transfer from university to the market. Universities allow proximity with science and technology and give some credibility to the new projects, i.e. provide capital, technology and know how that can support the technology transfer to the market and allows the commercialization of new technology generating spillover effects over the regions and nations.

Nowadays, most of the BI offers services associated to different generations, for instance, university/technology incubator generally supplies infrastructures, virtual incubation, international network and some of them includes accelerators more commons in fourth generation models.

2.2 BI: the virtuous triad

The discussion about the importance of BI to entrepreneurial ecosystems is controversy. Some approaches question if they are effective infrastructures or waste of public money (e.g. Tavoletti, 2013). In the fact, if BIs just supplied an infrastructure, their role could be limited in supporting nascent business. In this way, BIs must provide also business support to accelerate learning curve and external networks. The virtuous triad (Figure 1) reflects different perspectives and evolution about the role of BI to promote entrepreneurship, and includes two approaches. In one hand, its important assisting intangible resources, such as infrastructures, to support growing and increase surviving rates of nascent business. In the other hand, it is fundamental provide intangible resources, such as business services and networks, that are critical to minimize the risk of valley of dead in first years.

Infrastructure. According to Manan (2000) the first BIs were launched in the USA in the 1950s. Nevertheless, this model became more common in the 1980s and reach to the other countries in the world in a variety of forms (business centers, innovation centers, etc.). The BIs offer infrastructures at an inexpensive cost, such as office space, and allow sharing resources (Adkins, 2002). BIs provide office space rented in favorable conditions to incubates (Lalkaka, 2003) and promote shared resources such as reception, meeting rooms, conference rooms or car parking (Bergek and Norrman, 2008) and it is as well essential to create shared leisure spaces to encourage tenants to integrate and maximize the potential collaboration and the free exchange of ideas (European Commission, 2014).
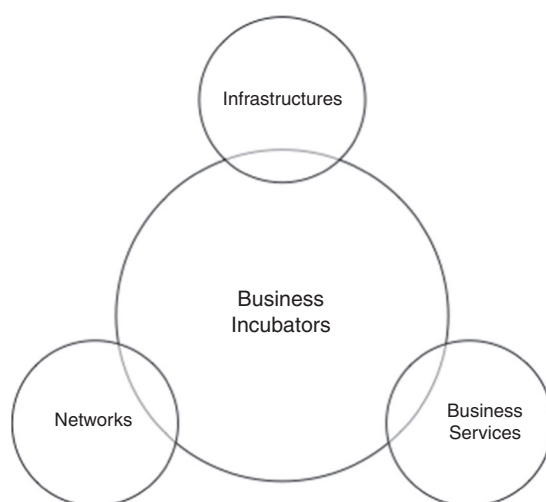
Figure 1.
Virtuous triad

Business services. The literature recognizes the role of the BIs in promotion and creation of new technology-intensive firms (Löfsten and Lindelöf, 2003). Nascent technology-intensive firms, in general, reveal a lack of business skills that limit the chances for survival. The first generation of incubators are restricted mainly to the infrastructure, however, the low survival rates reveal that start-ups needed other complementary resources. The second generation of incubators provided knowledge-based services and represented much more than just a physical arrangement for start-up companies (Cuadrado Roura *et al.*, 2010).

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 BI. Coaching is identified as a crucial element, providing one-to-one support initiatives, to accelerate tenants learning and skills development processes (Adkins, 2002). Also, training reveal a positively influence on tenants performance (Knopp, 2007). Some studies (European Commission, 2014) applied to evaluate BIs conclude that their core activity is the provision of business support services to its clients. In the 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) target to the needs and specifies of nascent entrepreneurs.

Moreover, it is important the qualification and experience of incubator staff. They must have or acquire specific skills and expertise useful to assist companies more effectively. The lack of skills meant that incubator staff was unable to take care of companies more effectively, creating a vicious circle (European Commission, 2014).

Networks. The third generation of BIs appeared during the 1990s with a special focus on providing access to services through external networks (Adkins, 2002). Networks provide to tenants a preferential access to potential customers, suppliers, technology partners and investors and also are assumed as the most important fact in

success of BIs programs (Grimaldi and Grandi, 2005). Empirical evidences also suggest that access to networks is critical to development of tenants companies (Bergek and Norrman, 2008). Networks allow overcoming the resource scarcity of companies, by the access to specialized resources, expertise, learning opportunities and allows a faster development of legitimacy of companies involved. Zhao and Aram (1995) suggested that companies could overcome theirs resource constraints through networking and thereby accelerate their growth.

European Commission (2010) highlights some advantages from networks over a regional level, networking allows: to benchmark yourself with your peers; to catch inspiration and take appropriate measures for continuous improvement; to meet other practitioners and develop common ideas that will benefit the regional system for innovation and the end-users of the incubation; to promote the innovations at an international level, which can lead to commercialization and internationalization opportunities for the entrepreneurs.

3. Methodology and research design

This study uses a qualitative research methodology due the necessity to understand deeply local contextualization of the topic. As suggested by Yin (2009), we did a comparative study to analyze the role of BIs in creation and growing of start-ups in Portugal and Brazil.

The empirical study is based on interviews ($n = 8$) conducted with key informants of BIs in Portugal and Brazil during September to November 2014. For each BI studied, the president, vice president or director manager was interviewed. They were chosen as key informants, attending to the position to provide a strategic overview about facts and objectives of each BI. On average each interview lasted about 1.5 hours.

The interview comprised six dimensions:

(1) BI objectives;

(2) BI team management profile;

(3) selection and exit policy;

(4) prestigious perception;

(5) internationalization support; and

(6) virtuous triad: infrastructure, business support and networking.

We purposefully sampled the cases for study and identified BI comparable between these two countries. To guarantee the comparability of the results in Brazil we used BI from the more developed Brazil state, São Paulo. First, we wanted to guarantee the existence of comparable cases between Brazil and Portugal. In Brazil we studied CIETEC and SUPERA, both located in University of São Paulo campi. CIETEC is in the campus of city of Sao Paulo and it is considered as one of the largest BIs in Latin America. SUPERA is located in a medium city (Ribeirão Preto) in São Paulo state, it is also associated to University of São Paulo and operates in a modern Technological Park.

In Portugal we studied, in Lisbon region, Incubadora do Tagus Park, Start-up Lisboa, DNA Cascais and Incubecenter. And, we also studied two incubators located in north of the country and in smaller cities Instituto Pedro Nunes – IPN (Coimbra) and CEI (Castelo Branco). All of them are public, except Incubecenter which is private. Tagus Park and IPN are university incubators more focussed on technology transfer

from universities to the market. Start-up Lisboa, Incubecenter, DNA Cascais and CEI receive different projects, from HEI and also from the market and could not be label as technological incubators.

Table I presents some facts about number of firms in each BI and mortality rate (average). The interviews allow understanding that in all cases necessity entrepreneurs reveal a higher mortality rate than opportunity or technological entrepreneurs.

4. Results
This section presents the main results from the empirical studies divided according to content analysis of the interviews' six dimensions.

4.1 BI objectives
The analysis of the interviews suggest that all of them promote the competitiveness and job creation and try to minimize the disadvantages of entrepreneurial individual action, focus on the reduce the mortality rate, mainly in the start-up first years of life (Peters *et al.*, 2004; Al-Mubaraki and Schrödl, 2011; Al-Dajani *et al.*, 2014). Some of the studied BI, particularly technological BI, also aims to support R&D and technology transfer and support the creation of spin-offs. Some of them play an important role to promote regional development and offer simultaneously other programs for the community in the areas of social entrepreneurship or entrepreneurship education (e.g. SUPERA Educa or DNA Cascais Entrepreneurship Education program).

4.2 BI team management profile
The team management of the BIs studied reveal some differences but also similarities. All of the managers are men, except in the case of Incubecenter, where a woman led the BI. Most of them have between five and eight people in management team, including director or manager, and several employees who usually accumulate more than one function in the team. In average the age of the team is heterogeneous between the BIs studied. CIETEC, IPN, Incubecenter, DNA Cascais and Tagus Park have teams more mature and experienced. SUPERA, Start-up Lisbon and CEI have younger teams. The qualification of the teams is very similar, most of them have at list a graduation degree, and some of them have a master or PhD. Most have skills in scientific areas of economics and management. The results are coherent with some literature that suggested the importance of the team management to the BI results (Hansen *et al.*, 2000; Grimaldi and Grandi, 2005; European Commission, 2014).

Incubator	Incubated numbers (alumni)	Mortality rate in average (%)
CIETEC	421	30
SUPERA	57	17.5
Tagus Park	7	20
Incubecenter	0[a]	0
Start-up Lisboa	180	4.5
CEI – Castelo Branco	0	12[b]
Instituto Pedro Nunes	210	28
DNA Cascais	244	20
Note: [a]Do not have yet alumni; [b]in the first six months of life		

Table I.
Incubated numbers
and mortality rate in
average by incubator

4.3 Selection criteria and exit policy

The selection process there is mostly through the incubator web site, and in most cases the Canvas is the model used to transform an idea in a business model, in some cases complemented by some financial statements. Technological incubators considering also the potential to technology transfer in selection process. But in general, they want to catch businesses with potential, mainly innovative, possible to implement, scalable (high potential to growth) and replicable. Technology incubators receive about 70-80 percent projects from masters and doctoral programs of universities (IPN, Tagus Park and SUPERA). CIETEC related some particularities. This BI enjoys a huge prestige in São Paulo and as result attracts more and more entrepreneurs from the market (outside university) that look for access to USP ecosystem, i.e., access to technology and knowledge, prestige and networks. The non-technological incubators receive in general more projects outside university, however, the HEI located in their regions are also important in the recruitment of incubated. The exit roles are very similar between them, in average incubation period is about four years, with exceptions applied to biomedical or pharmaceutical firms. Some incubators have associated technology parks or companies that facilitate the exit to contiguous spaces (Tagus Park or SUPERA). In general, they state that exit moment is natural and depends on the growth of companies or internationalization of firms.

4.4 Prestigious perception

We also tried to understand the reasons that attract entrepreneurs to incubators and what the expectations of the incubated. The two most cited reasons, in the perspective of the incubators (mainly by Brazilian BI), were the prestige and image that entrepreneurs can achieve because of their association with BI, and also the opportunity to access to networks and partnerships. And finally the rent prices of the spaces and the possibility of receiving support to accelerate their business and stay focus on your core business.

4.5 Internationalization support

Other item considered relevant to characterize and compare BI is internationalization. The BI with higher rates of internationalization is Tagus Park with 100 percent of incubated businesses operating globally. These values are about 30-40 percent in the Start-up Lisboa, CIETEC, IPN, DNA Cascais and SUPERA. The CEICB and Incubecenter reveal lower internationalization rates of their incubated firms, however, they are both very young. DNA Cascais and IPN highlights the relevance of belonging to an international network of Business Innovation Centers (BIC), which favours the internationalization of incubated firms and the possibility of using the infrastructures and network of the BIC partner in other countries. This factor could reduce internationalization risk.

4.6 Virtuous triad: infrastructure, business support and networking

Based on the model presented in literature review (Figure 1), three key incubator-level dimensions are highlighted:

(1) Infrastructure: with regard to infrastructure all BI offer individual spaces and co-working offices. They also offer shared resources, such as meeting rooms, social spaces, parking, etc. We did not found significant differences between them in this aspect. But most of the buildings were not prepared for the

incubator proposal, they were reused except in the cases of SUPERA, Tagus Park and IPN. SUPERA also provide some specific laboratories and equipments to support high-growth sectors, such as, biotechnology and advanced materials. Nevertheless this research emphasize that, soft services, such as network and business services are nowadays more important than hard infrastructures.

(2) Business support: all BI offer coaching to their tenants companies, however, the typology of services diverse between them. The coaching, in general, includes basic services to support-to-support initiative geared to accelerate tenants' learning process and develop their skills (Knopp, 2007). The services cover in general managerial or technical areas. Most of them do not have in house core managerial regular services in accountability or law services, for instance, but provide these services via network experts. IPN have in house most of these services (marketing, accountability, etc.). All of the BI provide regularly formal workshop, seminars and training sessions about specific topics (mainly about finances, marketing, intellectual property, etc.).

(3) Networks: we checked the access to networks questioning BI considering the access to professional business services provided through a network of contacts, access to financial resources and access to international networks. Professional business services through a network of contacts comprise basic services, such as accounting, legal or administrative support, as well as more specialized services such as strategy consulting (Lee and Osteryoung, 2004) or patent attorneys (Rice, 2002).

Professional business services are presented in all of studied BI. Access to such services can be provided through HEI, for example in the case technology transfer office. And, in all cases they offers negotiated preferential agreements with accounting, law and consulting firms with a minimum level of free hours. Every BI provides access to networks to provide financial resources.

5. Concluding remarks

Comparative studies between Portuguese and Brazilian BIs did not reveal substantial differences. It is possible that these results reflect the cultural proximity between Portugal and Brazil. These two countries have historical confluences and a common language. Portugal is considered a later adopter in Europe and Brazil is considered as an emergent country in Latin America, facts that could approximate the profiles of countries concerning innovation and technology. Additionally, the BI studied in Brazil are situated in the more developed state of Brazil (São Paulo) and linked to the most prestigious Brazilian University (University of São Paulo). The more evident differences registered are related to characteristics of BI (technological or non-technological) not regardless the country origin. The conceptual model explored (virtuous triad) considered infrastructures, business services and networks, applied to the eight BIs studied reveal differences between BIs types concerning to type of innovation developed by tenants, BI's team management, business services and experience learning curve of each BI. We found differences between non-technological and technological BI concerning tenants profile, selection criteria and entrepreneurship (opportunity vs necessity). In all cases BI management team are high qualified.

Concerning BI team management it is possible to register that in general the younger is the BI younger is the BI team management. Most of the BI offer only basic services and

provide professional business services through a network of contacts. The infrastructure is considered as a relevant factor, however, infrastructure do not make the difference, it is essential the experience of management team, access to business and academic networks, to ensure success. In Portugal, probably due the market size, most technology firms born global or intends to internationalize. This fact implies that most of start-ups use business names and logos prepared to enter in a global market. Because of this tendency for early internationalization, most of technological BI offers support to internationalization. In Brazil, this trend is not so clear. Besides this aspect was not possible to find significant differences between the two countries.

The results also suggest that softer services, such as network and business services are more important to start-ups creation and growth than hard infrastructure. The success of incubators are also depending on the providing a wide variety of services tailored according to tenants requirements, concentrate more on intangible business services and use qualified managers and support staff.

Additionally, this research suggests that despite the studied BI were born post 90s decade, they unexpectedly reveal several features associated with first or second generation BI. They are mainly focussed on infrastructure and basic services, while support for improving network and access to knowledge services are neglected. The results also suggest that BI are learning organizations, and improve the incubation model during the time, are examples the cases of IPN in Portugal and CIETEC in Brazil that supply more tailored services and reveal a experiential learning curve beneficial for their tenants. These results are curious and reveal a model similar with start-ups, born with less experience and learn by doing during their existence, adjust processes and procedures, internationalize, growth and improve results. The designing of public policies in this field, maybe could consider include human resources with higher experience in the management team of junior BI and even create BI as spin off of senior BI.

These results could be explored in future and raised a set of research questions set for the future, such as:

RQ1. Why younger BI do not adopt immediately models and practices more recent in terms of incubation models?

RQ2. Does BIs following pathways in terms of learning and adapting the management model that affect their tenants?

RQ3. How can BIs accelerating your learning model in the first years of life?

RQ4. Are tenants success related to experience of BI team management?

Future studies aims to enlarge the number of case studies and also complement the study with collection of information about tenants' perceptions about BI actuation and also aims to answer to some of the questions proposed by this research.

References

Acs, Z.J. and Armington, C. (2004), "Employment, growth and entrepreneurial activity in cities", *Regional Studies*, Vol. 38 No. 8, pp. 911-927.

Adkins, D. (2002), *A Brief History of Business Incubation in the United States*, National Business Incubation Association, Athens, OH.

Aerts, K., Matthyssens, P. and Vandenbempt, K. (2007), "Critical role and screening practices of European business incubators", *Technovation*, Vol. 27 No. 5, pp. 254-267.

Ahmad, A.J. and Ingle, S. (2011), "Relationships matter: case study of a university campus incubator", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 17 No. 6, pp. 626-644.

Al-Dajani, H., Dedoussis, E., Watson, E. and Tzokas, N. (2014), "Graduate entrepreneurship incubation environments: a framework of key success factors", *Industry and Higher Education*, Vol. 28 No. 3, pp. 201-213.

Al-Mubaraki, H. and Schrödl, H. (2011), "Measuring the effectiveness of business incubators: a four dimensions approach from a gulf cooperation council perspective", *Journal of Enterprising Culture*, Vol. 19 No. 4, pp. 435-452.

Ali Ahmad, S.I. (2013), "Business incubators and HTSF development: setting an agenda for further research", in Ray Oakey, A., Groen, G., Cook, P. and Sijde, V.D. (Eds), *New Technology-Based Firms in the New Millennium,* Vol. 10, Emerald Group Publishing Limited, Burlington, pp. 119-140.

Bergek, A. and Norrman, C. (2008), "Incubator best practice: a framework", *Technovation*, Vol. 28 Nos 1/2, pp. 20-28.

Cuadrado Roura, J.R., Qian, W.H. and Riggle, J. (2010), "Incubation or business pull? Investigating the geography of US business incubators", *Development Quarterly*, Vol. 25 No. 1, pp. 79-90.

European Commission (2010), "The smart guide to innovation based incubators (IBI)", *European Union Regional Policy*, available at: http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/innovation_incubator.pdf

European Commission (2014), "Has the ERDF successfully supported the development of business incubators?" Special Report, No. 7, European Court of Auditors, European Commission, Brussels.

Grimaldi, R. and Grandi, A. (2005), "Business incubators and new venture creation: an assessment of incubating models", *Technovation*, Vol. 25 No. 2, pp. 111-121.

Hansen, M.T., Chesbrough, H.W., Nohria, N. and Sull, D.N. (2000), "Networked Incubators", *Harvard Business Review*, Vol. 78 No. 5, pp. 74-84.

Holtz-Eakin, D., Joulfaian, D. and Rosen, H. (1994), "Entrepreneurial decisions and liquidity constraints", *RAND Journal of Economics*, Vol. 25 No. 2, pp. 334-347.

Jiménez Escobar, J. and Morales Gutiérrez, A.C. (2011), "Social economy and the fourth sector, base and protagonist of social innovation", *Revista de Economía Pública, Social y Cooperativa*, No. 73, Special Issue, pp. 33-60.

Knopp, L. (2007), *State of the Business Incubation Industry*, National Business Incubation Association, Athens, OH.

Lalkaka, R. (2003), "Business incubators in developing countries: characteristics and performance", *International Journal of Entrepreneurship and Innovation Management*, Vol. 3 Nos 1/2, pp. 31-55.

Lee, S.S. and Osteryoung, J.S. (2004), "A comparison of critical success factors for effective operations of university business incubators in the United States and Korea", *Journal of Small Business Management*, Vol. 42 No. 4, pp. 418-426.

Löfsten, H. and Lindelöf, P. (2003), "Science parks and the growth of new technology-based firms", *Research Policy*, Vol. 31 No. 6, pp. 859-876.

Manan, H. (2000), "Technology business incubators – bringing technology to the market place, Malaysia", available at: www.waitro.org/Publications/Seminars/China2000/manan.htm (accessed January 19, 2015).

Peters, L., Rice, M. and Sundararajan, M. (2004), "The role of incubators in the entrepreneurial process", *Journal of Technology Transfer*, Vol. 29 No. 1, pp. 83-91.

Rice, M.P. (2002), "Co-production of business assistance in business incubators: an exploratory study", *Journal of Business Venturing*, Vol. 17 No. 2, pp. 163-187.

Scaramuzzi, E. (2002), *Incubators in Developing Countries*, infoDev Program, The World Bank, Washington, DC, pp. 1-54.

Schwartz, M. (2013), "A control group study of incubators' impact to promote firm survival", *Journal of Technology Transfer*, Vol. 38 No. 3, pp. 302-331.

Tavoletti, E. (2013), "Business incubators: effective infrastructures or waste of public money? Looking for a theoretical framework, guidelines and criteria", *Journal of the Knowledge Economy*, Vol. 4 No. 4, pp. 423-443.

Westhead, P. and Storey, D.J. (1994), *An Assessment of Firms Located On and Off Science Parks in the United Kingdom*, HMSO, London.

Wonglimpiyarat, J. (2014), "Incubator policy to support entrepreneurial development, technology transfer and commercialization", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 10 No. 4, pp. 334-351.

Yin, R. (2009), *Case Study Research: Design and Methods*, 4th ed., Sage Publications, Thousand Oaks, CA.

Zhao, L. and Aram, J.D. (1995), "Networking and growth of young technology-intensive ventures in China", *Journal of Business Venturing*, Vol. 10 No. 5, pp. 349-370.

Further reading

Almeida, M. (2005), "The evolution of the incubator movement in Brazil", *International Journal of Technology and Globalization*, Vol. 1 No. 2, pp. 258-277.

Clausen, T. and Korneliussen, T. (2012), "The relationship between entrepreneurial orientation and speed to the market: the case of incubator firms in Norway", *Technovation*, Vol. 32 Nos 9/10, pp. 560-567.

EC (2002), "Benchmarking of business incubators", final report, EC, Brussels.

European Commission Enterprise Directorate General (2002), "Benchmarking of business incubators", final report, ECEDG, Brussels.

Ferguson, R. and Olofsson, C. (2004), "Science parks and the development of NTBFs: location, survival and growth", *Journal of Technology Transfer*, Vol. 29 No. 1, pp. 5-17.

Fernández Fernández, M.T. and Blanco Jiménez, F.J. (2011), "Incubación de empresas y soft landing empresarial en los paises socio mediterraneos", *Economia y compettividad en el area euromediterranea*, julho-agosto No. 861, pp. 161-174.

Marques, J., Caraça, J. and Diz, H. (2010), "Do business incubators function as a transfer technology mechanism from university to industry? Evidence from Portugal", *The Open Business Journal*, Vol. 3 No. 1, pp. 15-29.

Scillitoe, J.L. and Chakrabarti, A. (2010), "The role of incubator interactions in assisting new ventures", *Technovation*, Vol. 30 No. 3, pp. 155-167.

About the authors

Professor Luisa Margarida Cagica Carvalho holds a PhD in Management in the University of Évora – Portugal. Professor of Management in the Department of Management and Social Sciences – Open University, Lisbon – Portugal. Guest Professor in international universities teaches in courses of master and PhDs programs. Researcher at CEFAGE (Center for Advanced Studies in Management and Economics) University of Evora – Portugal. Author of several publications in national and international journals, books and book chapters. Professor Luisa Margarida Cagica Carvalho is the corresponding author and can be contacted at: luisam.carvalho@uab.pt

Simone Vasconcelos Galina is an Assistant Professor of Innovation and Operations Management at the School of Economics, Business and Accountancy of Ribeirão Preto at the University of São Paulo. She has a PhD in Engineering from Polytechnic School of the University of São Paulo. She is a Teacher and Advisor of Master and Doctorate students at the Graduate Program in Management of Organizations (PPGAO). She leads the Group of Studies on Innovation and Internationalization of Companies and her main areas of expertise are innovation management, R&D internationalization and globalization of operations.