Business incubator research: a review and future directions*

Investigación en incubadoras de empresas: una revisión y futuras líneas de investigación

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Resumen

El propósito del artículo es analizar la producción científica en torno a las Incubadoras de Empresas, para lo cual se examinaron 50 artículos de incubación de empresas publicados, entre los años 1985 y 2012, en las revistas del campo del emprendimiento y la gestión de la tecnología e innovación más importantes en el JournalCitationsReport (JCR). En cuanto a los resultados, se observa un predominio de estudios cualitativos orientados mayoritariamente al análisis de la creación de Incubadoras de Empresas u sus efectos, adicionalmente, la Teoría del Capital Social, la Teoría Institucionalista, la Teoría de la empresa basada en recursos, la Teoría de la Coevolución, y la Teoría de la Agencia, son los marcos conceptuales más utilizados.

Palabras clave: *Incubadoras de empresas, redes de incubación, emprendimiento, gestión de innovación.*

Abstract

The purpose of the paper is to analyze the scientific production concerning Business Incubators. For which, 50 business incubation articles published between 1985 and 2012 in the journals of the field of entrepreneurship and technology management and innovation that are most important in the Journal Citations Report (JCR) were examined. In terms of results, there is a predominance of qualitative studies focused mainly on the analysis of the creation of business incubators and their effects. In addition, the Social Capital Theory, Institutionalist Theory, the Theory of the firm based on resources, Coevolution Theory, and Agency Theory, are the most widely used frameworks

Keywords: *Business Incubations, Incubations Networks, Entrepreneurship, Innovation Management.*

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1. INTRODUCCIÓN

Successful business incubators (BI) serve a critical role in the development of local, regional, and national economies through the creation of jobs and the generation of profits (Aernoudt, 2004; Aerts, Matthyssens, and Vandenbempt, 2007; Grimaldi and Grandi, 2005) and technology development and innovations (Cooper and Park, 2008; Lee and Osteryoung, 2004; Phan, Siegel, and Wright, 2005; Swierczek, 1992; Tsai et al., 2009). BI are newer and popular organizational forms that are created, often with the help of economic development agencies, to support and accelerate the development and success of affiliated ventures to achieve economic development goals (Marlow and McAdam, 2011; Peña, 2004; Rice, 2002; Scillitoe and Chakrabarti, 2010; Sofouli and Vonortas, 2007).

The development and evolution of the concept of BI indicates the nonexistence of conceptions that only analyze its complexity (Aernoudt, 2004; Allen and McCluskey, 1990; Allen and Rahman, 1985; Bollingtoft and Ulhoi, 2005; Hackett and Dilts, 2004a; Hackett and Dilts, 2004b; Mian, 1997; Phan, Siegel, and Wright, 2005; Rice, 2002; Scillitoe and Chakrabarti, 2010; Thierstein and Willhelm, 2001; Tötterman and Sten, 2005; Tsai et al., 2009).

During the past three decades, the BI notion has suffered changes. In the eighties and nineties, it was conceived as an organizational environment, but since 2000 it has been perceived as an institutional environment that are not only crucial for the economic growth and prosperity of a business or sector in a certain country, but also, directly or indirectly contribute to the economic national development and determine other components of a National System of Innovation.

According to Bollingtoft and Ulhoi (2005, p. 269), "BI is an umbrella term for any organization that provides access to affordable office space and shared administrative services (see also Allen and McCluskey, 1990; Fry, 1987). Over the years, BI have been marketed under a variety of more or less synonymous labels, including Business Accelerators (Barrow, 2001); Research Parks (Money, 1970); Science Parks (Martin, 1997);

Knowledge Parks (Bugliarello, 1998); Seedbeds (Felsenstein, 1994); Industrial Parks (Autio and Klofsten, 1998), Innovation Centers (Campbell, 1989), Technopoles (Castells and Hall, 1994) and Networked Incubators (Hansen et al., 2000)".

This initial conception nourishes the creation of new businesses, to turn an institutional environment capable of realizing dynamic processes directed by the social, economic and political environment into one that facilitates the acceleration, discovery, validation and application of new ideas and concepts in order to develop and commercialize new products, technologies and business.

The evolution of BI can be defined as a formal way inside a surrounding environment (a 'community inside the community') that generates critical sources of opportunities and restrictions across a network of support, where the availability, accessibility and supply of services and shared resources facilitates the beginning, development, acceleration and business survival of an entrepreneur destined to commercialize new technological products and services.

The nature of BI research and the emergence of business incubation as a legitimate academic pursuit have begun to attract the interest of scholars. Hackett and Dilts (2004b) claim that the field of business incubation has made only limited progress towards disciplinary status in a normal science framework. Others think that business incubation remains at a theory-building stage, and is "dispersed and isolated" and characterized by accumulative fragmentalism (Phan, Siegel, and Wright, 2005).

The paucity of research on business incubation forms the interdisciplinary or multidisciplinary perspectives that consider the different theories of management, organization, strategy, economics and business. The complex nature of BI means they are studied from broader analytical frameworks. Therefore, the aim of this study is to analyze the content and evolution of BI research, identifying the subjects, research methodologies and levels of analysis, as well as the most outstanding authors and articles of greatest impact. To this end, we conducted a search of articles on business incubation in entrepreneurship, technology and in-

novation management journals included in the *Journal Citations Report* (JCR)[1], based on three criteria.

First, publication in one of seven major academic journals in the field of entrepreneurship – *Entrepreneurship Theory and Practice (ETP), Journal of Business Venturing (JBV), International Small Business Journal (ISBJ), Small Business Economics (SBE), Entrepreneurship & Regional Development (ERD), Small Business Management (SBM), Strategic Entrepreneurship Journal (SEJ)* – or five important academic journals in the field of technology and innovation management: *Technovation (T), Research Policy (RP), Technological Forecasting and Social Change (TFSC), Journal of Product Innovations Management (JPIM) and Technology Transfer (TT)*.

Second, the use of one or more keywords related to BI in the article title or abstract, i.e., business incubator (incubator network, incubator center), business incubation (incubatee, incubation) or incubation model (incubation process, incubation type).Third, publication between 1985 and 2012 inclusive. All editor notes, book reviews and review articles in the business incubator domain and replies to published articles were omitted so that the data contained only articles and research notes that were non-invited and peer-reviewed.

We found 50 studies, 27 of which were articles in technology and innovation management journals of high impact included in the JCR; the remainder were published in high impact journals of entrepreneurship. 50 articles met the selection criteria. Articles were categorized by journal, subject and theory framework, qualitative/quantitative analysis and level and subject of analysis. In addition, the reference section of each article was used to count the number of citations from the Institute for Scientific Information (ISI) database.

[1] This criteria has been used by major authors such as Davidsson and Wiklund (2001), Dean, Shook and Payne (2007), Van Praag and Versloot (2007) and Brush, Manolova and Edelman (2008), among others.

The structure of this article after this brief introduction is as follows. Details on the literature review of BI, which include the qualitative analysis and some contributions to the literature on levels and subjects of analysis of BI, follows. Finally, the conclusions are recorded including past trends and future directions of research in this subfield of entrepreneurship.

2. STUDIES ON BI

In organizing this article, we have adopted the perspective that BIs are distinct organizations within the entrepreneurial value chain. This value chain comprises the set of organizations whose activities are linked by the successive transformation of resource and knowledge inputs to marketable outputs in the period leading to and shortly after the creation of a new firm. BIs 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, Siegel, and Wright, 2005). Therefore, to advance BI research, we first need to carry out a content analysis and then contribute to the literature on the levels and subjects of the analysis of BI.

2.1 Content analysis

The different topics discussed in the articles were classified according to the two types of sources previously identified: the seven major entrepreneurship journals and the five leading journals of technology and innovations management. Table 1 shows a journal ranking, impact factor and the number of articles published in the past three decades along with the most important authors of this subfield of entrepreneurship. The only journal that has no articles was the SEJ.

Table 1. Research orientations of BI

No	Journal in the JCR (2009)	Impact Factor	1980s	1990s	2000-2012	Total	%	Articles
1	JBV	2,26	2	1	3	6	12%	(Bollingtoft and Ulhoi, 2005; Merrifield, 1987; Mian, 1997; Phan, Siegel, and Wright, 2005; Rice, 2002; Stuart and Abetti, 1987)
2	ETP	1,70		1	2	3	6%	(Allen and McCluskey, 1990; Choi and Kiesner, 2007; Marlow and McAdam, 2011)
3	SBE	1,38			3	3	6%	(Adegbite, 2001; Aernoudt, 2004; Peña, 2004)
4	ISBJ	1,35			4	4	8%	(Cooper and Park, 2008; Fang, Tsai, and Lin, 2010; McAdam and Marlow, 2007; Tötterman and Sten, 2005)
5	SBM	1,09	1	2	2	5	10%	(Allen and Rahman, 1985; Autio and Klofsten, 1998; Bruton, 1998; Lee and Osteryoung, 2004; Marvel, 2012)
6	ERD	1,02			2	2	4%	(McAdam and Marlow, 2011; Thierstein and Willhelm, 2001)

No	Journal in the JCR (2009)	Impact Factor	1980s	1990s	2000-2012	Total	%	Articles
7	T	2,47		2	11	13	26%	(Aerts, Matthyssens, and Vandenbempt, 2007;Bergek and Norrman, 2008; Bøllingtoft, 2012; Bruneel, Ratinho, Clarysse and Groen, 2012; Clausen andKorneliussen, 2012; Fonseca and Chiappetta, 2012;Grimaldi and Grandi, 2005; Schwartz and Hornych, 2008; Schwartz and Hornych, 2010; Scillitoe and Chakrabarti, 2010; Swierczek, 1992; Vanderstraeten and Matthyssens, 2012)
8	RP	2,26		1	2	3	6%	(Colombo and Delmastro, 2002; Mian, 1996; Nowak and Grantham, 2000)
9	TFSC	1,78			3	3	6%	(Barbero, Casillas, Ramos and Guitar, 2012; Sonne, 2012; Tsai et al., 2009)
10	JPIM	1,52	1	1		2	4%	(Scherer and McDonald, 1988; Udell, 1990)
11	TT	0,88			6	6	12%	(Cooper, Hamel and Connaughton, 2012; Guerrero, Urbano, Cunningham and Organ, 2012;Hackett and Dilts, 2004a; Hackett and Dilts, 2004b; Peters, Rice, and Sundararajan, 2004; Sofouli and Vonortas, 2007)
Total			4	8	38	50	100%	

Source: Own elaboration

As detailed in Table 1, most research was located in journals of technology and innovation management (54%), more specifically in the T (26%), and was published during the period 2000 - 2012 (81%). For the entrepreneurship journals (46%), the most cited were JBV (53%). Evidence of a growing body of business incubator articles in technology and innovation management and entrepreneurship journals could lend support to the view that business incubation is emerging as a distinct domain. Active scholarship in theory development could signal the conceptual definition of new domain boundaries. Comparing late to early study years, an average of 74% articles were published during the period 2000 - 2012 and only 24% during 1980s (8%) and 1990s (16%).

These data indicate that business incubation researchers publishing in entrepreneurship and technology and innovation management journals use a wide variety of reference sources. However, five journals seem to be particularly influential: JBV, ISBJ, SBM, T and TT, with 34 articles. In fact, of the 50 found only seven were theoretical and 43 were empirical studies. Among theorists, some authors were prominent. Merrifield (1987), with the professionally managed incubation center concept, emerged as the most successful model. Phan, Siegel and Wright (2005) use observation, synthesis and future research to establish science parks and incubators. Aernoudt (2004) uses see incubators as a tool for entrepreneurship. Nowak and Grantham (2000) conceptualize virtual incubators. Tsai et al. (2009) analyze the co-evolution of business incubation and national innovation systems in Taiwan. Finally, Hackett and Dilts (2004a, 2004b) make a systematic literature review of BI and propose a theoretical framework for study.

For example, several studies in recent years have referenced or discussed BI research in terms of its development and evolution. In their survey of tenured business incubator scholars at major universities, Hackett and Dilts (2004, p. 56) claim that "a systematic review of literature on BI in 17 journals" were included or not in the JCR, which shows some development in this subfield of entrepreneurship.

However, there are gaps that can be closed from this theoretical review article. The first attempts to show the growing importance of this object

of study in high impact journals included in the JCR, and the second aims to update this and other studies for a review theoretical of BI. Phan, Siegel and Wright (2005) found that BI research has become an international phenomenon. Although it represents a small percentage of all published BI research, the vast majority of such research is published in journals dedicated to entrepreneurship and small business. They warned that BI scholars may become increasingly self-referential and inward-directed because of the field's reliance on dedicated entrepreneurship, technology and innovation management journals, at the expense of the intellectual development achieved through the external legitimization of its tenets in publications in the various business and management fields.

In comparing management and BI research published from 1987 to 2005, Scillitoe and Chakrabarti (2010, p. 157) concluded that "progress towards coherence in the development and evolutions in business incubator research has been limited. No powerful unifying field and notions exist, nor do multiple coherent points of view. Business incubator studies tend to be less sophisticated in sampling frames, hypothesis development, statistical analysis, and dynamic longitudinal analysis than are organizational studies in the more established disciplines". The other empirical studies were grouped into five themes, under the direction of research and academic article volume with similar interests as shown in Table 2.

Table 2. Subjects, methodologies and authors

Subjects	Methodology			
	Quantitative		Qualitative	
Creation and effects of BI in the entrepreneurship environment	10 (23%)	(Aerts, Matthyssens, and Vandenbempt, 2007; Allen and Rahman, 1985; Colombo and Delmastro, 2002; Clausen and Korneliussen, 2012; Grimaldi and Grandi, 2005; Schwartz and Hornych, 2010; Scillitoe and Chakrabarti, 2010; Stuart and Abetti, 1987; Swierczek, 1992; Udell, 1990)	13 (30%)	(Allen and McCluskey, 1990; Autio and Klofsten, 1998; Bergek and Norrman, 2008;Bøllingtoft, 2012; Bruneel, Ratinho, Clarysse and Groen, 2012; Bruton, 1998; Choi and Kiesner, 2007; Fonseca and Chiappetta, 2012; Peters, Rice, and Sundararajan, 2004; Scherer and McDonald, 1988; Sofouli and Vonortas, 2007; Thierstein and Willhelm, 2001; Tötterman and Sten, 2005)
New model of the BI network	1 (2%)	(Fang, Tsai, and Lin, 2010)	1 (2%)	(Bollingtoft and Ulhoi, 2005)
The phenomenon of BI, as "co-evolution, co-creation or co-production"	0 (0%)		1 (2%)	(Rice, 2002)
The emergence of the University Business Incubator.	4 (9%)	(Lee and Osteryoung, 2004; Marvel, 2012; Mian, 1994; Mian, 1996)	3 (7%)	(Cooper, Hamel and Connaughton, 2012; Guerrero, Urbano, Cunningham and Organ, 2012; Mian, 1997)
Describe, analyze or make clear a single variable or category of research.	3 (7%)	(Barbero, Casillas, Ramos and Guitar, 2012; Peña, 2004; Schwartz and Hornych, 2008)	7 (16%)	(Adegbite, 2001; Cooper and Park, 2008; Marlow and McAdam, 2011; McAdam and Marlow, 2007; McAdam and Marlow, 2011; Sonne, 2012; Vanderstraeten and Matthyssens, 2012)
Total	18(42%)		25(58%)	

Source: Own elaboration

In Table 2, most of the research is qualitative (58%) and located in subject 1: Creation and effects of BI in the entrepreneurship field (53%), where qualitative and quantitative research represents 30% and 23%, respectively. This is followed by subject 5: Describe and analyze a variable or category of research (23%). This indicates that 77% of intellectual production has been devoted to traditional studies and has neglected the emergence of new research (new model of BI network; the phenomenon of BI as co-evolution, co-creation or co-production; and the emergence of UBI).

Empirical articles are more geared towards the implementation of a single theory for the analysis of results using repeated social capital theory, institutional theory, resource-based firm theory, co-evolution theory, agency theory and others. Among the qualitative research (25 articles), case studies were used in 20, with the support of tools such as surveys, interviews and observations. These arguments lead to the following propositions:

Proposition 1: The BI research articles published in major entrepreneurship, technology and innovation management journals are more empirical than they are theoretical studies.

Proposition 2: The BI research articles published in major entrepreneurship, technology and innovation management journals use more qualitative methodologies than they do quantitative.

These empirical studies highlight five important issues about the relevance of the field of business incubation. First, significant aspects are raised about the scope and depth of the subfield. The first aspect looks at the creation and effects of BI in the entrepreneurship environment (Scillitoe and Chakrabarti, 2010); the impact of BI in entrepreneurial development (Allen and Rahman, 1985); the relation among the structures, policies, services and performances of incubators (Allen and McCluskey, 1990); the development of BI in different contexts (Bruton, 1998); the configuration of science parks and incubators (Scillitoe and Chakrabarti, 2010); the effects of the model of incubation on the management of business processes (Peters, Rice, and Sundararajan, 2004); the analysis

of four categories or typologies of BI (Grimaldi and Grandi, 2005); the performance of science parks and BI (Sofouli and Vonortas, 2007); the development of a center for BI (Thierstein and Willhelm, 2001); the impact of technological BI (Autio and Klofsten, 1998); and the effects of technological BI on entrepreneurship development (Colombo and Delmastro, 2002).

The second aspect looks at the importance of a new model of BI networks from the notion of share capital and the hybrid relation between incubatee and incubator (Bollingtoft and Ulhoi, 2005); the credibility and construction of capacities of BI networks of support (Tötterman and Sten, 2005); and the organizational and social learning of these networks (Fang, Tsai, and Lin, 2010).

The third shows a new way of studying BI, known as the "co-evolution or co-creation" (Tsai et al., 2009) or "co-production" (Rice, 2002) of entrepreneurship activities between offer and demands, that is to say, the cooperation between four levels of analysis (incubatee-incubator-network-community). This raises the collaboration that exists between BI and the communities in which they work (Rice, 2002) and the creation of activities, programs and systems of incubation and innovation in specific contexts.

The fourth aspect denotes the emergence of UBI, which serves in the first instance as a tool for the creation of new high-technology entrepreneurs (Mian, 1994; Mian, 1996; Mian, 1997), and is also a key success factor for the promotion of the start-up and spin-off university (Lee and Osteryoung, 2004).

In fifth aspect describes, analyzes or makes clear a single variable or category of research such as: making sense of the cooperation between four levels of analysis (McAdam and Marlow, 2011); the influence of entrepreneurial initiatives regarding incubates (Marlow and McAdam, 2011); the credibility and professional images of BI entrepreneurs (McAdam and Marlow, 2007); the influence of BI on the processes of innovation (Cooper and Park, 2008); the factors that influence the incubatee and in-

cubator (Peña 2004); and the indicators of performance of BI in a certain context (Adegbite, 2001).

The five articles most cited in the subfield of business incubation are: Colombo and Delmastro (2002) assess the effectiveness of technology incubators in Italy; Mian (1997) deals with the analysis and proposal of a model that comprises three performance dimensions: program growth and sustainability, the tenant firm's survival and growth and the contributions to the sponsoring university's mission; Stuart and Abetti (1987) show the early results from a research program that combines research on both new products and new ventures to come up with a more comprehensive evaluation of relative success factors; Mian (1996) presents empirical data on University Technology Business Incubator (UTBIs) by focusing on their value-added dimensions, which include typical incubator services along with university-related inputs; and Hackett and Dilts (2004a) present a literature review on BI.

We found that the most cited author is Mian (1996, 1997), who gives the theoretical bases and practices of BI that contribute to the endogenous development of an efficient, fast and dynamic area of growth. The article we consider most representative of the subfield of business incubation is the theoretical review carried out by Hackett and Dilts (2004a), who present a synthesis overview of the development and evolution of BI.

In summary, there exist seminal studies of BI, which depart from a systematic review using the four levels of analysis and offer a theoretical construction of the phenomenon of BI (Hackett and Dilts, 2004a; Hackett and Dilts, 2004b); the development and evolution of a new concept and model of a BI network (Bollingtoft and Ulhoi, 2005); the need to study the relations and interactions of four levels of analyses that intervene in the entrepreneur activity (Scillitoe and Chakrabarti, 2010); and perform an analysis of the phenomenon from the co-evolution, co-production or co-creation of activities, programs and instruments for the incubatee, incubator and network (Tsai et al., 2009).

2.2 Contributions to the literature on the levels and subjects of analysis

From a general perspective, the research over recent decades has been orientated towards different areas and levels of analysis; nevertheless, it is possible to find similarities that allow us to propose a relation in the four levels and three subjects of analysis (Table 3).

Table 3. Levels and subjects of analysis

Subjects / Levels	Development	Configuration	Impact
Individual or incubatee	(Allen and Rahman, 1985; Clausen and Korneliussen, 2012; Merrifield, 1987; Stuart and Abetti, 1987,)	(Adegbite, 2001; Marvel, 2012; Peña, 2004; Tötterman and Sten, 2005)	(Aernoudt, 2004; Udell, 1990)
Organization or incubator	(Choi and Kiesner, 2007; Hackett and Dilts, 2004b; Mian, 1997; Scherer and McDonald, 1988)	(Barbero, Casillas, Ramos and Guitar, 2012; Bergek and Norrman, 2008;Guerrero, Urbano, Cunningham and Organ, 2012; Hackett and Dilts, 2004a; Mian, 1994; Nowak and Grantham, 2000; Phan, Siegel, and Wright, 2005; Schwartz and Hornych, 2008; Vanderstraeten and Matthyssens, 2012)	(Aerts, Matthyssens, and Vandenbempt, 2007; Autio and Klofsten, 1998; Bruneel, Ratinho, Clarysse and Groen, 2012; Bruton 1998; Colombo and Delmastro, 2002; Cooper and Park, 2008;Fonseca and Chiappetta, 2012; Grimaldi and Grandi, 2005; Lee and Osteryoung, 2004; Marlow and McAdam, 2011; McAdam and Marlow, 2011; Mian, 1996; Schwartz and Hornych, 2010; Thierstein and Willhelm, 2001)
Network	(Bollingtoft and Ulhoi, 2005; Rice, 2002)	(Bøllingtoft, 2012; Cooper, Hamel and Connaughton, 2012; Fang, Tsai, and Lin, 2010; Sofouli and Vonortas, 2007)	(McAdam and Marlow, 2011; Mian, 1996; Schwartz and Hornych, 2010; Thierstein and Willhelm, 2001)
Community	(McAdam and Marlow, 2007; Rice, 2002; Tsai et al., 2009)	(McAdam and Marlow, 2011; Scillitoe and Chakrabarti, 2010; Sonne, 2012)	(Allen and Rahman, 1985; Sofouli and Vonortas, 2007; Thierstein and Willhelm, 2001)

Source: Own elaboration

Table 3 shows that the research has focused on topics such as the development (Allen and Rahman, 1985; Merrifield, 1987; Stuart and Abetti, 1987), configuration (Adegbite, 2001; Peña, 2004; Tötterman and Sten, 2005) and impact (Aernoudt, 2004; Udell, 1990) of BI. Therefore, it is possible to recognize the subject of analysis: the development, configuration and impact of BI and the four levels of analysis: individual, organization, network and community.

The individual analysis is at the incubatee level, where the entrepreneur inside the incubator is the object of study; it centers on his or her explanation of how participation in the incubator affects the actions and results of the individual and the firm. At this level, it is possible to find authors that study the different sectors, regions and states and their relations with the community (Adegbite, 2001; Aernoudt, 2004; Allen and Rahman, 1985; Marvel, 2012; Merrifield, 1987; Stuart and Abetti, 1987; Tötterman and Sten, 2005; Udell, 1990).

The organization analysis can be considered to be at the micro level, where the object of study is BI, especially their functioning and structures. This study is focused on explaining how BIs are sympathetic to the incubatee and the process of incubation. It is possible to find some authors that propose research on the development, configuration and impact of BI as well as their change, sustainability and relation and interaction (Aerts, Matthyssens, and Vandenbempt, 2007; Autio and Klofsten, 1998; Bergek and Norrman, 2008; Bruton, 1998; Choi and Kiesner, 2007; Fonseca and Chiappetta, 2012; Hackett and Dilts, 2004a; Hackett and Dilts, 2004b; Mian, 1997; Nowak and Grantham, 2000; Phan, Siegel, and Wright, 2005; Scherer and McDonald, 1988).

Additionally, Grimaldi and Grandi (2005) suggest four categories of BI – Business Incubator Centers (BICs), UBI, Independent Private Incubators (IPIs) and Corporate Private Incubators (CPIs) – and two models, namely non-profit and for-profit incubators. This further indicates the complexity of BI and the need to approach its study from a broad framework of analysis, including interdisciplinary and multidisciplinary perspectives.

The processes of incubation can be divided into the beginning, development and maturity of traditional, technological or innovative entrepreneurships. This centers on the processes of entrepreneurship accompaniment, technical assistance and the offer of services to entrepreneurs (Hackett and Dilts, 2004a; Mian, 1996; Peters, Rice, and Sundararajan, 2004; Tsai et al., 2009).

In spite of this, at these two levels of analysis questions exist that need to be resolved, for example what is the level of interaction of the entrepreneurs with the network and the community, what are the links between the incubatee and the network, what is the relation between the development, configuration and impact and the community and what changes and transformations have affected the processes of BI.

Network analysis is conceived at the meso level, namely the study of the network or the organizational field of BI from a sociological perspective, particularly the relation between the environment and other networks. This analysis centers on the understanding of the logic of the development at a local, regional, national and international context (Bollingtoft and Ulhoi, 2005; Fang, Tsai, and Lin, 2010; Rice, 2002; Sofouli and Vonortas, 2007; Thierstein and Willhelm, 2001).

Community analysis is conceived at the macro level, namely the factors in the social, political and economic environment. It centers its attention on the relation between the environment and other BI, individuals, organizations and institutions, and seeks to understand the levels of entrepreneurship, regional and national development (McAdam and Marlow, 2007; McAdam and Marlow, 2011; Rice, 2002; Scillitoe and Chakrabarti, 2010; Tötterman and Sten, 2005; Tsai et al., 2009).

However, these topics have been studied in isolation with little interest in interpreting or understanding the relations and interactions between the four levels and three subjects of analysis (Aernoudt, 2004; Hackett and Dilts, 2004a; Hackett and Dilts, 2004b; Phan, Siegel, and Wright, 2005; Rice, 2002; Scillitoe and Chakrabarti, 2010).This theoretical and empirical gap implies that current studies have used analytical frames (interdisciplinary and multidisciplinary) that are too wide. Thus, in this

study, we aim to explain the changes and evolutions of BI at any one time and the degree of influence in the beginning, development and maturity of the entrepreneur.

Together, theory development followed by empirical testing and validation serves to generate increasing consensus in the subfield and its relevance (Hackett and Dilts, 2004a). We expect to see greater visibility of BI research in key entrepreneurship and technology management journals. Furthermore, adhering to a pattern of theory development followed by empirical testing, we expect to see a decrease over time in the allocation of BI articles focused on theory and a corresponding increase in empirical studies. These and other arguments lead to the following propositions:

> *Proposition 3: The number of BI research articles published in major entrepreneurship, technology and innovation management journals will increase over time.*

> *Proposition 4: While theoretical and BI research will emerge in tandem in the major entrepreneurship, technology and innovation management journals, theoretical articles will appear more frequently in the early stages of BI research.*

Exchanges should increase within the entrepreneurship field as well as between its scholars and the broader academic community. At the real gestation of the subfield, there are no scholars dedicated to BI, so early authors must originate from groups of scholars dedicated to research in other academic fields. These authors will bring to bear theoretical frameworks, concepts and ideas from their base disciplines in an attempt to explain BI phenomena from broader analytical frameworks.

However, such exchanges between BI academics and the academic community reveal that some phenomena cannot be explained or predicted using one disciplinary lens, but several lenses from a theoretical integration richer and more diverse for the analysis of incubators. As the subfield emerges, dedicated BI publications have been introduced and are expected to become an increasingly important source of thought and formulation for scholars.

We expect to observe the increasing use of refereed journals dedicated to business incubation as a subfield. BI, being a high impact organization for endogenous economic development, will continue its transformation and adjustment in terms of design (Bollingtoft and Ulhoi, 2005) and technical and financial operation (Phan, Siegel, and Wright, 2005; Scillitoe and Chakrabarti, 2010), in order to strengthen and improve the generation of new ventures and local, regional and national business growth. Thus:

> *Proposition 5: BI research published in the major entrepreneurship, technology and innovation management journals increasingly relies on analytical frameworks from other disciplines by broader theoretical integrations for the analysis of incubators.*

Some authors have explored and analyzed BI using a combination of theoretical perspectives as stated before. This indicates that the interest of scholars is to explain more fully and comprehensively these organizations, which are increasingly growing in quantity and quality.

3. CONCLUSIONS AND FUTURE DIRECTIONS

Because of the varied names of BI, studying the concept is difficult. Therefore, it is imperative to update and reconcile the definitions and designs in academic, social and economic settings in order to contribute to the best of local endogenous development and thus to academic and scientific production. Given the substantial increase of academic production in this subfield of entrepreneurship during the 2000 - 2012, is also necessary to identify and study underexplored research topics (BI network, co-evolution and UBI) as well as different levels and foci of analysis.

Papers on BI typically begin with two features: an enumeration of the different levels and subjects of analysis, types of incubators, perspectives of analysis and a list of antecedents and the consequences of success factors. For example, Hackett and Dilts (2004a) identify four levels of analysis: incubatee, incubation processes, incubators and community; Phan, Siegel and Wright (2005) describe four levels of BI analysis using

the incubatee-incubator-park system relating to entrepreneurship development; and Scillitoe and Chakrabarti (2010) suggest three subjects of analysis including the development, configuration and impact of BI. This suggests that organizations are sufficiently idiosyncratic to ensure that developing a unified theory of BI may be difficult.

However, there are existing organizational theories that we can exploit. A general model of BI should allow us to answer the following questions that are standard for research into other organization forms but would represent advances to the extant research on this topic. The first and only question is what disciplines facilitate the study of BI as a subfield of entrepreneurship. One might argue that BI can be studied in a complementary way using institutional theory (institutionalization), agency theory (relationships), social capital theory or network theory (interactions), resource-based view theory (capabilities) or learning organizational (accumulation), co-evolution theory (create together) and entrepreneurship field (new ventures).

An extension to this question may be to ask if one can describe the ecology of BI as an institutionalization processes for tenant firms, BI or the network. With the exception of the work by Tsai et al. (2009), there is little existing evidence on the search processes adopted by firms concerning their decisions to locate to a particular business incubator and the intermediaries involved in the process. Theoretically, we can build complementary models that characterize BI as being in competition with each other and with other organizations such as corporations to attract tenant firms to co-locate in them.

However, it is evident that there are similarities and differences among BI located in the same geographic region and in different geographic regions (Phan, Siegel, and Wright, 2005). Specifically, because incubators encompass independent organizations, they can be examined from different perspectives and at different levels and subjects of analysis.

We suggest a number of avenues for further research. First, there is a need to consider what disciplines facilitate the study of BI as a subfield of entrepreneurship. An associated issue is to describe the ecology of BI

from a systemic perspective. An important dimension of such analysis is to consider the relations and interactions of the four levels of analysis (incubatee, incubator, network and community) and the three focuses of analysis (development, configurations and impact). Second, it is evident that as BI take place in different environmental and institutional contexts there is a need to develop using social capital theory, institutional theory, resource-based firm theory, co-evolution theory and agency theory.

We observe that the theoretical questions and approaches are myriad, limited only by a researcher's imagination and analytical tools. Hence, the opportunities for innovative, theory building and empirical analysis are enormous, and therein emerges the proposal to address the phenomenon of incubators from interdisciplinary or multidisciplinary perspectives. This emphasizes the need to treat the entrepreneur, network and community as levels of analysis apart from that of the business incubator because there are substantive implications on performance measurement. In sum, we believe that a fruitful research direction lies in the identification and examination of the relations and interactions of four levels and three subjects of analysis from interdisciplinary or multidisciplinary perspectives.

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