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Abstract There is a wide literature about business incubators (BIs), especially about successful cases in high tech and knowledge intensive industries. Despite that, there is neither a viable integrative theory of effective business incubation nor clear guidelines about the preconditions for establishing BIs and their management. Such theory and guidelines are urgently needed because there is increasing evidence in the literature that, despite many successful cases and public policies supporting business incubation, most of BIs are not successful at all and serious doubts have emerged about the general effectiveness of business incubation and the advisability of investing public money in it. Based on a systematic literature review of the poor and scattered theoretical knowledge of effective business incubation, general principles are proposed to decide when a BI should be established and what it should do to be effective. The research is limited to non-profit BIs whose main goal is regional economic development as they represent the overwhelming majority of operating BIs.

Keywords Business incubators · Business incubation · Theoretical contribution · New ventures · Start-ups

Introduction

According to the National Business Incubation Association (NBIA), the world's leading association of business incubators (BIs) based in the USA, business incubation is a 'process' of business support: 'Business incubation is a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services' [33]. The UK Business Incubation has a more traditional approach and identifies business incubation with 'location' and 'services' provided: 'Business incubation provides

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growth SMEs and start-ups with the ideal location to develop and grow their businesses, offering everything from virtual support, rent-a-desk through to state of the art laboratories and everything in between. They provide direct access to hands-on intensive business support, access to finance and expertise and to other entrepreneurs and suppliers to really help businesses and entrepreneurs to grow—faster' [51]. The Association of German Business Incubators (ADT) and the Asian Association of Business Incubation (AABI) provide similar definitions focused on the kind of provided services. All the different definitions focus on the services and resources provided but with different accents.

The main expectation of policy makers that invest public money in business incubation is that incubator graduates have the potential to create jobs, revitalize cities and regions, diversify local economies, commercialize new technologies, transfer technology from universities and major corporations and strengthen local and national economies in general. So they may have many different goals and vary in the way they deliver their services, in their organizational structure and in the types of clients they serve. Different classifications and typologies of business incubation have been identified. The most effective is probably the one that identifies four main categories [3]: public non-profit incubators (Business Innovation Centre from a popular EU policy), private independent profit-oriented incubators, university business incubators, private corporate profit-oriented incubators. Most of the BIs across the world are non-profit organizations focused on regional economic development and even in the USA about 94% of operating BIs belong to such a typology, and only 6% of USA incubators are for-profit entities, usually set up to obtain returns on shareholders investments [25]. That is why the present research focuses on non-profit BIs whose main goal is regional economic development.

The increasing focus on knowledge intensive start-up firms and their potential for early international growth in the global economy has increased the attention for BIs as the main public tools to create such 'international new ventures' [36] and 'born global firms' [39]. As a consequence, the number of BIs has been increasing, as well as their geographical spread across the world. The first BI in history is thought to be the Batavia Industrial Center, opened in Batavia, NY, in 1959, in order to revitalize that neighbourhood after the closure of a large factory. The phenomenon did not become a popular one until the late 1970s, and in 1980, it is estimated that 12 BIs were active in the USA [33]. Starting from the beginning of the 1980s, the number of BIs in the world has been growing rapidly from 200 up to over 3,000 in 2000 ([52], p. 27) and around 3,600 in 2010 [4]. In the USA, even after the dot-com bust of the early 2000s, the number of business incubation programs has continued to increase: In late 2005, NBIA estimated that approximately 1,100 BIs were operating in the USA, up from 950 in 2002; even more impressive is the growth in the number of operating incubation programs since the late 1990s; since 1998, the number of incubators in the USA has nearly doubled [33]. UK Business Incubation reports that there are approximately 300 BIs in the UK today [51], and the Association of German Business Incubators reports 212 such facilities in Germany [5]. The Asian Association of Business Incubators, which includes among its members both incubators and national associations of incubators (from China, India, Japan, South Korea, Australia, New Zealand, Malaysia, Singapore, Kazakhstan, Kyrgyzstan, Pakistan, Uzbekistan, Philippine, Thailand and Vietnam), estimates 1,000 incubators in Asia (except

Middle East), 850 incubators in Western Europe, around 380 in South and Central America, 180 in Eastern Europe and 180 in Africa, Middle East and others [4].

Despite increasing numbers, diffusion and popularity of BIs and related associations, not to speak of related literature, public funding, public policy and promotion, 'empirical research evidence clearly suggests that they tend to fail in supporting entrepreneurship, innovation, and regional development and, therefore, they do not fulfil their expected role as policy instrument' ([48], p. 460). There is plenty of literature and data claiming the positive contribution of BIs, with specific reference to the number of companies and jobs created [34, 25], but most of the time such claims from incubators' associations are not methodologically sound evaluations of effectiveness because they just measure intended effects and do not compare them with unintended ones [6]: They do not consider that some firms would have grown and would have been funded even outside the incubator; some others moved into the incubator at a later stage of their growth, attracted by cheap office space, facility or public funding.

As has been very well clarified, suitable methods for analysing the effectiveness of BIs are the before-and-after comparison and the control-group concept [48]: 'Effectiveness' is understood as differences in regional and business performance after the use of business incubation (longitudinal analysis); 'control-group' concept compares characteristics from a group of firms or regions taking advantage of BIs and a control group not utilising BIs' facilities (cross-sectional analysis), with both groups selected randomly or according to a set of criteria.

The most comprehensive and methodologically sound evaluations of BIs have been undertaken in Europe and in the USA. A multi-level investigation in Germany, including 1,021 businesses and 108 technology-oriented BIs, shows that the potential of technology-oriented start-ups is too small and, overall, decreasing, which fails to promote the sustainable success of the incubation industry in Germany [47]: (1) At least one third of the firms in BIs are active in low-value service sectors or commerce, (2) 19% of the firms were already more than 2 years old when they entered the facilities and thus not newly founded, (3) only 3% of firm founders would not have started their businesses without the existence of incubators and (4) attracting suitable tenants from other regions is unlikely due to the immobility of firm founders.

A study conducted among 116 science parks (they can be considered as a specific typology of BIs: close to university or research centres, sell or lease spatially contiguous land and/or buildings at high prices because of prestigious locations, accept subsidiaries of international firms or already established firms and are focused on 'spatial' integration) in the USA casts serious doubts about their regional employment effects in comparison to regions without science parks and with similar characteristics [29]: Just a quarter of the 116 analysed science parks are evaluated as successful and success depends on how well equipped is the region in which they are located and on a first mover advantage (the first science parks tend to be more successful than late comers).

Extensive studies on the effectiveness of BIs and science parks have been conducted in the UK for many years [32]. In one case, 130 businesses originated from science parks, and 121 from outside such incubators were compared: The businesses in science parks exhibit a higher failure rate of 38% compared with the 32% businesses outside such incubators [53]. Even more striking are some results about employment, as they reveal that the mean employment growth rates of firms located

on science parks and those located off science parks are virtually identical [45]. Empirical research also suggests that level of technology in incubated firms is not superior to not incubated ones [12, 54], that there are time-delayed effects because of the science park location on the performance of start-ups [16] and no 'high incidence of technology transfer despite the fact that many were established with that goal in mind' ([37], p. 299).

On the contrary, there are good reasons to believe that BIs are especially effective in reaching political goals: a tangible real estate investment to be pictured and shown to the public as a piece of evidence of a public policy for innovation, qualified employment and economic growth. A radical solution to avoid wasting public money on ineffective BIs would be 'that technology-oriented business incubators should be run as private organisations without public funding' ([48], p. 469) so that it is the market itself that selects the effective ones and not the flow of public funding. In fact, the already quoted empirical evidence suggests that they do not provide significant stimulus for individuals starting a business; they do not increase the likelihood of firm survival, innovativeness or growth and they are a very modest contributor to regional economic development: 'Using the logic of the NBIA, creating on average 20,000 jobs per year in a nation with a labour force of 147.4 million and an unemployed rate of 5.5% (in 2004) is not really a big push' ([48], p. 469).

Curley, Curley et al. [14] propose a radical critique to the traditional business incubation process that culminates in a business plan, drafted with experts' advice and suggest an 'experiment-related decision process'. Along with many other researchers, they agree that the business incubation industry has been artificially fuelled by the provision of subsidies and grants (with mediocre outcomes) and suggest that, despite the failure of incubators, there is 'the need to expand the incubation process beyond the limits of the business plan, to encompass experimentation and the simulation of new business concepts in an experimental laboratory environment' ([14], p. 1).

Despite significant empirical evidence against its effectiveness, business incubation is still a popular public policy and phenomenon. Many successful cases quoted in the literature and in the public debate suggest that business incubation can be effective under some circumstances.

Research Question

As has been shown in the previous section, despite significant empirical evidence against the effectiveness of business incubators, many successful cases of business incubation exist and significant public money continues to be available for business incubators. That means there is a great need of theory, criteria and guidelines about the preconditions for establishing business incubators and their management, so that it can be decided when a business incubator should be established and how it should be managed. This would avoid the flow of public money into business incubators for political purposes, just because public money is available, regardless of their effectiveness.

The systematic literature review that follows tries to identify, collect and systematize the already existent theoretical knowledge of business incubation and is intended as a 'theoretical contribution' in the direction of a comprehensive theory

of effective business incubation. I accept the recent definition of 'theoretical contribution' by Corley and Gioia [13] in the *Academy of Management Review* that 'rests largely on the ability to provide *original insight* into a phenomenon by advancing knowledge in a way that is deemed to have *utility* or usefulness for some purpose' ([13], p. 15) with two subcategories underlying each of these main two dimensions: 'revelatory' or 'incremental' originality and 'practical' or 'scientific' utility.

The assumption I also endorse by Corley and Gioia [13] is that 'our theories should be *problem driven* [..], it should be embraced the fact that we are a profession (academia) studying another profession (management), so our orientation toward theoretical contribution should include an explicit appreciation for applicability' ([13], p. 22). It means that the resolution of the real problem—establishing and managing effective business incubators—is the main purpose of this theoretical contribution, rather than abstract derivations of hypothetical formulations.

Considering the controversial empirical evidence about business incubation and the fact that it is a ubiquitous and popular phenomenon, it is expected that the present contribution will 'reveal' new insights to scholars and practitioners about the establishment and management of effective business incubators. In that sense, it aims to be a 'theoretical contribution' that rests on 'revelatory originality' and 'practical utility'.

Method

In order to identify what it is known on the subject, it is indispensable to systematically review the existing literature. To execute a literature review, the methodology must ensure, on the one hand, that it is exhaustive in scope and, on the other hand, that it is traceable and replicable to secure objectivity. Considering the issues that have arisen in the introduction, I conducted a literature review about the theoretical knowledge of business incubation with a fairly wide scope. In management science, a systematic literature review approach has been introduced by David and Han [15] and enhanced by Newbert [35]. A six-step process—instead of the nine steps of David and Han [15]—is applied to bring conceptual clarity into the theory of business incubation. I will discuss each step in turn:

Step 1 Search exclusively for published journal articles. As already refined by Newbert, search was limited to articles published in 'scholarly journals'. According to the original argumentation of David and Han, the exclusion of book chapters and unpublished work enhances the quality by requiring a review process. Following this logic, the limitation on only scholarly journals further increases the quality due to a rigorous peer review process prior to publication.

Step 2 Search the ABI/Inform and EBSCO. ABI/Inform and EBSCO were chosen as key databases. Because business incubators have been examined from different disciplines and theoretical perspectives, the multidisciplinary ABI/Inform database provides an appropriate base. To ensure an exhaustive coverage, the ABI/Inform search was enhanced by an additional search in the EBSCO database to include all studies from economic and management journals.

Step 3 Ensure articles' substantive relevance by requiring both the following two keywords to be contained in title or abstract: *business incubat** and *theor**. As explained by David and Han [15], the asterisk at the end indicates that

variations of the word were permitted. The two selected keywords ensure the identification of most of the articles whose claim is to deal with theoretical issues related to business incubation. Carrying out steps one to three on the literature yielded 27 articles from ABI/inform and 13 articles from EBSCO (by using the only keyword *business incubat** resulted in larger pool of 206 articles in the ABI/inform database and 140 in EBSCO—duplicated articles included—but I did not review those articles because I assumed that the world *theor** should also be included in the title or abstract if a theoretical contribution was claimed).

Step 4 Consolidate results from ABI/Inform and EBSCO to eliminate duplicate articles. After applying criterion 3, the number of articles remaining was 40, with still some articles in common from both databases. Six duplicates articles were identified and eliminated in the step, so that applying step 4 resulted in a pool of 34 articles from both databases.

Step 5 Ensure substantive relevance through reading all abstracts for substantive context. Articles retained had to indicate a contribution to the theoretical knowledge of business incubation in the abstract. This criterion allowed me to reduce the number of articles from 34 to 24.

Step 6 Ensure substantive relevance through reading all remaining articles in their entirety for substantive context, at least the ones that were accessible to us in full text. In fact, Povilaitis and Čiburienė [38] and Kučinskienė and Fominienė [26] were not accessible to us because they were written in Lithuanian. The full text of Lender and Dowling [28] was not available in the databases and library resources and I was unable to retrieve it, so that in the end I had the opportunity to read just 21 articles in full text. Articles that did not possess substantive context were eliminated from the pool after reading the full text. For example, the article by Todorovic and Suntornpithug [49] met all criteria, even passed step 5 because after reading the abstract, it seemed as if they provided valuable findings to the theory of business incubation. But after reading this article in its entirety, the article was removed because, although it treats the topic of university business incubators and develops a set of propositions, it focuses exclusively on the role and characteristics of universities and not on university business incubation itself. Hughes et al. [23] adopted the networked incubator as a context for the study of entrepreneurial orientation in emerging young high technology firms, but its theoretical contribution was revealed to be not about business incubation. Markman et al. [31] make reference to business incubation theory, but the main focus is the structures and strategies of university technology transfer offices as 'technology intermediaries' between labs and business incubators. Jones et al. [24] were revealed to be about economic development and not really 'business incubation'.

By applying this last filter on the sample, four more articles were removed (Table 1).

Having followed this systematic approach, I believe that the review comprises the most significant theoretical contributions to business incubation that have been published in 'scholarly journals'. For the subsequent section, the pool of 17 articles selected through the systematic literature review is my 'unit of analysis'. I read each

Table 1 Summary of selection filter: ABI/inform and EBSCO

Fylter type	Description	ABI result	Ebsco result	Total
3 substantive	*business incubat** and *theor** in title or abstract	27	13	40
4 duplicates	Deletion of duplicates articles found in EBSCO	27	7	34
5 substantive	Remaining abstracts read for substantive relevance	17	7	24
6 substantive	Remaining and accessible articles read for relevance	16	5	21
	Remaining relevant articles	12	5	17

article of the final pool and extracted information. Given the low number of articles, the information gathered from them was not systematic but critical nevertheless.

Results

In line with the stated impression by other scholars and a previous literature review on business incubation [19], the systematic literature review reveals that the number of contributions to the theoretical knowledge of business incubation is very limited in number. In fact, I have been able to identify just 17 relevant articles and to read 21.

It is worth noting that the articles are all in different journals and there are just two journals in which multiple articles appear, the *Journal of Technology Transfer* (three articles from the same authors) and the *Journal of Business Venturing* (two articles). This is a sign that the theoretical contributions to business incubation are not just limited in numbers but scattered around in the literature and not part of a systematic debate. It is also evident that the interest in the theory of business incubation is a recent phenomenon despite business incubation being a widespread phenomenon for a good many years: 13 of the 17 articles are from 2004 onwards, and six are from 2008 onwards.

In the following section, the 17 articles are divided according to the five primary research orientations that it has been possible to identify: (1) general contributions to business incubation theory, (2) theoretical contributions regarding business incubation in emerging markets, (3) theoretical contributions regarding the efficacy of business incubation, (4) theoretical contributions regarding incubator–university linkages and (5) theoretical contributions regarding 'networked incubators'.

General Contributions to Business Incubation Theory

The most systematic effort towards a theory of business incubation is in the article by Maital et al. [30]. It outlines a grounded theory of business incubation, driven by case studies, empirical results and field work. The authors studied in detail 38 projects inside an Israeli business incubator, rating them along three dimensions: technology, market potential, management skills, leadership capabilities and entrepreneurship embodied in the team. The last dimension was by large the most important key variable to explain the success of business incubation projects in Israel, whereas 'funding' is key variable to explain the success of business incubation projects in India. In conclusion, the empirical evidence supports three main principles that, the

authors claim, are common across countries: (1) *The paradox of market emulation*—in other words, successful incubators both emulate market conditions (for example, choosing projects according to the same criteria that venture capitalists use in the market increases incubated firms' success rates) and shield their 'infants' from them; managing this paradox is fraught with difficulty, not least because it is often not explicitly recognized: 'a general theory of incubation will include principles that guide incubation processes toward optimal resolution of the market failure-market emulation conflict' ([30], p. 4). (2) *Resolving the key make-or-break constraint*—in other words, in every country, there are many constraints that hinder ultimate business success of incubator projects, but there is always a more important and key one: "a theory of business incubation should include principles that guide identification of the key 'resonating' constraint and provide direction toward reducing or eliminating it" ([30], p. 4). (3) *Alignment with local and national cultures*—a theory of incubation should help to reinforce those aspects of the national or local culture that act positively on incubation's success and mitigate or eliminate those aspects of culture that act negatively; a typical mistake in that sense is that incubator processes imitate those prevalent in America without any critical adaptation to national cultures but "American culture is in many ways an 'outlier', or a special case, with, for instance, individualism *and risk-taking* far more pronounced than in [..] Europe and especially Asia" ([30], p. 4). These three principles are not yet a theory of business incubation because an interconnected system of propositions that makes a theory is still missing, but they are a significant step in that direction as they identify three elements of such a theory: the market/incubation dilemma, the key constraint and the national culture.

Hackett and Dilts [19] developed a systematic literature review on business incubators and business incubation: The review revealed that much attention had been devoted to the description of incubator facilities and less attention on the incubatees, the innovation they seek to diffuse, the incubation outcomes that had been achieved and the incubation process itself.

Given the paucity of theoretically grounded models of business incubation in the literature, Hackett and Dilts [20] advanced a real option-driven incubation process model in which 'business incubation performance' (measured in terms of incubate growth and financial performance at the time of incubator exit) depends on three variables: 'selection performance' (refers to the degree to which the incubator behaves like an 'ideal type' venture capitalist when selecting emerging organizations for admission to the incubator), 'monitoring and business assistance intensity' (refers to the degree to which the incubator helps incubatees: time intensity of assistance provided and comprehensiveness) and 'resource munificence' (refers to the abundance of incubator resources: availability, quality and utilization). The model suggests the following propositions/hypothesis: (1) Business incubation performance is positively related to selection performance, (2) business incubation performance is positively related to intensity of monitoring and business assistance efforts and (3) business incubation performance is positively related to resource munificence. These conclusions mean that the more incubators behave like venture capitalist firms and the more intense their business support is, the better incubator performance can be expected, at least as far as static efficiency is concerned. The theory considers business incubation as a 'process' and is 'option driven' because business incubation

performance is a function of the incubator's ability to 'create options through the selection of weak-but-promising intermediate potential firms for admission to the incubator, and to exercise those options through monitoring and counselling, and the infusion of resources while containing the cost of potential terminal option failure' ([20], p. 48).

Hackett and Dilts [21] tested their model and collected data from 53 incubators operating in the USA in order to systematically examine the incubation process with a set of pre-tested scales. Their empirical investigation offers (1) new, validated scales for measuring the process of incubating new ventures; (2) empirically based refinements to their option-driven theoretical model of the incubation process and (3) data on business incubation outcomes that are useful for incubator planning and benchmarking purposes.

Leblebici and Shah [27] argue that neither theory nor empirical investigation about business incubation can be understood without taking the history into account explicitly: in their contribution organization theory and history meet, in order to describe and explain the development of the business incubation industry in the world. Their contribution is in the typical agency-structure debate: 'is organisational life determined by intractable structural constraints or is it actively created through strategic actions of their agents, that is, management?' ([27], 359). Their main argument, based on the concept of agency, is that 'agency is always oriented towards the past, the present and the future, and this temporal quality of agency is necessary to merge organisational theory with organisational history. We applied these ideas to a case study of organisational form – the business incubator' ([27], p. 375). So that their main contribution to business incubation theory is to provide evidence of the importance of history in theory building.

In a pioneer study, Allen and McCluskey [2] collected data from 127 incubators in the spring of 1987, after no more than 10 years of significant business incubation. They did so in order to discover relationships between structure, policies and service variables with special attention on determining what, if anything, influences incubator performance. They discovered that 'tenants generally underutilize professional business advisory services and, when used, often evaluate them unfavourable' ([2], p. 64). Their main general finding is that 'policy prescriptions were not related to performance outcomes. This [..] reinforces the common contention that business incubators are idiosyncratic reflections of local conditions' ([2], p. 74), so that the common practice of stakeholders specifying arrangements, services or policies, to which incubators must conform, is called into question: 'what works in one incubator may not work for another even if it shares many of the same enterprise development purposes. The uniqueness of each incubator seems largely due to the local entrepreneurial environment and the needs and resources of stakeholders' ([2], p. 74). Based on these findings, managers must know as much as possible about the entrepreneurial environments and carve out a niche in that environment, adapting their strategies to the environment.

Burnett and McMurray [10] focused on family businesses and conducted a qualitative study on 12 family start-up firms in order to explore how they experienced the business incubation process. One of the main findings is that 'for family start-ups, the boundaries between personal relationships and business relationships appeared to dissolve or overlap, and relationships with other tenants and the incubator manager

developed from a strong trust base and camaraderie' ([10], p. 60). This study shows that 'small family start-ups relocate into incubators for a variety of family circumstances; for example to avoid isolation and to seek out different types of business networks, support and personal friendships' ([10], p. 72). The incubation literature shows a lack of family research studies conducted within incubator context, and although this study is an exploratory one, the three research questions addressing why family start-up firms choose to locate their businesses in an incubator, what services they seek and what types of relationships they establish, sheds light on family behaviour in incubators and thus provides a contribution to the literature.

Rice [40] analyses the business assistance programs inside business incubators. The entrepreneurial ventures located in an incubator are, in fact, 'consumers' of those outputs and operate in an interdependent co-production relationship with the incubator. This study explores the types of business assistance provided through co-production, the modes of co-production and factors that affect the variability of impact. The allocation of the time of the incubator manager, the intensity of intervention, the breadth of co-production modalities deployed and the readiness of the entrepreneur to engage in co-production are revealed as factors affecting the output elasticities related to co-production inputs. Through a multiple case study methodology, this exploratory study illuminates the nature of the co-production dyadic relationship between the incubator manager and the entrepreneur and defines co-production modalities. In addition, it provides insight into the factors that affect output elasticities. These observations led to the development of a typology of incubator companies based on the dimensions of maturity and readiness: (1) *anchor tenants:* entities that have a reason to be in the incubator, pay their bills reliably and therefore support the financial needs of the incubator and neither need nor want co-production input from the incubator manager; examples include accounting and law firms, economic development agencies, university technology transfer offices and so forth; (2) *long shots:* companies that have substantial need for co-production but are not ready to engage; they benefit from the supportive environment offered by an incubator and need time to mature; (3) *up-and-comers:* companies with significant resource gaps that can be addressed through co-production; these companies are run by entrepreneurs, who are aware of the gaps, recognize the potential for co-production to help them resolve the gaps and are willing to engage; (4) *superstars:* companies that have matured beyond up-and-comer status and require minimal coproduction input from the incubator manager, even though their readiness to engage remains high; for the most part, they are capable of addressing crises and sustaining their development without the involvement of the incubator manager; they are likely to graduate from the incubator in the near term, but while still in the incubator, act as role models for up-and-comers and long shots. The output elasticity of the incubator manager inputs is affected by the readiness of the entrepreneur to engage in co-production. This readiness appears to be related to awareness by the entrepreneur of the firm's gaps in knowledge, skills and resources; recognition of the potential of the incubator manager to help fill those gaps and willingness to engage in co-production. Similarly, the output elasticity of the entrepreneur inputs is affected by the readiness of the incubator manager to engage in co-production. However, readiness of the incubator manager does not appear to be related to awareness, recognition and willingness. Generally, the admissions process makes incubator managers aware

of the gaps in their firms' resources, they recognize that the incubator and its supporters have resources that can be brought to bear and they are willing to engage. Instead, incubator manager readiness is related to capacity for committing sufficient time to co-production to achieve a level of intensity required for impact, as well as the breadth of co-production modes implemented. Thus, readiness of the incubator manager is related to the balance between co-production and non-co-production activities of the incubator. In conclusion, Rice [40] has illuminated the concept of interdependent co-production of services, specifically business assistance programs offered through business incubators, and the lessons learned may be useful in any business incubation situation in which an incubator and an entrepreneur are engaged in co-production of business assistance.

Theoretical Contributions Regarding Business Incubation in Emerging Markets

Young-Ho Nam [55] interviewed ten high-tech venture founders in Korea and realized the first research on incubator organizations in Korea. Based on these interviews, their experience at incubator organizations and subsequent performance, 11 hypotheses were verified. The success of founders is positively correlated with the following opportunities in the incubator organization: the opportunity to prepare a business plan, to develop a prototype of a new product, to be acquainted with other disciplines, to work together as a team and to acquire various kinds of capabilities such as market-specific know-how, entrepreneurial skills and financing know-how at incubator organizations. On the contrary, success is not correlated with the opportunity to acquire technological know-how and traditional managerial skills at incubator organizations. An additional significant finding is that 'government labs are more favourable incubators than private labs, in that government labs provide more autonomy in carrying out projects and wider viewpoints in understanding an industry or market' ([55], 295).

Riddle et al. [41], employing Eisenhardt's case-based theory development approach (1989), studied a Dutch incubator located in The Hague, providing services exclusively to transnational diasporan entrepreneurs (that is migrants and their descendants who establish entrepreneurial activities that span the national business environments of their countries of origin and countries of residence) and leveraged case findings to generate theory about the role that incubators can play in helping these entrepreneurs overcome the institutional challenges that they face. The study illustrates how the application of a stakeholder approach illuminates why incubator goals and services vary, identifies which outcome measures are appropriate to apply to a given incubator's activities and explains variability in incubator performance against those metrics. It also illustrates how the multi-territorial nature of a transnational business incubator's stakeholder set can affect the goals that it sets, the way in which it selects its clients and the types of business support and mediation services that it provides. In that sense, it clarifies: (1) that in order to evaluate the performance of a business incubator and define the metrics, the main stakeholders must be identified (local policy maker or national policy maker, international organizations or private investors or a university) and their geographical location and (2) that outcome indicators must be put in relation to goals because different business incubators do not have the same outcome objectives.

Tsai et al. [50], drawing on the national innovation system and business incubation experience in Taiwan, systematically review the dynamics of innovation by investigating the inter-relationships between university, industry, government and the extended knowledge value chain for incubation. Their assumption is that incubation acts at the meso-level as a critical interface between macro-innovation systems and micro-business ventures, and their main contribution is related to the linkages between business incubators and the overall national innovation system. They propose the concept of 'virtual business incubation' (already introduced and used by other authors such as [43, 46]) as a new style of business incubation in emerging markets in which tenants are incubated from their own location through the incubation centre's information infrastructure.

Theoretical Contributions Regarding the Efficacy of Business Incubation Itself

Based on a number of case studies, Bee [7] claims that 'incubator operators often create competitors for local companies that are well established and profitable taxpayers. [..] Incubators reduce regional tax revenues since they substitute established, profitable companies, with strong tax streams, for start-up companies that are profitless and therefore unable to pay taxes' (p. 11).

According to Bee [7], business incubators create a distortion in the market, a transfer of money, with no real creation of wealth but rather consumption of wealth, the only exception being few high tech and especially biotech ones 'when they are designed to meet a real, not theoretical, barrier to entry, provided the community has a substantial market potential for specialized start-ups in emerging technologies' (p. 12). The biotech industry, in fact, has real barriers to entry because of the need for expensive, but rarely used, wet labs that meet legal standards.

Gstraunthaler [18] poses the question whether business incubators have been installed due to the real economic demand to help all the promising start-ups to develop or if they serve primarily political goals. The contribution is based on in-depth interviews with the management of all seven business incubators of Lithuania and in that sense it is limited to one country. Despite being based on a single country, its findings seem to be generalizable to the many peripheral or less endowed nations or regions that are establishing business incubators for local economic development: 'The business incubators have so far been unable to attract venture capital for their tenants. None of their tenants has successfully applied for venture capital funding either. [..] the start-ups they host see public institutions as the sole source of the capital they need to grow. [..] Securing public funding is seen as a major task of the business incubators as the management fee is a major source of funding. Their success is strongly linked to the support of the public funding institutions' ([18], p. 415).

One of the main activities of Lithuanian business incubators' management is not really providing assistance to carefully selected tenants, but renting their properties to as many tenants as possible and drafting and managing EU projects in order to raise funds, so that 'what made these property developments so attractive was the available public money, particularly from the European Union. As long as the money keeps flowing, there is a strong incentive to grow. These incentives do not derive from a strong demand, but rather seem to be driven by the availability of money' ([18], p. 415–416).

Theoretical Contributions Regarding Incubator–University Linkages

Rothaermel and Thursby [42] focused on business incubators' linkages to universities and tested a set of hypotheses through following 79 start-up firms incubated at the Georgia Institute of Technology over the 6-year period between 1998 and 2003. Their results indicate a trade-off: Incubated firms without university ties (that means new ventures that do not rely on a strong university link either through a technology licence or having one or more university faculty as part of the senior management team) were 'more likely to fail but also more likely to successfully graduate within a timely manner' ([42], p. 1089).

The policy implication is a balanced approach combining the necessary university link with a team of professional managers, and when the university linkage is through a university licence, incubator firm failure is reduced while still allowing for timely graduation from the incubator.

Aernoudt [1] focuses on the links between incubators and business angel networks as opposed to university linkages and on the significant differences between Europe and USA. In fact, as far as the role of universities is concerned, he claims that the importance of the links between universities and incubators is greatly overestimated in respect to the role of business angels and finance: 'good-quality houses, four-star hotels, good restaurants, and proximity to an international airport are much more important than proximity to the university' ([1], p. 131), and even the most outstanding successes of university business incubators, like the Cambridge Science Park in the UK, show weak or no connection to the university: 'its success is not due to the fact that academics spun out of Cambridge colleges to translate ideas into commercial reality' but 'success is due to the image of one of the world's greatest seats of learning and this cachet has encouraged people to start up [..] there or relocate from outside. Indeed many businesses have no connection with the University' ([1], p. 131).

Theoretical Contributions Regarding 'Networked Incubators'

Bøllingtoft and Ulhøi [9] focus on a special typology of incubator, the 'networked incubator' [22], which is a hybrid form of the archetypal business incubator, characterized by a for-profit orientation and a preferential access to a network of companies. Empirically, the paper is based on 6 months of ethnographic data collected in Denmark in one of the first known networked incubators. Their main theoretical contribution is that 'BIs can be seen as attempts to address market failures and the problem of a three-dimensional liability of newness' ([9], p. 284): One dimension relates to administrative support, the second dimension relates to age and related lack of visibility in the market and the third relates to being on your own versus being in a 'community'. They also provide evidence that (1) close physical proximity (e.g. being located on the same floor) plays a vital role in networking; (2) nurturing social capital needs some kind of investment and "some of the primary costs are paid for in the form of time invested in social activities and 'small talk'" ([9], p. 284), (3) in networked incubators the line of demarcation between 'private' and 'business' is increasingly blurred and (4) unless the importance of social networks is addressed, it may be difficult to realize the full potential of business incubators. The main implication for research of this ethnographic study is that 'no one model can account

for the complex social dynamics at work, nor can studies, such as this, present a universal solution. Due attention will have to be given to the specific context and circumstances' ([9], p. 286) in order to 'avoid the trap of methodological and theoretical fundamentalism' ([9], p. 286).

Singh and Jain [46] argue that two important elements of incubator services are often overlooked when incubator performance is measured: cluster development and 'facilitation of social network-building activities' that are relevant in a given region (p. 256). Based on Silicon Valley experience, they conclude that: 'Incubators should focus on attracting firms and entrepreneurs that have solutions, technologies and services that are relevant to local issues. [..] In addition, efforts should be made to attract to the incubator, similar firms that work within the same industry. This helps build a critical mass of people who can both compete and collaborate with one another' ([46], p. 256). So that Singh and Jain [46] root the idea of 'networked incubator' in a region, social community and single industry, suggesting that it is within these conditions that incubators provide the best performance. An effort should be made to develop the network potential through a 'virtual incubator', in order to develop opportunities and exchange 'best practices' with other economic development groups. They suggest that the Silicon Valley phenomenon and the role that business incubators had in that case could be replicated in other geographical area 'with time and careful planning' ([46], p. 253).

Discussion

The present systematic literature review of scholarly peer reviewed journals reveals that, despite the popularity and diffusion of business incubators, a proper theory of business incubation is basically nonexistent and theoretical contributions to that purpose are limited and sketchy. The main consequence is that no clear guidelines and criteria are available to decide when and where a business incubator should be established or what it should do and how it should be managed in order to be effective. Despite that, based on the theoretical knowledge already available in the cited literature, an attempt can be made in order to draft some principles or propositions about the establishment and management of business incubators. Such principles or propositions are not that interlocked and complete system of propositions that make a theory of business incubation but they can provide some guidelines and criteria for deciding how to set up and manage a business incubator.

Prior to drafting the principles, let us start with a definition. Based on the literature review, the most clear and comprehensive definition of business incubator is the one provided by Bergek and Norrman [8], in which the incubator is intended as a 'protected space' for start ups and fledgling companies made up of four main components: (1) shared office space, which is rented under more or less favourable conditions to incubatees; (2) a pool of shared support services to reduce overhead costs; (3) professional business support or advice ('coaching') and (4) network provision, internal and/or external. The concepts of 'protected space' and 'shared office space' can also be extended to a 'virtual space', considered the progress in new technologies and the opportunity to have a virtual office space. The relative emphasis on each component is different in

different authors and has varied over time, but all the four components are fundamental for identifying a business incubator.

As a second step, in order to draft principles or propositions that make a business incubator 'effective', it is necessary to define its goals, as different incubator goals require different incubator models and different models produce different outcomes and performances and so different evaluations of 'effectiveness'. In general, different goals depend on different stakeholders (and in the case of business incubation there can be very different stakeholders: national, regional or local policy makers; a university; a public or private research lab; the incubator owner) but the same stakeholders can also have different goals. In fact, measuring outcomes without putting them in relation to different stakeholders and their different goals is meaningless [41], and comparisons should only be made between incubators that have the same goals: If the main stakeholder is a regional policy maker and the goal is to enhance economic development and create jobs locally, a good indicator is the increase in the number of employees in a region, whereas if the main stakeholder is the national policy maker, the regional dimension is not relevant; if the main stakeholder is a university and the goal is to commercialise and transfer research ideas to raise funds, growth in sales is a suitable indicator, whereas if the main stakeholder is still a university but the goal is stimulating firms involved in emerging technologies, the number of new patents could be a better indicator; if the main stakeholder is the owner of a private incubator and the goal is to maximize return on real estate investment, the amounts of collected rents, the number of tenants and the overall incubator profit are better indicators; if, at one extreme, the main stakeholder is a policy maker and the goal is to attract EU public money to a region, as seems to be the case of Lithuania, a good indicator should be the number of EU projects that have been approved and the overall flow of EU public money into the region.

That said, in drafting the following principles or propositions, I make a choice among the different models of business incubators and assume that the incubator's main stakeholder is a regional policy maker whose main goal is to promote sustainable and qualified employment in a region, through the creation of innovative and technology based new ventures.

Principle 1—Keep Market Forces Out of the Incubator A business incubator must be a 'space protected from market forces' intended to promote the growth of 'weak-but-promising' ventures, so that introducing market criteria inside the incubator (such as selecting the strongest ventures or the one that would pay higher rents or the ones that would be selected by private ventures in the market or the ones that operate in more secure markets, such as accounting firms, legal firms or traditional testing labs) increases the static efficiency of the incubator [20] but decreases its dynamic efficiency and moves it away from its goals. This principle is only partially present in Maital et al. [30] as they conceive it as a 'paradox of market emulation' or a trade off between the need to imitate markets in order to increase efficiency and the need to shield new ventures from markets in order to protect them, whereas I conceive it as keeping the market out of the incubator in order to promote dynamic efficiency instead of static efficiency: 'A system—any system, economic or other—that at every point of time fully utilizes its possibilities to the best advantage may yet in the long

run be inferior to a system that does so at no given point of time, because the latter's failure to do so may be a condition for the level or speed of long run performance' ([44], p. 83), so that keeping market forces out of the incubator is not to the detriment of efficiency in general (it is to the detriment of static efficiency in the short run) but a precondition for innovation and dynamic efficiency: 'this ability to hold off market forces (at least temporarily) enables organizations to pursue innovative activities' ([17], p. 34). In general, introducing market mechanisms and prices inside firms, as if there were no significant differences between markets and firms, misses the very fundamental nature of the firm and the fact that it 'puts purpose above price' ([17], p. 37), but this is especially dangerous and detrimental to innovation inside organizations that should 'incubate' 'infant firms': 'A market that puts purpose above price degenerates rapidly, as the erstwhile Soviet system has shown. Similarly, an organization that puts its faith in prices above purpose fails, too' ([17], p. 37). Indeed, putting price above purpose in a business incubator would be like feeding infants according to a market based mechanism! Everything would be lost: both the incubator competitive advantage in promoting innovation and dynamic efficiency and the weak-but-promising infant ventures: 'purpose provides the ultimate source of an organization's advantage over markets and must lie at the core of any theory that [..] does not assume organizations emerge when markets fail but identifies markets as beginning where organizations fail' ([17], p. 37). In conclusion, I adopt the general concept from Schumpeter [44] as Ghoshal and Moran [17] have applied it to management studies and I apply it to business incubation in order to revise the partial intuition of Maital et al. [30].

Principle 2—in Business Incubation, It Is Critical to Take the Region into Account: (a) When Choosing the Incubator Location, (b) When Selecting Ventures and (c) When Coaching and Supporting the Incubated Ventures (a) A region needs to have a sufficiently large population and advanced economy in order to reach agglomeration economies and host a business incubator [7]. It must also possess a strong university or other research-oriented organisation in the region [42]. Of course, these factors are not sufficient to ensure the expected outcomes [1] and are mediated by facility management [42] and external linkages that develop between business incubators and other regional and national networked organisations that support entrepreneurship and innovation [9, 22]: 'Due attention will have to be given to the specific context and circumstances' in order to 'avoid the trap of methodological and theoretical fundamentalism' ([9], p. 286), so that the success of a business incubator depends on the regional innovation system and the general regional environment and what might or might not occur is contextually determined because 'business incubators are idiosyncratic reflections of local conditions' ([2], p. 74) and a management practice that is effective in one place may not be effective in another. As an exception to this general rule, some outcomes will, in spite of context, lead to minimal performances, while others will reflect the potential of context and offer spectacular success stories, depending on different histories and chain of events [27]. However, success stories are not very likely to reoccur in other regions and times and can—if at all—only be developed in the very long run [46]. Smaller regions with research organisations are more suitable for profit-making business incubators so as to avoid complete dependence on public funding and political will, with the unavoidable

consequence that all the efforts of the incubator management will not be on the coaching and support of tenants but on public fundraising and EU project drafting [18]; in any case, it is more difficult for a technology-oriented business incubator to survive if it is not located in a sizable region. Finally, it is important to note that the higher the number of established business incubators in a region, the less likely the success of any new incubator [29]. (b) Incubators should select ventures, whose solutions, technologies and services are relevant to the regional economy or can have an impact on it. These will allow firms within the incubator to develop a base of local clients which will help develop the regional economy. The incubator should select similar ventures that work within the same industry, so as to build a critical mass of people who can both compete and collaborate with one another and develop a cluster [46]. It is clear from the first principle that selection should not be biased towards ventures paying the higher rents or that already show the best survival chances, such as 'anchor tenants' [40]: Selection should 'put purpose above price' and should take the region fully into account. (c) As argued by Maital et al. [30], different countries have different key constraints (in India it is funding, in Israel it is experienced managerial capacity) and different cultures, but this is true also at the regional level and in the same country: Coaching and supporting should help ventures dealing with key regional constraints and should take into account cultural differences, for example, regarding the incubator manager commitment of time to 'interdependent co-production of services' ([40], p. 163) or type of services provided and management style.

Principle 3—Business Incubation Is a Process, Option-Driven and Based on Interdependent Co-production Relationships Among Incubatees, Incubator Management and External Networked Actors The concept of business incubation as an 'option driven process' [20], based on 'interdependent co-production relationships' [40] among 'networked actors' [9] that we have found in the literature is the most suitable to catch the intangibility, uncertainty and relational nature of the phenomenon. It is also the most suited to avoid the 'real estate drift' that characterizes many business incubators [48]. The most relevant implication of the principle is that real estate investments and tangible infrastructures are not an essential ingredient of business incubation and should be pursued only when it is demonstrated that they support the business incubation process better than a 'virtual incubator' [50]. Under these assumptions, business incubation performance may be considered as a function of the incubator's ability to create options through selection, monitoring, counselling, allocation of resources and containment of terminal option failure [20]. The focus on family businesses inside incubators by Burnett and McMurray [10] supports the principle, as it highlights the importance of personal relationships and trust inside incubators, as opposed to market relations.

Principle 4—Public Support Is Indispensable to Protect and Promote the Growth of 'Weak-but-Promising' Innovative Ventures in Less Endowed Regions and a 'Virtual Incubator' Approach Can Avoid the Expensive Establishment of Incubators in Regions That Cannot Support Them Young-Ho Nam [55] has found evidence that 'government labs are more favourable incubators than private labs, in that government labs provide more autonomy in carrying out projects and wider viewpoints in

understanding an industry or market' (p. 295), while private-funded incubators seem to be more suitable in very endowed regions [22] or smaller regions with research organizations [18]. If, at one extreme, it may be suggested 'technology-oriented business incubators should be run as private organisations without public funding' ([48], p. 469), in order to avoid any possible waste of public money and any risk of establishing high-tech incubators in regions that lack the critical economic mass or knowledge environment to support them, it seems unlikely that a 'weak-but-promising' new venture will survive in a poorly endowed region if incubator protection and assistance is not provided in its infancy. The 'virtual incubator' [50] approach and the use of new technologies could both combine public support for 'weak-but-promising' ventures in less endowed regions and avoid expensive real estate investments in regions that lack the resources to support a business incubator. Indeed, the idea of a 'virtual incubator' has been thought for Silicon Valley [46], but it is in emerging economies and less endowed regions that it can be more effective in order to cut distances and as a less expensive step in building a cluster: 'Leveraging information technology, a virtual incubator should be developed that highlights client firm capabilities, technologies and milestones [..]. Most states and regional areas have many individual economic development centres [..]. These can also be linked together as part of the virtual incubator, as well as any influential individuals who serve as advisors' ([46], p. 259). This fourth principle is also supported by Carayannis and von Zedtwitz [11], who provide an overarching incubator model and guidelines for designing a 'gloCal, real and virtual network of incubators (G-RVIN)'. G-RVIN is a 'knowledge and innovation infra-structure and infra-technology', with local presence and global reach, to link local and global actors and leverage the diverse divides. The present contribution is to be understood complementary to their findings: while they emphasise the potential of virtual incubation in less developed economies as a way to link them to actors in developed economies—'G-RVIN model may be particularly helpful in less-developed economies, where incubators can help bridge knowledge, digital, socio-political and even cultural divides' ([11], p. 109)—the present principle focuses on the risks of ineffectiveness and unsustainability of business incubation in less endowed regions and conceive 'virtual incubation' as a smart way to both avoid the physical establishment of costly, ineffective real estate investments and stimulate entrepreneurship where it is more needed.

Conclusions

Based on a systematic literature review and systematization of already existent theoretical knowledge, four principles have been proposed and drafted:

1. Protect weak-but-promising ventures from the market and do not emulate the market in the incubator.
2. Take the region fully into account: when deciding about establishing the incubator, when selecting ventures, when providing business support to the selected ventures.
3. Consider business incubation as a process, option-driven, relational and network-based, not as a tangible investment.

4. Take advantage of new technologies and a 'virtual incubation' approach to bring public supported business incubation into regions that cannot support a business incubator.

The four principles are an attempt to provide a set of guidelines and criteria in order to decide when a business incubator can be established and how it should be run, under the assumption that the main stakeholder, and thus the goal, is public and regional.

The present research has two main limits. The first one is that the systematic literature review, on which the four principles above have been drafted, has been limited by choice to: (1) scholarly peer reviewed journals that can be retrieved in the ABI/inform database and in the EBSCO database and (2) containing in the title or abstract: *business incubat** and *theor**. That resulted in the identification of 34 articles and full text reading of a small pool of 21 articles (among which just 17 were relevant). It is obvious that relevant theoretical contributions about business incubation may be contained: (1) in publications that are not scholarly peer reviewed journals, such as book chapters and other journals, or scholarly peer reviewed journals that are not included in the ABI/inform database and in the EBSCO database and (2) in scholarly peer reviewed journals containing in the title or abstract just the word *business incubat** and not the word *theor** (by using the only keyword *business incubat** resulted in larger pool of 206 articles in the ABI/inform database and 140 in EBSCO—duplicated articles included). The first choice is justified by the rigour that scholarly peer reviewed journals provide, especially in the field of theory building, and by the fact that the most relevant journals are in the ABI/inform and EBSCO database. The second choice is justified by the fact that I have assumed that the word *theor** (and not only *business incubat**) should also be included in the title or abstract if a significant theoretical contribution was claimed; in addition, that has eliminated from the analysis the numerous descriptive case studies of business incubators. Nonetheless, a future research path could extend the systematic literature review to all the scholarly peer reviewed journals containing the word *business incubat**, descriptive case studies included, looking for whatever theoretical contribution they may contain despite the lack of a theoretical contribution in the abstract.

The second limit of the present research is related to the four principles themselves and how they were conceived and drafted. They significantly extend, integrate and modify the principles that have been identified by Maital et al. [30] or, at least, they use those principles as a starting point, so that they are not a jump into the unknown but a leap forward. Nonetheless, the link between systematic literature review results and identification and drafting of principles is still very subjective and uncertain. It is hoped that other researchers will conduct a literary replication of this systematic literature review and will apply their talents to revising these principles or synthesising more effectively the already existent theoretical knowledge about business incubation.

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