International Review of Entrepreneurship, Article #1625, 18(2): pp. 203-220.

Business Incubators and Their Engagement in Sustainable Development Activities: Empirical Evidence from Europe

Tom Ballering and Enno Masurel
Vrije Universiteit Amsterdam, the Netherlands[1]

Abstract. We investigate the engagement of business incubators in activities aimed at sustainable development. Although the importance of business incubators and the importance of sustainable development are both clearly acknowledged nowadays, separately, there is hardly any attention for the engagement of business incubators in sustainable development activities in the academic literature. We conduct primary data collection among a sample of business incubators in Europe, offering respondents a range of questions about their engagement in sustainable development activities. We find that a significant proportion of business incubators in Europe clearly engage in activities aimed at sustainable development, with their own activities, program offering, selection of mentors, and selection of incubatees. Our empirical analysis also suggests the existence of a separate subgroup of *sustainable* business incubators, that differ significantly from other business incubators on a range of environmental and social aspects.

Keywords: business incubators, sustainable development, start-ups.

1. Introduction

This paper investigates the engagement of business incubators in activities aimed at sustainable development. We conduct primary data collection among a sample of business incubators in Europe, offering respondents a range of questions about their engagement in sustainable development activities. Business incubators foster entrepreneurs who wish to start up and develop their businesses (Allen and McCluskey, 1991). Nowadays, sustainable development has been acknowledged as an important phenomenon: see the current importance of, for example, the United Nation's Sustainable Development Goals, the climate discussion, and the Circular Economy. However, in the academic literature we see hardly any attention for the engagement of business incubators in activities aimed at sustainable development. This research gap led us to investigate the following

1. Corresponding author: Enno Masurel, Department of Management & Organization, School of Business and Economics, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands. Telephone: +31 20 59 85602; Email: e.masurel@vu.nl

research question: To what extent and how do business incubators engage in activities aimed at sustainable development?

This research question concerns both the business incubators' own operations and the relationship of the business incubators with their incubatees. From our empirical research conducted for the present paper, it appears that business incubators do engage in activities aimed at sustainable development, with their own activities (they engage in more than half of all potential sustainable activities shown to them in a questionnaire developed for the present paper), program offering (about a quarter of the business incubators includes positive environmental and social impact creation in their program offering), selection of mentors (the business incubators consider expertise and knowledge of environmental and social issues), and selection of incubatees (the business incubators consider ambition for positive environmental and social impact).

Europe hosts many business incubators, although the exact number cannot be determined easily. The explanation for this lack of clarity about the number of business incubators in Europe has to do with, among other things, the facts that 'business incubator' is not a protected term, and that the concept of business incubators in practice overlaps with other concepts such as accelerators, demonstration labs, science parks, and co-working spaces (e.g. Bouncken et al., 2020). Besides the many national organizations for business incubators, the European Business & Innovation Centre Network (EBN) plays an important role for business incubators (and more) in Europe. These various business incubation organizations formed a fertile ground for our data collection in order to find out more about the extent to which business incubators are engaging in sustainable development activities, despite the ambiguity of the concept of the business incubator. As there was no overall overview of business incubators in Europe available, we applied a convenience sampling approach, which is justified in situations in which no overall overview of the population is available. Data were collected by means of an internet-delivered standardized questionnaire in English.

The main contribution of our paper to the academic literature lies in the practical measurement of sustainable development activities among a sample of business incubators across Europe, as in the academic literature we see hardly any attention for the engagement of business incubators in activities aimed at sustainable development, despite the acknowledgment that sustainable development is an important phenomenon nowadays. A second contribution concerns the empirical identification of a new type of business incubators which we label *sustainable* business incubators (SBIs). Although in our sample, only 15% of business incubators are identified as SBIs, our empirical analysis shows that these incubators differ significantly from other business incubators on a range of environmental and social aspects, justifying their classification as a separate group.

The remainder of this paper is structured as follows. Next, Section 2 discusses the existing academic knowledge on business incubators and on sustainable entrepreneurship by start-ups. Section 3 derives the (working) hypotheses. The methodology applied in this paper is covered in Section 4, and the characteristics of the data collection are presented in Section 5. The hypotheses are tested in Section 6. Section 7 contains the discussion. The paper closes with Section 8, with the overall conclusions, its contribution to the academic literature, its main practical implication, the limitations of the study, and the recommendations for future research.

2. Literature Review

2.1. Business Incubators

Business incubators foster entrepreneurs who wish to start up and develop their businesses. One seminal work in the field of business incubators is by Allen and McCluskey (1991), whose definition of a business incubator still holds after all these years: "A business incubator is a facility that provides affordable space, shared office services, and business development assistance in an environment conducive to new venture creation, survival, and early-stage growth" (Allen and McCluskey, 1991, p. 61). Similarly, the authoritative National Business Incubation Association (NBIA) defines business incubators as facilities that provide young businesses with shared resources, such as office space, consultants, personnel, and access to financing and technical support (www.nbia.org). In the past few decades, a number of new forms and terms have been developed that overlap with the concept of business incubators, such as accelerators, demonstration labs, science parks, and co-working spaces (Bouncken et al., 2020). Business incubators have been studied from a number of different angles, but hardly from the perspective of sustainable development.

Grimaldi and Grandi (2005) distinguished four types of business incubators, based on the following incubators' characterizing variables: institutional mission, industrial sector, location, market, origin of ideas, phase of intervention, incubation period, sources of revenue, services offered, and management teams. These four types are: Business Innovation Centers; University Business Incubators; Corporate Business Incubators; and Independent Business Incubators. According to these authors, Business Innovation Centers were the first and most popular public incubators, and their origin dates back to 1984, when the first Business Innovation Centers were set up on the initiative of the European Commission. The incubating activities of the Business Innovation Centers consisted of offering a set of basic services to tenant companies, including the provision of space, infrastructure, communication channels,

information about external financing opportunities, and visibility. University Business Incubators were set up by those universities that were willing to adopt a direct entrepreneurial role in generating and spreading scientific and technological knowledge. They are institutions that provide support and services to knowledge-based ventures, in both the pre-incubation (entrepreneurial intentions) stage and the incubation (entrepreneurial actions) stage (Guerrero, Urbano and Gajón, 2017). They are similar to Business Innovation Centers, but they place more emphasis on the transfer of scientific and technological knowledge from universities to companies. Corporate Business Incubators and Independent Business Incubators, the remaining two types of business incubators according to the typology of Grimaldi and Grandi (2005), are both private incubators. Corporate Business Incubators are owned and set up by large companies with the aim of supporting the emergence of new independent business units. These new business units (corporate spin-offs) usually originate from research-project spillovers (carried out within the source organizations) and are actually the outcomes of diversification strategies. It is quite common for the source organization company to control such ventures by holding an equity stake. Finally, Independent Business Incubators are set up by single individuals or by groups of individuals (companies may also be among their founding partners), who want to help rising entrepreneurs to create and grow their businesses. They invest their own money in the new companies and hold an equity stake.

In addition to these four types identified by Grimaldi and Grandi (2005), Noltes, Masurel, and Buddingh (2013) added a fifth type of business incubator: namely, the Green Business Incubator. According to them, these business incubators focus on recruiting entrepreneurs who are active in clean technologies, renewable energies, green businesses, etc. Although Noltes et al. (2013) admitted that, at that time, Green Business Incubators were hardly of any importance, they expected future success for these business incubators, as the global sustainability movement was still gaining ground.

Nevertheless, academic research has not advanced further than only a limited number of case studies on the engagement of business incubators in activities aimed at sustainable development (Bank and Kanda, 2016; Bank, Fichter, and Klofsten, 2017, Fonseca and Jabbour, 2012; Lose and Tengeh, 2015). This engagement of the business incubators with sustainable development activities focused on the business incubators themselves and on the relationship between the business incubators and their incubatees (tenants), e.g. concerning recruitment and support processes. However, most research on business incubators did not pay any attention to the engagement of business incubators in sustainable activities (see, e.g., Allen and McCluskey 1991; Aernoudt 2004; Aerts, Matthyssens and Vandenbempt, 2007; Albort-Morant and Oghazi, 2016; Albort-Morant and Ribeiro Soriano, 2016; Baraldi and Havenvid, 2016; Barbero, Casillas, Ramos and Guitar 2012; Barbero, Casillas, Wright and Garcia, 2014; Bergek and Norrman, 2008; Bruneel, Ratinho, Clarysse and Groen, 2012; Essig

2014; Lukes, Longo and Zouhar, 2019; Schwartz and Hornych, 2008; Von Zedtwitz 2003).

2.2. Sustainable Entrepreneurship by Start-ups[2]

Not much is known about the extent to which start-ups engage in sustainable activities, although it is admitted that practicing sustainable entrepreneurship in itself is important for start-ups (Galpin and Hebard, 2015; Hockerts and Wüstenhagen, 2010; De Lange, 2017), and that sustainable venture capitalists may be able to assist start-ups to engage in sustainable entrepreneurship (Bocken, 2015). However, much has been written about the engagement of small businesses in sustainable activities or sustainable entrepreneurship by small business in general (and start-ups are small businesses after all, cf. their firm size). Therefore, in the remainder of this section, we focus on the main characteristics of sustainable entrepreneurship by small businesses and the current frequently treated subjects in the academic research on sustainable entrepreneurship by small businesses.

Sustainable entrepreneurship as practiced by small businesses has its own characteristics, compared with those of large firms. According to the European Commission (2015), the vast majority of SMEs do not use formal and sophisticated tools for sustainable entrepreneurship, even when these tools are available. Furthermore, the same source mentions that those small businesses have always been very close to sustainable entrepreneurship, especially because of their typically local anchoring. Morsing and Perrini (2009) claimed that the impact of small businesses which engage in sustainable entrepreneurship has been underrated by policymakers and researchers. Kechiche and Soparnot (2012) noted that small businesses consider sustainable entrepreneurship not merely as an add-on but rather as a part of their overall day-to-day management. According to Baumann-Pauly, Wickert, Spence and Scherer (2013), small businesses are not necessarily less advanced in sustainable entrepreneurship than large firms, but small businesses and large firms are different from each other in how they practice sustainable entrepreneurship.

Frequently treated subjects of the academic research on sustainable entrepreneurship by small businesses are: (1) the motivation to engage in sustainable entrepreneurship; (2) the relationship between sustainable entrepreneurship and economic performance; (3) the obstacles to engage more in sustainable entrepreneurship. The motivation to engage in sustainable entrepreneurship may just have to do with the personality of the entrepreneur

2. As the entrepreneur plays a crucial role in small businesses, among them start-ups, using the term "sustainable entrepreneurship" is appropriate when dealing with small businesses; the term "corporate social responsibility" (CSR) refers more to large, often multinational corporations.

(see, e.g., De Clercq and Voronov, 2011; Kuckertz and Wagner, 2010; Lourenço, Jones and Jayawarna, 2012; Williams and Schaefer, 2013), or with the entrepreneur acting together with the support of the stakeholders (see, e.g., Alniacik, Alniacik and Genc, 2011; Russo and Perrini, 2010; Tang and Tang, 2012). One specific motivation to engage in sustainable entrepreneurship may be its possible positive link with a firm's economic performance, although the research covering this relationship has produced mixed results (see, e.g., Brammer, Hoejmose, and Marchant, 2012; Choongo 2017; Vickers and Lyon, 2014). Regarding the third subject, the major obstacles for the development of sustainable entrepreneurship by small businesses are: the costs involved; having the right employees; the availability of time; and the lack of support from stakeholders (see, e.g., Caldera, Desha, and Dawes, 2019; Fenwick, 2010; Inyang, 2013; Klewitz, Zeyen, and Hansen, 2012; Masurel and Kester, 2018; Revell, Stokes, and Chen, 2010; Santos, 2011; Shi, Peng, Liu, and Zhong, 2008; and Sweeney, 2007).

To sum up, as was said at the beginning of this subsection, sustainable entrepreneurship in itself is important for start-ups; that's why it would be good to learn to what extent and how business incubators may support them in that realm. Moreover, researching sustainable development activities by business incubators may offer new leads for the academic research on sustainable entrepreneurship by small businesses.

3. Development of Working Hypotheses

As stated in Section 2.1, the study of the academic literature on business incubators showed that there is hardly any evidence that business incubators engage in activities aimed at sustainable development. The limited sources in this respect (Bank and Kanda, 2016; Bank, Fichter, and Klofsten, 2017, Fonseca and Jabbour, 2012; Lose and Tengeh, 2015) focused on the business incubators themselves and on the relationship between the business incubators and their incubatees.

Obviously, we are aware of the important role of activities aimed at sustainable development nowadays, responding to the current importance of, for example, the Sustainable Development Goals, the climate discussion, and the Circular Economy. However, we noticed hardly any attention for the engagement of business incubators in activities aimed at sustainable development in the academic literature. Therefore, all four (working) hypotheses presented below have a negative formulation.

Although business incubators may not consider themselves as being exclusively focused on activities aimed at sustainable development, in principle they might still actually engage in such activities. However, again, there is hardly any literature suggesting that business incubators are undertaking sustainable

development activities themselves. Therefore, the first working hypothesis is formulated as follows:

H1: Business incubators in Europe do not carry out own activities aimed at sustainable development.

Further, on the basis of the evidence from the literature available, no convincing indication has been found that business incubators do include sustainable aspects in the programs they offer to their incubatees. Hence, the second working hypothesis is formulated as follows:

H2: Business incubators in Europe do not include sustainable aspects in the programs they offer their incubatees.

Also, the literature studied does not contain any notion of business incubators taking any expertise and knowledge of sustainable entrepreneurship into consideration during the mentor selection process, although mentors play an important role for business incubators. Therefore, the third working hypothesis is as follows:

H3: Business incubators in Europe do not consider expertise and knowledge of sustainable entrepreneurship during the selection of mentors.

Finally, it can be concluded from the current state of the literature that an ambition for sustainable entrepreneurship is not considered by business incubators during the selection of their incubatees. This leads us to the fourth and last working hypothesis:

H4: Business incubators in Europe do not consider the ambition for sustainable entrepreneurship during the selection of incubatees.

4. Methodology

As there was no overall overview of business incubators in Europe available, we used a convenience sampling approach, which is justified in situations in which no overall overview of the population is available. Contact details were obtained from the websites of various business incubation organizations, namely: the European Business & Innovation Centre Network (www.ebn.eu); the Dutch Incubation Association (www.dutchincubator.nl); the Bundesverband Deutscher Innovations-, Technologie- und Gründerzentren (www.innovationszentren.de); the Swedish Incubators & Science Parks (www.sisp.se); the Industrial Development Corporation of Norway (www.siva.no); La French Tech

(visa.lafrenchtech.com); Czech Startups (www.czechstartups.org); the Investment and Development Agency of Latvia (www.liaa.gov.lv); UBI Global (www.ubi-global.com), the European Space Agency Business Incubation Centres (www.esa.int); the European StartUs network (www.startus.cc); and the Impact Hub (www.impacthub.net). Additional contact details of business incubators from the United Kingdom were sourced from the "UK directory of Business incubators and accelerators 2018" (www.gov.uk).

Data were collected in the period November-December 2018 from business incubators throughout Europe, by means of an internet-delivered standardized questionnaire in English. Earlier academic research on the subjects of business incubators and sustainable entrepreneurship by start-ups, separately (see Section 2 of this paper), formed the main foundation of the survey. But first, expert interviews with the managers of three Dutch business incubators were held to further develop and validate the survey questions and answers. In November 2018, 934 managers of business incubators across Europe were invited to complete the questionnaire and were reminded twice to do so.

The questionnaire consisted of five different parts:

1. General information about the business incubator (which included questions concerning the size and the type of business incubator);

2. The activities aimed at sustainable development carried out by the business incubator (five social activities and five environmental activities, on a "yes" or "no" basis);

3. Aspects focused on programs offered by the business incubator (among which the creation of positive environmental and social impact, on a "yes" or "no" basis);

4. The fields of expertise and knowledge considered by the business incubator during the recruitment of mentors (among them environmental and social issues, scored on a 5-point Likert scale);

5. The aspects considered by the business incubator during the selection of incubatees (among them the ambition for a positive environmental and social impact, scored on a 5-point Likert scale).

Whereas the incubator's own activities and the program offered are rather straightforward concepts, and therefore the answers "yes" and "no" were sufficient, the recruitment of mentors and the selection of incubatees are less straightforward concepts, and therefore answers scored on a 5-point Likert scale were used.

5. Data

Invitations to participate in the research project were sent to 934 business incubators in total, and, in the end, 59 completed questionnaires were returned, resulting in a response rate of 6.3%. The questionnaires were completed mainly by the managing director/CEO (35.6%), the incubator manager (32.2%), and the program manager (15.3%).

In the literature review of this paper, it has already been mentioned that the first business incubators were founded in the 1980s. This claim finds support in the data collected for this study, as the oldest business incubator in the response group started operating in 1982. The youngest business incubator started operating only in 2018 (the year the survey was conducted), suggesting that business incubators are still a topical phenomenon. The majority of the business incubators in our response group were located in Western Europe, in particular in the United Kingdom (20.3%), Germany (10.2%), Italy (6.8%), the Netherlands (6.8%) and Portugal (6.8%). The remaining 49.1% of the business incubators in our response group were broadly scattered across the rest of Europe, including those countries that most recently joined the European Union (i.e. after the year 2004). Note again that we practiced convenience sampling, and that this approach may particularly affect the regional structure of our sample.

The largest group of respondents (30.5%) represented a Business Innovation Center, described in the survey as a public-private initiative that supports small businesses to develop. Close to a fifth of the respondents (18.6%) represented a University Business Incubator, which is a part of a university, and which supports university staff and/or students to valorize their knowledge. Also close to a fifth (18.6%) of the respondents represented an Independent Private Incubator, a private company that supports small businesses to develop. From our fieldwork it appeared that 15.3% of all business incubators considered themselves to be a Sustainable Business Incubator: an organization that supports small businesses to develop environmental and/or social issues.[3] Only 3.4% of the respondents represented a Corporate Private Incubator, part of a large corporation, which supports small businesses to develop, either by its own staff or by those attracted from outside. Finally, approximately a seventh (13.6%) of the respondents did not identify with any of the five types provided as answer options.

In the remainder of this section, within the whole population of business incubators, a distinction is made between Sustainable Business Incubators (hereafter the SBIs) and Other Business Incubators (hereafter the OBIs).

The average number of people employed by the business incubators was 13.0 (8.1 for the SBIs and 13.9 for the OBIs), with a standard deviation of 30.1 (11.4 for the SBIs and 32.4 for the OBIs). The average physical space occupied by a

3. Originally, in the survey, this type of business incubators was called "Sustainability Business Incubator", but, on further consideration, we prefer the term "Sustainable Business Incubator", because in our opinion this term better captures the concept.

business incubator in our response group was 1,540 square meters (1,478 for the SBIs and 1,551 for the OBIs), with a standard deviation of 2,627 (2,879 for the SBIs and 2,611 for the OBIs). Two kinds of incubatees can be distinguished in this research: the incubatees housed inside the facility of the business incubator, and the incubatees who are involved in a program of the business incubator but are not housed inside its facility. The average number of incubatees housed inside the business incubator facility was 27.3 (23.6 for the SBIs and 28.0 for the OBIs), with a standard deviation of 36.0 (22.8 for the SBIs and 38.0 for the OBIs). The average number of incubatees housed outside the business incubator facility but involved in a program of the business incubator was 41.0 (41.7 for the SBIs and 40.9 for the OBIs), with a standard deviation of 171.6 (90.2 for the SBIs and 183.1 for the OBIs).

6. Testing the Hypotheses

Table 1 shows the percentage of business incubators that carried out the specified social and environmental activities in 2017. From this table it can be derived that overall, business incubators engage in 53.9% of all potential social activities, in 50.5% of all potential environmental activities, and in 52.2% of all potential sustainable activities. Thus, Hypothesis 1 is rejected: European business incubators do engage in activities aimed at sustainable development to a certain extent, as they participate in more than half of all potential social and environmental activities. Sponsoring social activities is their main social activity, while paying attention to their own recycling is the main environmental activity of business incubators.

Table 1 also shows that the SBIs engage in 57.8% of all potential social activities and 82.2% of all potential environmental activities, resulting in an overall engagement of 70.0% in all potential sustainable activities. The related scores for the OBIs are 53.2%, 44.8%, and 49.0%. An independent-samples t-test was conducted to compare the engagement in social and environmental activities of the SBIs, on the one hand, and the OBIs, on the other. There is a significant difference in the scores for all the sustainable activities of the SBIs (mean = 0.70; *SD* = 0.19) and those of the OBIs (mean = 0.49; *SD* = 0.21); t(57)2.77, p = 0.008. There is also a significant difference between the scores of environmental activities for the SBIs (mean = 0.82; *SD* = 0.25) and those of the OBIs (mean = 0.45; *SD* = 0.35); t(57)3.03, p = 0.004. However, there is no significant difference in the scores for the social activities of the SBIs (mean = 0.58; *SD* = 0.21) and those of the OBIs (mean = 0.53; *SD* = 0.23); t(57)0.55, p = 0.586. It can therefore be concluded that the SBIs are different from the OBIs (particularly regarding environmental activities, not so much in terms of social activities), which justifies the distinction of SBIs in Europe as a separate type.

Table 1. Frequency of social and environmental activities carried out by the BIs (in percentages)

	All BIs	SBIs	OBIs
n =	59	9	50
Social activities:			
1. Internships offered to students	67.8	66.7	68.0
2. Development trajectories offered to employees	57.6	66.7	56.0
3. Made use of a formal complaints system for clients	32.2	33.3	32.0
4. Sponsored social activities	79.7	88.9	78.0
5. Jobs offered to people distant from the labor market	32.2	33.3	32.0
All social activities	53.9	57.8	53.2
Environmental activities:			
6. Attention paid to own CO_2 emission reduction	42.4	88.9	34.0
7. Attention paid to own energy reduction	59.3	77.8	56.0
8. Attention paid to own recycling	67.8	100.0	62.0
9. Attention paid to own water saving	47.5	88.9	40.0
10. Made use of renewable energy	35.6	55.6	32.0
All environmental activities	50.5	82.2	44.8
All social activities and All environmental activities together	52.2	70.0	49.0

Note: BIs = business incubators; SBIs = sustainable business incubators; OBIs = other business incubators.

Table 2 shows the percentage of the business incubators that offer different program aspects. From this table (rows 5 and 6) it becomes clear that 25.4% of all business incubators included positive environmental impact creation in their program offering, and that 30.5% of all business incubators included positive social impact creation. Although these scores are the lowest of all program aspects, Hypothesis 2 is rejected as well, as they are clearly greater than the expected zero: business incubators in Europe do to a certain extent include sustainable entrepreneurship in the programs they offer their incubatees.

In their program offering, 66.7% of the SBIs included positive environmental impact creation, and 77.8% included positive social impact creation. However, of the OBIs, only 18.0% included positive environmental impact creation, and only 22.0% included positive social impact creation. An independent-samples t-test was conducted to compare the inclusion of positive environmental and social impact creation in the program offering of the SBIs and the OBIs. There appeared to be a significant difference between the SBIs' scores of positive environmental impact creation (mean = 0.67; *SD* = 0.50) and those of the OBIs (mean = 0.18; *SD* = 0.39): t(57)3.31, p = 0.002. There also appeared to be a significant difference between the SBIs' scores of positive social impact creation (mean =

0.78; *SD* = 0.42) and those of the OBIs (mean = 0.22; *SD* = 0.44): t(57)3.65, p = 0.001. These results clearly suggest that the SBIs include sustainable aspects more frequently in their program offering than the OBIs do, and that the SBIs are different from the OBIs in Europe.

Table 2. Frequencies of program aspects included in the program offering (in percentages)

	All BIs	SBIs	OBIs
n =	59	9	50
1. Pre-Incubation	81.4	100.0	78.0
2. Incubation	86.4	77.8	88.0
3. Acceleration	67.8	77.8	66.0
4. Post-Incubation	39.0	55.6	36.0
5. Creation of positive environmental impact	25.4	66.7	18.0
6. Creation of positive social impact	30.5	77.8	22.0

Note: BIs = business incubators; SBIs = sustainable business incubators; OBIs = other business incubators.

Table 3 shows that, during the selection of mentors, the business incubators do to some extent consider expertise and knowledge of environmental issues (3.22) and social issues (3.25), measured on a 5-point Likert scale (both these scores come between those of the categories 'neither agree nor disagree' (3), on the one hand, and 'agree' (4), on the other). Hence, Hypothesis 3 is rejected as well: business incubators in Europe do to a certain extent consider expertise and knowledge of sustainable entrepreneurship during the selection of their mentors. However, during this process, these two particular expertise and knowledge fields score the lowest of all the expertise and knowledge fields listed in Table 3.

The SBIs put more emphasis on expertise and knowledge of both environmental issues (4.11) and social issues (4.22) during the selection of their mentors than the OBIs do (with lower scores of 3.06 and 3.08, respectively). An independent-samples t-test was conducted to compare the SBIs' scores for the consideration of expertise and knowledge in the fields of environmental and social issues during the selection of their mentors with those of the OBIs. In this respect, there is a significant difference between the scores for the consideration of environmental issues of the SBIs (mean = 4.11; *SD* = 1.05) and those of the OBIs (mean = 3.06; *SD* = 0.94); t(57)3.05, p = 0.003. There is also a significant difference between the scores for the consideration of social issues of the SBIs (mean = 4.22; *SD* = 0.83) and those of the OBIs (mean = 3.08; *SD* = 0.92); t(57)3.47, p = 0.001. These results clearly suggest that the SBIs consider expertise and knowledge in the field of sustainable entrepreneurship during the selection of mentors more often than the OBIs do, and again that the SBIs are different from the OBIs in Europe.

Table 3. Scores on expertise and knowledge fields considered during the selection of mentors (on a 5-point Likert scale)

	All BIs	SBIs	OBIs
n =	59	9	50
1. Business incubation and start-ups	4.34	4.78	4.26
2. Accounting/financial management	3.97	4.00	3.96
3. Presenting	3.95	4.33	3.88
4. Business plan creation	4.12	4.44	4.06
5. Marketing	4.14	3.89	4.18
6. Legal	3.71	3.33	3.78
7. Leadership	3.86	3.89	3.86
8. Human resource management	3.32	3.44	3.30
9. Environmental issues	3.22	4.11	3.06
10. Social issues	3.25	4.22	3.08

Note: BIs = business incubators; SBIs = sustainable business incubators; OBIs = other business incubators.

Table 4 indicates that the business incubators, in general, consider ambition for positive environmental impact (3.49) and ambition for positive social impact (3.47) during the selection of incubatees (on the 5-point Likert scale, these scores come between the categories "neither agree nor disagree" (3), on the one hand, and "agree" (4), on the other). So, Hypothesis 4 is rejected as well: business incubators in Europe do to a certain extent consider ambition for sustainable entrepreneurship during the selection of incubatees. However, during this process, these two particular aspects score the lowest of all aspects during the selection of incubatees.

The SBIs more strongly consider ambition for positive environmental impact (4.44) and ambition for positive social impact (4.22) during the selection of incubatees compared with the OBIs (with scores of 3.32 and 3.34, respectively). An independent-samples t-test was conducted to compare the SBIs' scores for consideration of ambition for positive environmental and social impact during the selection of incubatees with those of the OBIs. There is a significant difference concerning positive environmental impact between the SBIs' scores (mean = 4.44; *SD* = 0.88) and those of the OBIs (mean = 3.32; *SD* = 0.91); t(57)3.42, p = 0.001. There is also a significant difference concerning positive social impact between the SBIs' scores (mean = 4.22; *SD* = 0.83) and those of the OBIs (mean = 3.34; *SD* = 0.98); t(57)2.53, p = 0.014. These results clearly suggest that the SBIs consider ambition for sustainable entrepreneurship during the selection of incubatees more often than the OBIs do. Thus, again it was shown that the SBIs are different from the OBIs in Europe.

Table 4. Scores on aspects considered during the selection of incubatees (on a 5-point Likert scale)

	All BIs	SBIs	OBIs
n =	59	9	50
1. Development stage of the company	4.03	4.11	4.02
2. Specific industry/sector	3.66	3.22	3.74
3. Founding team (composition, vision)	4.20	4.22	4.20
4. Innovativeness of the idea	4.19	3.33	4.34
5. Target market	3.85	3.33	3.94
6. Growth potential	4.12	4.00	4.14
7. Ambition for positive environmental impact	3.49	4.44	3.32
8. Ambition for positive social impact	3.47	4.22	3.34

Note: BIs = business incubators; SBIs = sustainable business incubators; OBIs = other business incubators.

7. Discussion

The rejection of all four working hypotheses means that the results of our empirical fieldwork clearly do not align with the current theoretical framework employed in business incubator research, which indicates that there is a gap between the theory and practice of the engagement of business incubation in activities aimed at sustainable development.

Our explanation for the rejection of all four hypotheses is twofold. On the one hand, it can be argued that the academic literature on the subject of the engagement of business incubators in sustainable development activities is clearly lagging behind practice. Engagement in activities aimed at sustainable development by business incubators, as such, is still relatively new, and apparently the development of the theory concerning business incubators has not been able to keep up with the pace of recent changes in practice. This is confirmed by the very limited amount of literature on sustainable development activities by business incubators. On the other hand, it can be argued that business incubators in practice are keeping up with societal developments. Business incubators have steadily evolved in recent times, though more or less under the radar of the academic research world. This development of business incubators can partly be ascribed to the fact that they often deal with innovative ideas, entrepreneurs and businesses, which might require them to better keep up with recent developments than is generally assumed. This also means that the important roles of the Sustainable Development Goals, the climate discussion, and the Circular Economy are more or less acknowledged by business incubators in practice, although much more so by the group of *sustainable* business incubators, which, according to our survey results, forms a minority in the business incubator population.

8. Conclusions

This research has investigated the engagement of business incubators in sustainable development activities. Our empirical research, without any doubt, showed that business incubators clearly engage in activities aimed at sustainable development, with their own activities, program offering, selection of mentors, and selection of incubatees. The contribution of our paper to the academic literature lies in the practical measurement of sustainable development activities among a sample of business incubators across Europe, as in the academic literature we see hardly any attention for the engagement of business incubators in activities aimed at sustainable development, despite the acknowledgment that sustainable development is an important phenomenon nowadays (see the current importance of, for example, the United Nation's Sustainable Development Goals, the climate discussion, and the Circular Economy). Notwithstanding the finding that business incubators in Europe do engage in sustainable development activities, there is still room for improvement, given the scores in Tables 1 to 4. This is the main practical implication of the paper.

This study has a number of limitations. First, it should be noted that the empirical data were gathered from the employees of the business incubators themselves. Although this is an accepted approach for researching unstudied questions in a relatively new field, it should be evident that the answers reflected the perception of the respondents, which could be subjective. The second limitation is related to the limited sample size, which affects the generalizability of the findings. Furthermore, the convenience sampling approach applied may have affected the gathered data and thus makes it harder to judge the representativeness of the research.

Regarding the first limitation, it is recommended that future researchers should strive to use more objective measures, for example, those based on the administrative data of the business incubators. Moreover, it is recommended that future research should apply a different sampling approach: for example, purposive sampling, to enhance the generalizability of the results, if possible. It is also recommended to build upon this research by further examining the newly suggested type of business incubators, the sustainable business incubators (SBIs), the motivation of business incubators to engage in activities aimed at sustainable development, the regional aspects of business incubators in relation to their activities aimed at sustainable development, and to go more in-depth on the activities by the business incubators aimed at sustainable development.

References:

Aernoudt, R. (2004), "Incubators: Tool for Entrepreneurship?", *Small Business Economics*, 23(2): pp. 127-135.

Aerts, K., Matthyssens, P. and Vandenbempt, K. (2007), "Critical Role and Screening Practices of European Business Incubators", *Technovation*, 27(5): pp. 254-267.

Albort-Morant, G. and Oghazi, P. (2016), "How Useful are Incubators for New Entrepreneurs?", *Journal of Business Research*, 69(6): pp. 2125-2129.

Albort-Morant, G. and Ribeiro-Soriano, D. (2016), "A Bibliometric Analysis of International Impact of Business Incubators", *Journal of Business Research*, 69(5): pp. 1775-177.

Allen, D.N. and McCluskey, R. (1991), "Structure, Policy, Services, and Performances in the Business Incubator Industry", *Entrepreneurship Theory & Practice*, 15(2): pp. 61-77.

Alniacik, U., Alniacik, E. and Genc, N. (2011), "How Corporate Social Responsibility Information Influences Stakeholders' Intentions", *Corporate Social Responsibility and Environmental Management,* 18(4): pp. 234-245.

Bank, N. and Kanda, W. (2016), "Tenant Recruitment and Support Processes in Sustainability-profiled Business Incubators", *Industry and Higher Education,* 30(4): pp. 267-277.

Bank, N., Fichter, K. and Klofsten, M. (2017), "Sustainability-profiled Incubators and Securing the Inflow of Tenants – The Case of Green Garage Berlin", *Journal of Cleaner Production*, 157: pp. 76-83.

Baraldi, E. and Havenvid, M.I. (2016), "Identifying New Dimensions of Business Incubation: A Multi-level Analysis of Karolinska Institute's Incubation System", *Technovation*, 50: pp. 53-68.

Barbero, J.L., Casillas, J.C., Ramos, A. and Guitar, S. (2012), "Revisiting Incubation Performance: How Incubator Typology Affects Results", *Technology Forecasting & Social Change*, 79(5): pp. 888-902.

Barbero, J.L., Casillas, J.C., Wright, M. and Garcia, A.R. (2014), "Do Different Types of Incubators Produce Different Types of Innovations?", *Journal of Technology Transfer,* 39(2): pp. 151-168.

Baumann-Pauly, D., Wickert, C., Spence, L.J. and Scherer, A.G. (2013), "Organizing Corporate Social Responsibility in Small and Large Firms: Size Matters", *Journal of Business Ethics*, 115(4): pp. 693-705.

Bergek, A. and Norrman, C. (2008), "Incubator Best Practice: A Framework", *Technovation*, 28(1-2): pp. 20-28.

Bocken, N.M.P. (2015), "Sustainable Venture Capital – Catalyst for Sustainable Start-up Success?", *Journal of Cleaner Production,* 108: pp. 647-658.

Bouncken, R., Ratzmann, M., Barwinski, R. and Kraus, S. (2020), "Coworking Spaces: Empowerment for Entrepreneurship and Innovation in the Digital and Sharing Economy", *Journal of Business Research,* 114: pp. 102-110.

Brammer, S., Hoejmose, S. and Marchant, K. (2012), "Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits", *Business Strategy and the Environment*, 21(7): pp. 423-434.

Bruneel, J., Ratinho, T., Clarysse, B. and Groen, A. (2012), "The Evolution of Business Incubators: Comparing Demand and Supply of Business Incubation Services across Different Incubator Generations", *Technovation*, 32(2): pp. 110-121.

Caldera, H.T.S., Desha, C. and Dawes, L. (2019), "Evaluating the Enablers and Barriers for Successful Implementation of Sustainable Business Practice in 'Lean' SMEs", *Journal of Cleaner Production,* 218: pp. 575-590.

Choongo, P. (2017), "A Longitudinal Study of the Impact of Corporate Social Responsibility on Firm Performance in SMEs in Zambia", *Sustainability*, 9(8): article 1300.

De Clercq, D. and Voronov, M. (2011), "Sustainability in Entrepreneurship: A Tale of Two Logics", *International Small Business Journal*, 29(4): pp. 322-344.

De Lange, D. (2017), "Start-up Sustainability: An Insurmountable Cost or a Life-giving Investment", *Journal of Cleaner Production*, 156: pp. 838-854.

Essig, L. (2014), "Arts Incubators: A Typology", *The Journal of Arts Management*, 44(3): pp. 169-180.

European Commission (2015), *Opportunity and Responsibility: How to Help More Small Businesses to Integrate Social and Environmental Issues into What They Do.* Retrieved from https://ec.europa.eu/docsroom/documents/11866/attachments/1/translations/en/renditions/pdf

Fenwick, T. (2010), "Learning to Practice Social Responsibility in Small Business: Challenges and Conflicts", *Journal of Global Responsibility*, 1(1): pp. 149-169.

Fonseca, S.A. and Jabbour, C.J.C. (2012), "Assessment of Business Incubators' Green Performance: A Framework and its Application to Brazilian Cases", *Technovation*, 32(2): pp. 122-132.

Galpin, T. and Hebard, J. (2015), "Sustainability in Start-up Ventures: What Founders Say versus What They Do", *World Journal of Entrepreneurship, Management and Sustainable Development*, 11(4): pp. 246-255.

Grimaldi, R. and Grandi, A. (2005), "Business Incubators and New Venture Creation: An Assessment of Incubating Models", *Technovation*, 25(2): pp. 111-121.

Guerrero, M., Urbano, D. and Gajón, E. (2017), "Higher Education Entrepreneurial Ecosystems: Exploring the Role of Business Incubators in an Emerging Economy", *International Review of Entrepreneurship*, 15(2): pp. 175-202.

Hockerts, K. and Wüstenhagen, R. (2010), "Greening Goliaths versus Emerging Davids - Theorizing about the Role of Incumbents and New Entrants in Sustainable Entrepreneurship", *Journal of Business Venturing*, 25(5): pp. 481-492.

Inyang, B.J. (2013), "Defining the Role Engagement of Small and Medium-sized Enterprises in Corporate Social Responsibility", *International Business Research*, 6(5): pp. 123-132.

Kechiche, A. and Soparnot, R. (2012), "CSR within SMEs: Literature Review", *International Business Research*, 5(7): pp. 97-104.

Klewitz, J., Zeyen, A. and Hansen, E.G. (2012), "Intermediaries Driving Eco-innovation in SMEs: A Qualitative Investigation", *European Journal of Innovation Management*, 15(4): pp. 442-467.

Kuckertz, A. and Wagner, M. (2010), "The Influence of Sustainability Orientation on Entrepreneurial Intentions: Investigating the Role of Business Experience", *Journal of Business Venturing*, 25(5): pp. 524-539.

Lose, T. and Tengeh, R.K. (2015), "The Sustainability and Challenges of Business Incubators in the Western Cape Province, South Africa", *Sustainability,* 7(10): pp. 14344-14357.

Lourenço, F., Jones, O. and Jayawarna, D. (2012), "Promoting Sustainable Development: The Role of Entrepreneurship Education", *International Small Business Journal,* 31(8): pp. 841-865.

Lukes, M., Longo, M.C. and Zouhar, J. (2019), "Do Business Incubators Really Enhance Entrepreneurial Growth? Evidence from a Large Sample of Innovative Italian Start-ups", *Technovation*, 82: pp. 25-34.

Masurel, E. and Kester, S. (2018), "SMEs and the Use of their Full Potential for Sustainable Entrepreneurship: Empirical Evidence from the Dutch Construction Sector", *International Review of Entrepreneurship*, 16(2): pp. 241-256.

Morsing, M. and Perrini, F. (2009), "CSR in SMEs: Do SMEs matter for the CSR agenda?", *Business Ethics: A European Review*, 18(1): pp. 1-6.

Noltes, G.H.F., Masurel, E. and Buddingh, T. (2013), "Performance Measurement in Business Incubators: Empirical Evidence from Europe", in: Baycan T. (ed), *Knowledge Commercialization and Valorization in Regional Economic Development*, Cheltenham, UK: Edward Elgar Publishing, pp. 238-257.

Revell, A., Stokes, D. and Chen, H. (2010), "Small Businesses and the Environment: Turning Over a New Leaf?", *Business Strategy and the Environment*, 19(5): pp. 273-288.

Russo, A. and Perrini, F. (2010), "Investigating Stakeholder Theory and Social Capital: CSR in Large Firms and SMEs", *Journal of Business Ethics*, 91(2): pp. 207-221.

Santos, M. (2011), "CSR in SMEs: Strategies, Practices, Motivations and Obstacles", *Social Responsibility Journal*, 7(3): pp. 490-508.

Schwartz, M. and Hornych, C. (2008), "Specialization as Strategy for Business Incubators: An Assessment of the Central German Multimedia Center", *Technovation*, 28(7): pp. 436-449.

Shi, H., Peng, S.Z., Liu, Y. and Zhong, P. (2008), "Barriers to the Implementation of Cleaner Production in Chinese SMEs: Government, Industry and Expert Stakeholders' Perspectives", *Journal of Cleaner Production*, 16(7): pp. 842-852.

Sweeney, L. (2007), "Corporate Social Responsibility in Ireland: Barriers and Opportunities Experienced by SMEs when Undertaking CSR", *The International Journal of Business in Society*, 7(4): pp. 516-523.

Tang, Z. and Tang, J. (2012), "Stakeholder-Firm Power Difference, Stakeholders' CSR Orientations, and SMEs' Environmental Performance in China", *Journal of Business Venturing*, 27(4): pp. 436-455.

Vickers, I. and Lyon, F. (2014), "Beyond Green Niches? Growth Strategies of Environmentally-motivated Social Enterprises", *International Small Business Journal*, 32(4): pp. 449-470.

Von Zedtwitz, M. (2003), "Classification and Management of Incubators: Aligning Strategic Objectives and Competitive Scope for New Business Facilitation", *International Journal of Entrepreneurship and Innovation Management*, 3(1-2): pp. 176-196.

Williams, S. and Schaefer, A. (2013), "Small and Medium-sized Enterprises and Sustainability: Managers' Values and Engagement with Environmental and Climate Change Issues", *Business Strategy and the Environment*, 22(3): pp. 173-186.