sustainability

MDPI

Review

Critical Factors and Performance Measurement of Business Incubators: A Systematic Literature Review

Photchanaphisut Pattanasak [1], Tanyanuparb Anantana [2,3], Boontarika Paphawasit [4,5] and Ratapol Wudhikarn [1,5,*]

[1] Department of Knowledge and Innovation Management, College of Arts, Media and Technology, Chiang Mai University, Chiang Mai 50200, Thailand; photchanaphisut_patt@cmu.ac.th
[2] Department of Industrial Engineering, Faculty of Engineering, Chiang Mai University, Chiang Mai 50200, Thailand; tanyanuparb.a@cmu.ac.th
[3] Science and Technology Park, Chiang Mai University, Chiang Mai 50200, Thailand
[4] Department of Modern Management and Information Technology, College of Arts, Media and Technology, Chiang Mai University, Chiang Mai 50200, Thailand; boontarika.p@cmu.ac.th
[5] A Research Group of Modern Management and Information Technology, College of Arts, Media and Technology, Chiang Mai University, Chiang Mai 50200, Thailand
* Correspondence: ratapol.w@cmu.ac.th; Tel.: +66-53-920299 (ext. 416)

Abstract: Business incubators (BIs) are important supporters for young businesses, since they provide firms with physical facilities and intangible support. Existing literature reviews focusing on BIs have neglected to consider individual factors in their success in favor of combining key performance measurements to identify their development targets. This systematic literature review thus aimed to combine studies that examined specific issues pertaining to BI performance and related key performance indicators to measure their activities. We conducted a systematic literature review based on two research questions: the first research question concerned critical factors for BIs' performance; the second concerned their performance measurements. To ensure that we covered crucial factors and indicators of the latest generation of BIs, our systematic procedure included 74 studies published between 2005 and 2020 that were read in full and revealed ten critical factors that particularly emphasized financial resources and networking. We identified six categories for performance measurement, placing the greatest emphasis on the measurement of social capital. We recommend that academic researchers and BIs prioritize the intangible factors that constitute organizations' hidden value. This review thus provides novel findings by identifying common critical factors for BIs' performance and offering guidelines for performance measurement that consider BIs' intangible assets and trends for future studies.

Keywords: systematic literature review; business incubators; success factors; challenges; performance measurement; intellectual capital; sustainability

Citation: Pattanasak, P.; Anantana, T.; Paphawasit, B.; Wudhikarn, R. Critical Factors and Performance Measurement of Business Incubators: A Systematic Literature Review. *Sustainability* **2022**, *14*, 4610. https://doi.org/10.3390/su14084610

Academic Editors: Alessandra Bonoli and Angelo Paletta

Received: 20 March 2022
Accepted: 11 April 2022
Published: 12 April 2022

1. Introduction

Nowadays, new entrepreneurs are acknowledged as significant stimulants of the economy, and so the development of new ventures has been specified as a national strategy in several countries, both developed and developing. Therefore, to create, develop, and accelerate the success of new firms, the concept of business incubation has been used since its creation in 1959 [1]. Business incubation is now widely acknowledged as a key tool that provides significant support to new firms. Although the concept originated in the United States, business incubation is now used globally and in various contexts. Business incubation is empirically and widely recognized as a form of entrepreneurship support, particularly for new firms and businesses [2], which often lack both the resources and knowledge required to exploit business opportunities [3]. Moreover, new businesses tend to face various challenges, such as access to financial resources, marketing plans, and

limited business experiences, which may result in failure [4–6]. Therefore, to improve new firms' success rate, a driver or agency that propels business incubation, known as a business incubator (BI), is now required.

BIs may be defined as organizations established to support the early growth of new businesses with the ultimate goal of supporting young entrepreneurs in attaining financial independence [7,8]. Generally, BIs provide physical facilities and intangible support to incubated firms. Incubators also cooperate with various stakeholders to transfer crucial knowledge to entrepreneurs [9,10]. BIs' role has evolved continuously since 1959, and they now play several critical roles in supporting entrepreneurs, as physical facility providers, business trainers and coaches, and business network creators, among others. BIs may be classified into various types based on their primary roles and objectives—for example, as virtual incubators, independent commercial incubators, or technology BIs [11–13]. Incubators may also be categorized according to tenant type, such as startups or small businesses [14]. Business sectors may also function as classification criteria—for example, technology services, manufacturing, or mixed use [14]. Some scholars have categorized incubators according to the authorities or services that they provide to entrepreneurs [15–18]. However, most studies categorize BIs according to funding source: public or private. Publicly funded incubators with public funding are generally perceived as non-profit incubators, of which university BIs are among the most widely recognized. Meanwhile, profit incubators are supported by private funding, generally, seeking returns from clients or incubating firms from rent and service fees [15,19].

BIs are essential for sustaining the current fragile economy, since they support the early stages or foundations of business development. Generally, BIs foster entrepreneurial ideas and provide facilities for business founders [20]. They also improve survival rates and accelerate the growth of small- and medium-sized companies [21]. BIs are acknowledged as a strategic tool for firms' competitiveness [22], since they support startups as well as firms, thus promoting the creation and development of innovation in industries [23]. BIs further provide both tangible and intangible resources to enterprises, which are important fundamentals for business and economic development. They provide not only physical spaces but also networking and logistical supports and other consulting services to support the growth of firms [24]. Firms can accelerate their establishment rate concurrently with lower costs as a result of their comprehensive support. BIs also act as intermediaries to promote collaborations between universities and society. This support can improve entrepreneurs' technology transfer and innovation systems [25]. BIs play a crucial role in the transfer of material and data within an academic ecosystem and can significantly affect business incubation both positively and negatively [26]. Nowadays, they are acknowledged as a significant accelerator that can support and develop new topics, such as bioeconomy, in industry [27]. As the various roles and actions mentioned above illustrate, BIs offer several significant advantages to new firms in particular, including self-sustainability [28] and knowledge transfers [25]. The improvement and development of firms and businesses will, in turn, affect economic growth and sustainability [29].

To achieve their challenging goals, incubators must consider and manage several managerial elements. The proper identification, application, and management of critical factors are key priorities for BIs [30], since key factors have been empirically identified as the most significant drivers of incubators' achievements and successes [31]. Another important managerial aspect of BIs is the measurement of organizational performance. This key aspect may help assess organizational performance and provide opportunities to improve or enhance competitive advantages [32]. BIs should consider critical factors and turn them into actions that further become strategies supporting entrepreneurial activities [7]. The measurement of actions may help determine the extent of goal achievement [33]. Therefore, key performance indicators (KPIs) are essential in determining the success of BIs, since incubators take into account the dynamic incubation process and identify the target of the development [32].

Despite the considerable scholarly attention to BIs in recent decades, few systematic literature review (SLR) studies have been conducted on this specific topic, and these have been completed in recent years and from different perspectives. Mungila Hillemane et al. [34] systematically reviewed the goals, objectives, and function services of technology BIs and provided a general overview of BIs' operations. Hausberg and Korreck [2] reviewed the definitions and concepts of BIs, including an overview of functional processes, supporting strategies, and impacts of the new organizations. Lyken-Segosebe et al. [35] studied the issue in relation to universities' new roles, which have developed from an exclusively traditional research or teaching focus to participation in business sectors. The study focused specifically on approaches aimed at stimulating academic entrepreneurship and then concluded the critical failure factors of technology BIs. A study by Silva et al. [36] examined the critical factors of BIs and then grouped them into seven major factors but focused only on the success factors, overlooking the measurement and approaches implemented to achieve these factors.

As mentioned above, previous SLR studies focused on BIs' various managerial elements. Although they have the potential to provide crucial and in-depth knowledge supporting the management of BIs, significant issues regarding the critical factors enabling and challenging the success of BIs as well as their related KPIs are still mainly neglected in past works. To the best of our knowledge, only two studies have attempted to contribute to these crucial issues [35,36]; however, each study still focused on the different types of factors, either critical success or failure factors. Studies on the most recent generation of BIs have primarily emphasized the importance of networking activities, which is a key aspect of BIs' role [37,38]. However, this has raised the question of whether other significant factors impact BIs' performance. Moreover, all studies to date have focused exclusively on a specific type of BI: technology BIs. Therefore, these existing studies are still unable to identify common critical factors for both successes and failure perspectives along with coherent KPIs for generic BIs. Understanding the common and fundamental managerial elements of all types of BIs could help both scholars and practitioners efficiently manage incubators themselves and entrepreneurs. A comprehensive literature review study focusing on critical factors and KPIs was found to be lacking, and no review study could further link these factors and indicators to coherent strategic actions. The development of strategies corresponding to critical factors or KPIs is crucial for BIs, since it may shape managerial activities to succeed and achieve their ultimate goals [13].

To fill these significant gaps, this study aims to systematically review and identify the critical factors that both enable and challenge BIs' achievements. Moreover, to provide greater insight into BIs' measurement and management, both KPIs, which are applied to evaluate BIs' performance, are also reviewed and concluded in this study. In pursuit of these objectives, this study is guided by two major research questions (RQs) and their motivations, as detailed in Table 1.

Table 1. Research questions and motivation.

Research Question	Motivation
RQ1: What are the critical factors for BIs?	To identify critical factors that can enhance or hamper the performance of BIs.
RQ2: How do BIs measure their performance?	To identify current evaluation of BIs and criteria for goal achievement.

The findings that emerged in response to the RQs are expected to yield novel insights that will be beneficial for both academic and practical applications. We adopted an SLR approach in this study, which is organized as follows: first, this section provides background information of BIs and the importance of this study. The subsequent section, which details the research design, presents the procedure used to search for, identify, and select articles. The results section examines all qualifying studies, presents the descriptive results, and

responds to the research questions. Next, the results are analyzed. The final section presents the study's conclusions and limitations as well as avenues for future research.

2. Systematic Literature Review (SLR) Process

To ensure that our literature review was conducted systematically, we implemented an SLR process. SLR is a systematic review method that collects and analyzes studies based on the RQs [39]. As mentioned in the previous section, this study's RQs were already identified along with their corresponding objectives and presented in Table 1.

After RQs and objectives were identified, the next major step of SLR aims to define a systematic review protocol. All planning details of the review protocol were determined, including search boundaries, search terms, and cover period. After that was the stage of study selection, followed by data extraction, data analysis, and findings. Each stage is presented in the following sub-section.

2.1. Search Boundaries

To identify relevant review studies, we used SCOPUS as a search database since SCOPUS is useful for measuring the impact of articles [40]. This academic database encompasses almost all articles included in the Web of Science database. Moreover, it provided more articles in the fields of business and management and the humanities and social sciences that related directly to business incubation and, in particular, to our RQs. In this study, we filtered studies from the database merely for journal and conference proceedings to ensure that the studies we used were high-quality, having been subjected to peer-review [35].

To ensure that all studies were applicable, we required that the full texts be available and that the selected studies be written in English. Moreover, we excluded a book chapter and unpublished works from the search results on the basis of their questionable quality.

2.2. Search Terms

We used two search terms: "business" and "incubation". The combination of these two broad terms was applied to ensure an inclusive search. If we apply merely the word "incubation," there are several studies with other irrelevant fields appearing in the search results, since the incubation could be classified and examined in many different disciplines [41]. The Boolean operator "AND" was applied as a connecting word, since it could be ensured that two important words were considered together.

2.3. Cover Period

We set a timeframe for our search, including only articles published between 2005 and 2020, which primarily covered the latest generation of BIs. The present study's aim was to focus on critical factors and indicators of the latest generation of BIs and to identify strategic focal points that could enhance the BIs' value. Our aims related to the missions of third-generation BIs, which emerged around the beginning of the 2000s [42]. The third generation of BIs focused more on adding to and providing physical infrastructure [22]. In this study, therefore, we offer suggestions for further studies based on up-to-date situations and trends.

2.4. Study Selection

We applied the inclusion criteria to filter papers for the study selection, which included full-text articles and conference proceedings from the SCOPUS database. We sought only activities and definitions that were relevant to BIs. We further refined the keywords to screen for studies relevant to the research objectives detailed in each RQ, including "challenges", "success", "failure", "measurement", and "development of incubators", to evaluate the study's primary search based on titles, abstracts, and conclusions. Next, following the review protocol developed by Tahir et al. [43], we conducted a secondary

search that involved evaluating the studies based on inclusion criteria. Inclusion criteria are shaped by the motivations that represent the objectives of RQs [43].

Therefore, to ensure that all studies included were relevant, we identified specific inclusion criteria corresponding to the RQs, as follows:

- Studies that include discussion or identify critical factors of BIs' performance (RQ1).
- Studies that have offered suggestions for BIs to improve performance (RQ1).
- Studies that provide evaluation criteria for BIs' operation (RQ2).

Finally, we determined a shortlist of studies for analysis.

2.5. Data Extraction

After selecting articles based on the above criteria, we read them in greater detail. We then extracted data, which we recorded in MS Excel forms for analysis. The data were divided into general and specific information. The general information included the studies' years of publication, author(s), journals' names, countries, and methodologies applied. The general information is presented in the descriptive findings. The specific information was directly relevant to the RQs [43]. Information was captured using the keywords that we identified so that we could group the information into factors relating to our RQs and generate discussion.

2.6. Data Analysis

We presented the general information in the descriptive findings, including the frequency with which the journal appeared in the search results and time of publication. These are summarized as frequency and percentage and are presented in the next section. We then provided answers to each RQ based on the specific information derived from the collected data.

2.7. Findings and Conclusion

The table provides a summary of each RQ, with a discussion of tangible, intangible, internal, and external factors, which will be further explained in more detail. The SLR process that we implemented is detailed in Figure 1 below.

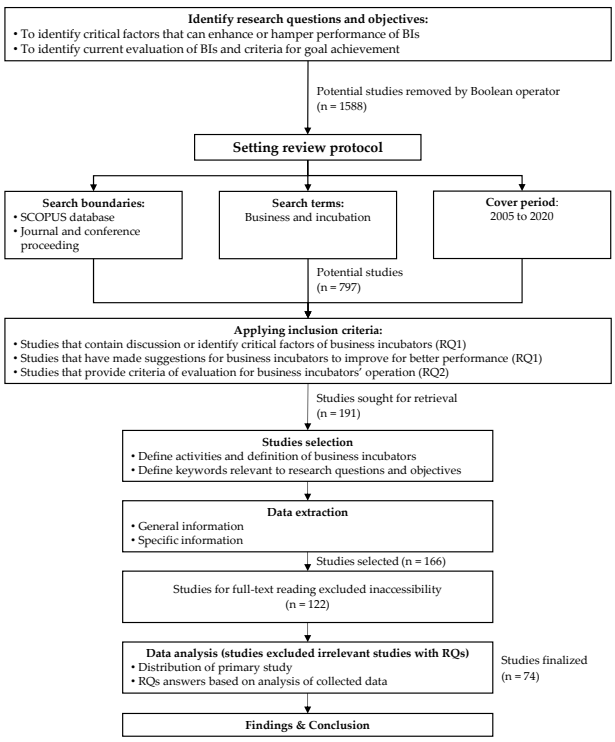

Figure 1. Process of systematic literature review with search results from SLR procedures.

In the next section, we will detail the descriptive findings and address each research question along with our discussion.

3. Results and Discussions

Using the procedure detailed above, we selected 122 articles for full-text reading. First, we used "incubation" as our only search term, and this yielded 13,017 documents. Some incubation topics were irrelevant, such as incubation in the scientific field. Therefore, the application of the Boolean operator yielded 1588 studies when irrelevant items were excluded. We then filtered for potential studies in SCOPUS by limiting our search journal and conference proceedings. As a result, the number of studies was reduced to 1376 findings, since book chapters and unpublished works were excluded from the search results. We then filtered for the publication date, and the eligible studies were reduced to 797 findings. The inclusion criteria were then determined by screening the titles and abstracts on the SCOPUS database. The eligible studies were then reduced to 191 potential results for review. We exported those abstracts and references to MS Excel for screening in greater detail in accordance with data extraction procedures.

As mentioned above, we were able to extract keywords from each study from the columns of extracted data in MS Excel. We also screened each study's abstract more carefully using specific keywords for each RQ. As a result, 166 studies were selected for full-text reading. However, 44 of these were inaccessible, and so we were able to access only 122 studies. These were finalized for full-text reading. However, close reading of the selected studies' full texts indicated that 48 studies were not directly relevant to the RQs. Therefore, 74 studies were ultimately summarized and discussed.

We selected the most relevant keywords, including "challenges", "success", and "failure", when screening the studies for discussion in relation to RQ1. The studies relating to RQ2 were selected based on the keywords "performance measurement". However, some studies that we did not select (e.g., [44]) mentioned ideas or suggestions that are relevant to the critical factors and to the development of actions for measuring performance. We regarded those studies as supporting our suggested theoretical contributions and implications.

3.1. Descriptive Findings

This section explains the descriptive findings from the procedures. Table 2 presents the frequency of the journals that have published in the area of BIs.

The table illustrates that publications pertaining to BIs were mostly found in the *Journal of Technology Transfer* (five papers), followed by *Benchmarking*, *Entrepreneurship and Regional Development*, and *Sustainability* (Switzerland) in equal numbers as second rank (three papers for each journal). The third-rank journals yielded an equal number of studies (two papers in each journal), including the *Journal of Small Business and Enterprise Development*, or the *International Journal of Technology Management*. Journals that published only one paper, apart from major findings, have been presented as "Others" at the end of the table. The results give an overview of the existing publications and journals relating to BIs. Apart from this, regarding the cover period, the summary is presented in Table 3.

The selected publications, which were published between 2005 and 2020, are presented according to frequency in the above table. Although BIs are now widely recognized as key supporters for young businesses, particularly from the third generation [42], few scholars were familiar with BI studies between 2005 and 2013. Scholarly interest in business incubation only began to grow in 2014. This may reflect trends in business incubation or may reflect the fact that businesses' contribution to the economy and society has been well recognized since then (e.g., [45]). We may assume that incubators play a crucial role in business support, based on the publication frequencies. We may seek further trends in the changes in focus over time. For example, publications since 2019 have emphasized networking performance as a means of increasing innovation effectiveness. Therefore, readers may predict what the next focal point will be.

Table 2. Distribution of journals found in the review.

Name of Journal	Frequency	Percentage
Journal of Technology Transfer	5	6.76
Benchmarking	3	4.05
Entrepreneurship and Regional Development	3	4.05
Sustainability (Switzerland)	3	4.05
Journal of Small Business and Enterprise Development	2	2.70
International Journal of Technology Management	2	2.70
International Journal of Entrepreneurial Behaviour and Research	2	2.70
Journal of Innovation and Entrepreneurship	2	2.70
International Journal of Entrepreneurship	2	2.70
Investigaciones Regionales	2	2.70
Technology Analysis and Strategic Management	2	2.70
R&D Management	2	2.70
Journal of the Knowledge Economy	2	2.70
Industry and Higher Education	2	2.70
Others	40	54.05

Table 3. Distribution of studies with respect to time of publication.

Time	Frequency	Percentage
2005	1	1.35
2006	2	2.70
2007	2	2.70
2008	1	1.35
2009	0	0.00
2010	2	2.70
2011	0	0.00
2012	4	5.41
2013	2	2.70
2014	12	16.22
2015	9	12.16
2016	2	2.70
2017	5	6.76
2018	10	13.51
2019	12	16.22
2020	10	13.51

The descriptive findings thus represent future trends and the general contexts of the studies. The next section presents more detailed findings and discussion relating to our RQs along with suggestions for future studies.

3.2. RQ1: What Are the Critical Factors for BIs?

Of the 74 finalized studies, we considered 47 to be relevant to RQ1. We summarized these studies with respect to the research question and presented them as follows.

As Table 1 illustrates, RQ1 is aimed at identifying the critical factors (CFs) that enhance or discourage BIs' performance. This section can be divided into three parts. The first sub-section identifies the major CFs and their positive and negative impacts on BIs. The next section presents the sub-factors or phenomena that support or obstruct major CFs. Finally, the third sub-section analyzes and discusses all findings pertaining to RQ1.

3.2.1. Critical Factors (CFs) for BIs

Numerous factors emerged from the extensive collection of reviewed articles. We extracted only the factors that indicated significant impacts on the development and improvement of BIs in both qualitative and quantitative perspectives to identify those that were critical. Analogous factors were combined to further reduce the number of factors,

and factors that were too narrow or specific were also amalgamated and classified into more generic ones. All CFs extracted during the preceding step were grouped and classified into categories or major factors regarding their characteristics, as Table 4 illustrates. The details of each CF and its advantages and disadvantages, as observed from proper management and poor operation or omission, are detailed below.

Table 4. Major critical factors, codes, and frequency of CFs found in past studies.

Groups of Critical Factors or Major Critical Factors for BIs	Codes	No. of Articles
Networking	CF01	12
Knowledge sharing	CF02	4
Staff expertise	CF03	8
Tenants or incubated firms	CF04	7
BI model and framework	CF05	10
Financial resources	CF06	16
Management system	CF07	9
Performance measurement system	CF08	4
Marketing	CF09	12
Services	CF10	11

Networking

Networking refers to the business support that BIs receive from various stakeholders, including both public and private organizations. This includes social support. Networking also encompasses the community's wider engagement for the purpose of accessing resources and capabilities beyond the organization's boundaries [46]. Networking may be broadly categorized into two types: internal and external. Internal networking involves the interaction among incubator staff or incubatees themselves, with the aim of providing and receiving encouragement and support [47,48], whereas external networking involves the use of experts' and advisors' knowledge and skills [47] as well as access to the resources of external parties, such as financial institutions, universities, local communities, and other organizations [48].

Advantages:

- Opens new funding opportunities for incubated firms, such as investment from venture capital [37].
- Enhances new ventures' opportunities to acquire new and inaccessible resources [16,33,36,49].
- Transfers intangible assets, such as information and knowledge, from experts to new ventures [12,48,50–52].
- Improves business ecosystems [53,54].
- Increases reputation from events that incubators participate [25].
- Has the potential to increase the recognition of incubated firms to the networks and public [25,37].

Disadvantages:

- Delays the business process [1,38].
- Businesses' attractiveness to investors or crowdfunding sources is low [55].
- Lack of professional support or partnering opportunities [23,37,56].

Knowledge Sharing

Knowledge sharing is the adoption of expertise, consulting, or business development through people [57]. In business incubation, knowledge sharing includes the transfer of know-how, technological/scientific ideas, or research findings among stakeholders [12,17].

Advantages:

- Improves the ability to acquire resources and enhance knowledge flows among incubators [58].
- Improves incubated firms' opportunities to identify missing knowledge and resources and to access scarce resources [49].
- Promotes synergy between businesses, which could lead to the creation of new products or services [59].

Disadvantages:

- Difficulties in shaping personal or organizational objectives owing to the lack of shared organizational values and norms [35].
- Lack of knowledge sharing from incubated firms; BIs provide few suitable supportive programs to them [59].

Staff Expertise

Staff expertise denotes the ability to provide good practice as well as knowledge and to achieve individual and organizational goals. It is particularly crucial for knowledge-based organizations [1,60]. It also includes the ability to interact with various parties within a business incubation system [7]. Expertise is represented by the organization's staff's qualifications and experience with respect to specific skillsets [12].

Advantages:

- Supports the flow of management, technology, or know-how advice from incubation programs [12,31,37,54].
- Provides qualified knowledge and skills for supporting tenants [33].
- Increases the reputation of BIs to attract incubatees [37].
- Enhances the ability to exploit knowledge for strategic planning of the program [47].
- Increases innovation capacity and innovation network for companies [30,58,61,62].

Disadvantages:

- Difficulty in supporting businesses' survival in the market [20,23,32,63,64].
- Difficulty in producing marketing activities [23].

Tenants or Incubated Firms

Tenants or incubated firms are those who have ideas or own businesses and are considered to be entrepreneurs that are qualified to set up their businesses under the incubation program's auspices. They have joined incubation programs to set up their enterprises or scale up with the incubators' support [12,53]. The proper management and mismanagement of tenants or incubated firms yield the following outcomes:

Advantages:

- Incubators can provide better support and guidance [48].
- Products of tenants or incubated firms meet market requirements [37].
- Identify and share dedicated expertise that is directly relevant to the incubated firms [53].

Disadvantages:

- BIs' improper exploration of tenants' businesses and requirements may lead to the obstruction of business development [59].

BI Model or Framework

BI models provide systematic frameworks within which BIs can create, deliver, capture, and exchange values. It covers several managerial aspects of business incubation, including mission, system, and people [65]. Generally, BI models can be divided into three stages: the pre-incubation, incubation, and graduation stages. Each part focuses on different BI management aspects: input, process, and output [48].

Advantages:

- Provides suitable processes, services, and resources to meet tenants' various requirements at different stages [48].
- Provides processes or approaches to support entrepreneurs in addressing problems [37,47].

Disadvantages:

- An ineffective model may render businesses less attractive to investors [1].
- Risks of business failure [5].
- Inefficient material or resource management within incubation programs [1,23,32].

Financial Resources

Financial resources refer to the financial support that BIs and incubated firms can obtain through capital investment, bank loans, or government support [12,66,67]. Generally, most companies define their success as profitability from investment [68]. Financial support is crucial in strengthening the business environment and infrastructure, which, in turn, improves the growth of businesses and entrepreneurs [69].

Advantages:

- Provides continuous mentoring and research support to tenants [37,67].
- Enhances partnerships with various stakeholders [37,67].
- Enhances the managerial capabilities of incubatees, expanding funding investment and adding value to business incubation programs [36,62,70].

Disadvantages:

- May impede opportunities to support new innovative enterprises and their activities, especially in research and development (R&D) tasks and market orientation [5,23,64,71,72].
- Difficulties in improving and effectively operating BIs' functions [1].

Management System

A management system is a set of processes and procedures that organizations apply to manage interrelated parts of their businesses to ensure that they can achieve their goals. BI management systems cover several incubation processes, such as expertise management and business planning for new entrepreneurs, to bring proactive management teams [12,33,54].

Advantages:

- Provides efficient technical assistance with external parties to ensure the success of incubated firms [48,64].
- Uniqueness of the business incubation program [48,64].
- Investors' or customers' perceptions regarding incubators' affiliations can guarantee the quality of incubated firms that come from successful BI strategies and their management system [15].

Disadvantages:

- Potential of mismanagement in financial management, inconsistencies with stakeholders' objectives, or provision of unclear working details [33,64,73].
- A lack of resource analysis process could bring difficulties in satisfying the real requirements of incubated firms [20,22].

Performance Measurement System

Measurement systems are systematic procedures used to track and monitor the performances of organizations, departments, and individual employees. A well-organized system can help improve organizational performance and firms' competitive advantages [7]. BIs' measurement systems can provide feedback that can be further used to improve the efficiency and effectiveness of incubators and incubated firms [32].

Advantages:

- Ability to clearly evaluate the performance of BIs and stakeholders [12,25,62].

Disadvantages:

- Unclear, intangible measurement leads to difficulties in supporting businesses to create innovative products, services, or practices [4,35,68].
- Difficulties in improving BIs' internal functioning [4,32,70].

Marketing

Marketing denotes the processes that organizations implement to research and promote the buying or selling of products or services. Business incubation marketing is the marketing activity that incubators mainly provide to tenants and incubated firms, such as innovation fairs or new product development for commercialization [37].

Advantages:

- Reduction in high failure rates for incubated firms when launching to new markets [30,67].
- Encouraging the promotion of new products on the market [37].

Disadvantages:

- Incubated firms confronting difficulties related to the limited size of the market, increased competition, rates of interests, lack of demands from locals, lack of procurement, and an imperfection in financial or credit [21,28,69,71,74].
- Poor development and growth of startups and incubated firms [55,75].
- Low attractiveness to investors leads to the obstruction of technology transfer or innovation creation and competitiveness improvement [21,28,69,71,74].

Incubator Services

Services are perceived as acts of transferring intangibles or values to customers [76]. The services that BIs provide may be broadly classified into three major groups: facility-related incubation services, such as office equipment or building; counseling services; and networking creation [59].

Advantages:

- Enhanced opportunities to collaborate or integrate with various stakeholders. These include opportunities to collaborate with governments to indicate industrial-related policy and taxation; associate with professional organizations to create new services or improve services such as business consulting, legal or technical services platform; and coordinate with venture capitalists (VC) as well as their funds [76].

Disadvantages:

- Service inflexibility may hamper value added to firms in terms of enhancing company visibility and credibility [33,35].
- Difficulties in supporting the independence of young firms and helping them to graduate [2].

As noted above, CFs can significantly affect the successes or failures of both incubators and their stakeholders. Good management of CFs can bring advantages, whereas improper management or mission of CFs could lead to several disadvantages. Therefore, to obtain greater insight into these CFs, this study also reviewed and analyzed their enabling and challenging sub-factors, known as "enablers" and "challenges", respectively. The classification of these sub-factors largely depends on scholarly perspectives as well as the specific circumstances of the cases studied in the reviewed articles. Table 5 summarizes several sub-factors found or mentioned in reviewed articles.

Table 5. Sub-factors found in reviewed studies.

Critical Factors	No. of Articles	
	Enabling Factors	Challenging Factors
CF01	6	7
CF02	1	3
CF03	1	7
CF04	4	3
CF05	3	8
CF06	5	12
CF07	5	4
CF08	2	2
CF09	4	8
CF10	7	5

To discriminate these types of sub-factors, the minor factors identified in past works are further classified and presented in Tables 6 and 7, according to the resource types: tangible and intangible factors, respectively. Each table classifies the factors according to their resource characteristics and is further classified into subdivided dimensions: enabling or challenging factors, followed by internal or external factors (i.e., controllable or uncontrollable). The results presented in Tables 6 and 7 list the CFs and their sub-factors applied in past works across various dimensions in accordance with the classifications mentioned above. The findings presented in these tables will be analyzed and discussed at the end of this section.

The data provided in Table 4 align with the resource-based perspective, as shown in Figure 2. Figure 2 illustrates that most existing works (16 papers, or 34%) mentioned or focused on tangible assets or financial resources (CF06), whereas several factors relating to intangible assets, which are knowledge sharing and performance measurement systems, were rarely examined (4 papers for each factor, or approximately 9%).

Financial resources were identified as the most critical factor [2], and so they were widely applied and studied in most existing works, as Figure 2 illustrates. This tangible factor could indicate success for both incubators and incubatees [68]. Moreover, this critical factor could empirically support and improve incubation activities for both tangible and intangible services, such as physical facilities, mentoring, coaching, and networking activities [69]. Many studies (e.g., [12,37]) have emphasized the significance of acquiring financial resources or budgets from several funding sources. A lack of sufficient funds could pose several obstacles for both BIs and incubated firms [2,29], such as the difficulty to initiate innovative activities of incubated firms [23] and to improve BIs' operations and functions [1]. Belas et al. [79] emphasized the importance of financial indicators as supports for SMEs, allowing enterprises to continue operating their businesses and stimulating economic growth. This economic development may influence entrepreneurs' decision processes when starting their businesses. The study thus highlighted the necessity of strategic innovation planning for coping with economic and financial crises. Financial indicators are still crucial in predicting enterprise survival. Valaskova et al. [80] found that debt can measure the share of foreign sources that can support companies' stability. This study emphasized that relevant stakeholders, such as policy makers or financial institutions, should prioritize the identification of enterprises' financial constraints. The findings of several existing studies clarify that financial resources, which focus on traditional and general business management, are still crucial for this current modern management or business incubation management. Therefore, to effectively manage and sustain BIs, a focus on financial resources is inevitably recommended. Moreover, based on the information extracted from the reviews, we suggest that BIs should focus on financial allocation tasks, since the stages of business incubation and their activities are very varied. Each business incubation task requires different financial resources. Therefore, distinguishing the stages

and activities of business incubation would support the efficient financial allocation of BIs [48].

Table 6. Tangible critical factors were found in past studies.

CFs	Enablers		Challenges		Enabling or Challenging Factors
	In	Ex	In	Ex	
CF01				✓	Limited studies analyzing patterns of communication or competition [23,37,56]
CF02				✓	Limited information regarding surrounding agents and knowledge flows [16]
CF03				✓	Inadequate numbers of consulting committee members [1]
CF06		✓			Government funding [37]
		✓			Venture capital (VC) investment [12,37]
		✓			Bank loans [12,66]
				✓	Lack of funding [2,5,29,32,37,64,71,72]
CF08			✓		Mainly focus on tangible measurement [4]
CF09		✓			Location of BIs [21,41]
				✓	Rates of interest [28]
				✓	Lack of procurement opportunities and business referrals [21]
				✓	Imperfection in financial or credit [21,28,69,71,74]
CF10	✓				Infrastructure for incubated firms [57,76]
		✓			Funding allocation from the government [66,67]
			✓		Exclusive focus on tangible services [4]
				✓	Location of incubatees in further afield [64]
			✓		Inadequate infrastructure [25]
Total	1	5	3	8	

Remark: In = internal resources; Ex = external resources.

Table 7. Intangible critical factors were found in past studies.

CFs	Enablers		Challenges		Enabling or Challenging Factors
	In	Ex	In	Ex	
CF01	✓				Innovative capabilities to increase collaboration among businesses [48,50]
		✓			Negotiation with stakeholders [53,54]
		✓			Stakeholder analysis for partnership [33,36]
			✓		No clear relationship between incubators and tenants [1,48]
			✓		Networking was not a priority [38]
				✓	Inadequate professional support [23,37,56]
				✓	Social relations are governed by policy [11]
CF02	✓				Mutualism among incubators [58]
			✓		Lack of shared values [35]
			✓		Tenants are reluctant to share knowledge [59]
CF03	✓				Experiences of incubator manager [54]
			✓		Lack of knowledge, skills, and experience in entrepreneurship [20,23,32,63,64]
			✓		Unclear indicators to measure the incubator's capacity [68]

Table 7. *Cont.*

CFs	Enablers		Challenges		Enabling or Challenging Factors
	In	Ex	In	Ex	
CF04	✓				Understand tenants' needs [37,48]
	✓				Similar types of tenants are recruited to BIs program [53,54]
			✓		Tenants are reluctant to share information [59]
			✓		Inadequate exploration of the heterogeneity of resource preferences [22]
				✓	Lack of commitment from entrepreneurs [64]
CF05	✓				Consideration of incubation stage [48]
	✓				Suitable mentoring program [37,47]
			✓		Struggling to plan [1,23,32]
			✓		Struggling with tenants' graduation [1,23,32]
			✓		Unclear objectives for recruiting tenants [5]
			✓		Program design to attract investment [1]
			✓		Design incubation program based on mindset [64]
				✓	Lack of clear policy objectives [37,61,64,67]
CF06	✓				Incubator's image of success for capturing resources [36]
	✓				Incubation stage for funding allocation [37,67]
				✓	Reliance on support from authorities [1,23,32,33,37,68]
			✓		Budget wasted on uncommitted entrepreneurs [64]
CF07	✓				Provision of clear entry and exit criteria for flow of management [48]
	✓				Measurement of experienced incubator manager, policies, and operations to identify sources of weaknesses and strength [33,54]
	✓				Clear mission for long-term goals [33,54]
	✓				Role of top management in strategic planning [36,50]
			✓		Inconsistent with stakeholders' needs [33,64,73]
			✓		Lack of creative problem solving [33,64,73]
			✓		Lack of analysis of required resources [20]
CF08	✓				Selection and exit criteria for measuring success [12,62]
			✓		Unclear intangible assessment [4,35]
CF09	✓				Staff expertise [12,33]
	✓				Incubated firms' business proposal regarding potential market [47]
			✓		Lack of market orientation to connect startups with other actors [55,75]
			✓		Unfamiliarity with marketing knowledge in further locations [64]
				✓	Limited market size [74]
				✓	Increasing competition [28]
				✓	Lack of demands from local market [21,28,71,74]
CF10	✓				Networking capabilities [31,76]
	✓				Clear selection criteria to provide affordable services [33]
		✓			Government policy for providing resources [76,77]
				✓	Lacking support from private sectors to build ecosystems for promoting entrepreneurs and investing in BIs [78]
				✓	Merely rely on the action of government [33]
Total	18	3	20	10	

Remark: In = internal resources; Ex = external resources.

Nowadays, however, as in other businesses and fields of study, an exclusively financial focus is no longer sufficient. The management of intangible factors is required to the same extent as tangible factors because the non-financial factors not only directly ameliorate BIs but also support financial factors. For instance, the management of networking factors may enhance opportunities for acquiring new sources of funding [37]. Therefore, regarding various advantages of non-financial factors, our findings, presented in Table 8, reveal that a moderate number of studies applied the financial factor concurrently with non-financial factors (28% of the reviewed papers), whereas only three articles (6%) focused exclusively on financial factors. Our analysis further revealed that almost all studies (approximately

94%) mentioned non-financial factors, 66% of articles (31 articles) focused exclusively on intangible factors, and approximately 28% mentioned both financial and non-financial CFs. However, most studies (47% of reviewed papers) still focused exclusively on single intangible CFs, with most scholars emphasizing the importance of intangible assets. Several studies also highlighted the significance of non-financial factors for BIs (e.g., [38,56]).

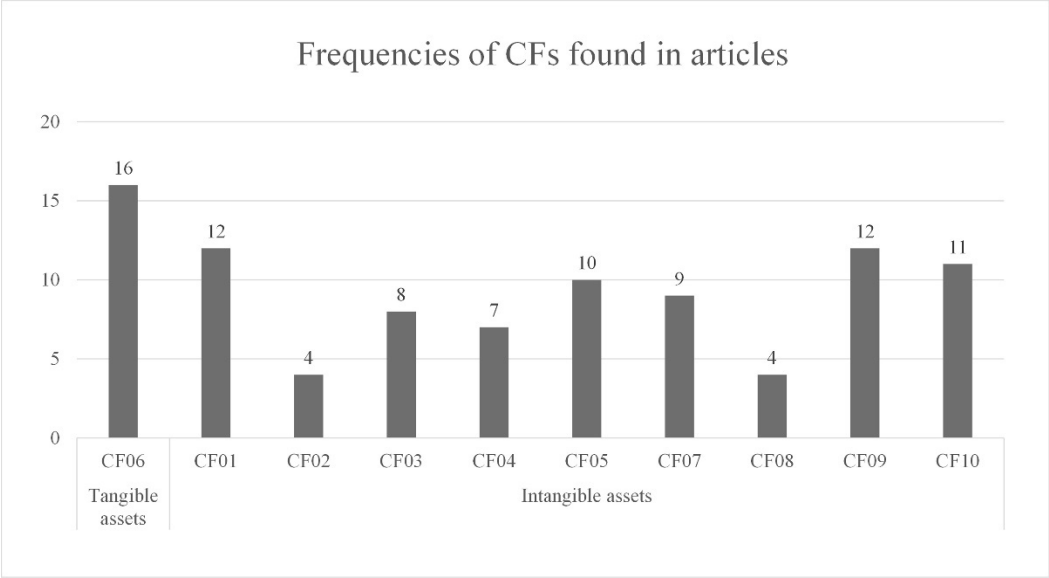

Figure 2. Frequencies of CFs found in articles.

Networking and marketing factors are the most widely applied non-financial CFs (12 articles per factor), and scholars have highlighted their significant advantages for both BIs and tenants. For instance, networking may lead to increased opportunities to access funding [12], whereas marketing could reduce the failures of incubated firms when launching new products or services [30]. Although these two CFs occurred in existing works, in terms of distinguishing influencing impact, networking seems to be more significant than marketing, since it increases the opportunities for improving marketing from strong networks, which may further expand markets and sales in addition to attracting more investment [25]. Therefore, based on the significance of the networking factor, we suggest that BIs should include a strategy emphasizing enhancing networking activities, which could be intermediaries between incubated firms and other parties, as identified in the past study [44]. It could also support the exchange of resources via partnerships, sharing information, or joining with regions when incubators confront inadequate resources [36]. Moreover, we strongly recommend that incubated firms increase knowledge sharing when networking opportunities with several partners arise. This will be crucial for enhancing their business opportunities, since knowledge sharing is a means of transferring know-how among businesses to enhance knowledge flow or identify knowledge gaps [49].

Among the various CFs, knowledge sharing (CF02) and performance measurement systems (CF08) received less attention in earlier studies. Based on the reviews, we believe that the low level of attention to knowledge sharing is mainly attributable to these factors' dependence on other CFs. Therefore, BIs generally prefer to manage the independent CFs first. For example, networking is identified as having a significant influence on knowledge sharing, since networking management could provide either advantages or disadvantages to knowledge sharing. Poor networking performance has led to a lack of trust among BIs and incubated firms [59], which directly and negatively affects the capability to share knowledge among key players and stakeholders. Based on this finding, it is thus important to foster mutual trust either among incubated firms themselves or between incubated firms and BIs to enhance the possibility of sharing information and knowledge. Another underexplored factor is the performance measurement system. Like knowledge

sharing, this factor was mentioned in four articles. Our reviews revealed that most studies concentrated on performance measurement, and BIs apply general tangible measures that are typically encountered in management studies, such as market share or business growth [4]. These tangible measures still failed to account for all necessary dimensions representing businesses' success. Therefore, to address this issue, some studies applied or discussed the measurement of intangible assets, an underexplored perspective [8,13]. However, although assets of this nature were identified as a crucial aspect in organizations' attainment of sustainability [8], it was still rarely studied in the business incubation area. Therefore, these findings provide us a suggestion cover to study and to explore more on the measurement of intangible assets in this field. The low level of attention to knowledge sharing and performance measurement systems leads to a lack of adequate knowledge of these two CFs, and this problem further impacts the focus on their applications. Therefore, to better appreciate the significance and advantages of these CFs and encourage their research and application, further study of these factors is highly recommended.

Table 8. Types of factor management in BIs studies.

Types of Factor Management in BI Studies	No. of Articles	% of Articles
Only non-financial management	31	65.96
- One non-financial CF	22	46.81
- Two non-financial CFs	7	14.89
- Three non-financial CFs	0	0
- Four non-financial CFs	2	4.26
- Five non-financial CFs	0	0
- Six non-financial CFs	0	0
- Seven non-financial CFs	0	0
- Eight non-financial CFs	0	0
- Nine non-financial CFs	0	0
Only financial management	3	6.38
Both financial and non-financial management	13	27.66
- Financial CF and one non-financial CF	4	8.51
- Financial CF and two non-financial CFs	4	8.51
- Financial CF and three non-financial CFs	3	6.38
- Financial CF and four non-financial CFs	1	2.13
- Financial CF and five non-financial CFs	0	0
- Financial CF and six non-financial CFs	1	2.13
- Financial CF and seven non-financial CFs	0	0
- Financial CF and eight non-financial CFs	0	0
- Financial CF and nine non-financial CFs	0	0

Various sub-factors, including the enabling factors and challenging factors, significantly influence the main factors. Therefore, in this study, we focus on these sub-factors to provide more in-depth information on them. The frequency with which the sub-factors have been mentioned or applied in existing studies is summarized and presented in Table 9.

Table 9 demonstrates that most studies mentioned or investigated the challenges that BIs face from both the tangible and intangible perspectives. The reviewed studies indicate that the proportion of the sub-factors relating to the challenges is greater than 60%. Surprisingly, this finding highlights the necessity for research dealing with either tangible or intangible challenges in relation to business incubation. Moreover, we noticed a significant degree of focus on intangible sub-factors in studies that adopted the resource-based perspective. Nevertheless, despite the attention given to intangible enablers and challenges, only a limited number of studies directly applied intangible management methods or techniques, such as the resource-based view (RBV) [45,76,81], balanced scorecard (BSC) [4,82], social mechanism approach [45], or intellectual capital management [8,13,83] in the business incubation field. This highlights an opportunity to study the applications and advantages

of management methods thoroughly and to focus specifically on the intangible aspects of BIs.

Table 9. Sub-factors of CFs.

Critical Factors	Tangible Sub-Factors					Intangible Sub-Factors				
	Enablers		Challenges		Total	Enablers		Challenges		Total
	In	Ex	In	Ex		In	Ex	In	Ex	
CF01	0	0	0	3	3	2	4	3	4	13
CF02	0	0	0	1	1	1	0	2	0	3
CF03	0	0	0	1	1	1	0	6	0	7
CF04	0	0	0	0	0	4	0	2	1	7
CF05	0	0	0	0	0	3	0	5	4	12
CF06	0	3	0	8	11	3	0	1	6	10
CF07	0	0	0	0	0	5	0	4	0	9
CF08	0	0	1	0	1	2	0	2	0	4
CF09	0	2	0	5	7	3	0	3	4	10
CF10	2	2	2	1	7	3	2	0	2	7
Total	2	7	3	19	31	27	6	28	21	82
	9		22			33		49		

As Figure 3 illustrates, the tangible sub-factors pertain primarily to BIs' external aspects. Several existing studies have mentioned this substantial linkage and identified that budgets and funding are the most significant tangible factors for both profit and non-profit BIs. For non-profit incubators, the financial resource is generally supported by external parties, and especially by the government, whereas private BIs require tangible resources from different external sources, which are investors or clients [15]. From this finding, it can be concluded that the proper management of tangible factors depends largely on external parties. Therefore, to deal with financial resources, which directly impact the effectiveness of BIs' operations [29], BIs should focus on acquiring funding, and thus identifying and accessing multiple sources of funding should be a priority for BIs. Based on earlier studies' findings (e.g., [25,37]), we suggest that BIs should strengthen their networking activities to enhance their reputations among investors and increase their opportunities to secure funding.

Intangible sub-factors, meanwhile, relate primarily to internal operations, as Figure 3 illustrates. This finding highlights the significance of intangible assets or intellectual capital (IC) for organizations' internal systems and performance. The acknowledgment of IC's importance aligns with earlier studies' suggestions (e.g., [83]). IC in relation to BIs has primarily been explored across three major dimensions: human capital, structural capital, and relational capital. These dimensions' importance lies mainly in the competence of BI staff, incubation services, and internal and external relationships, respectively. Human capital has been identified as the most significant IC component for BIs' success (e.g., [84]), because the incubation processes are related to various types of knowledge and skills, and most incubation work is directly related to and performed exclusively by staff. As mentioned above, intangible dimensions, particularly human capital, play a major role in business incubation. Moreover, regarding the proportionality of tangible and intangible sub-factors, as Tables 8 and 9 illustrate, it is clear that BIs should not focus exclusively on traditional management, which largely prioritizes finance or tangible assets, but should also take intangible assets into account.

A close examination of the sub-factors detailed in Table 9 indicates that the sub-factors that occurred most often in earlier works are enablers of or challenges to CF06 (financial resources). Previous studies focused on the sub-factors as challenges to BIs, and lack of funding presented the greatest concern for financial management. The highest frequency of sub-factors explicitly highlights the significance of financial resources to BIs. Several studies identified the problem related to financial resources that could lead to insufficient budgets,

and this consecutively affects several critical activities of business incubation. Therefore, to address this critical and also basic challenge by reaching and receiving more funding, we suggest that BIs should strengthen networking or individually create the opportunities to present their potentials to financial providers or supporters such as financial institutions, universities, local communities, or investors, as identified in other studies, e.g., [48].

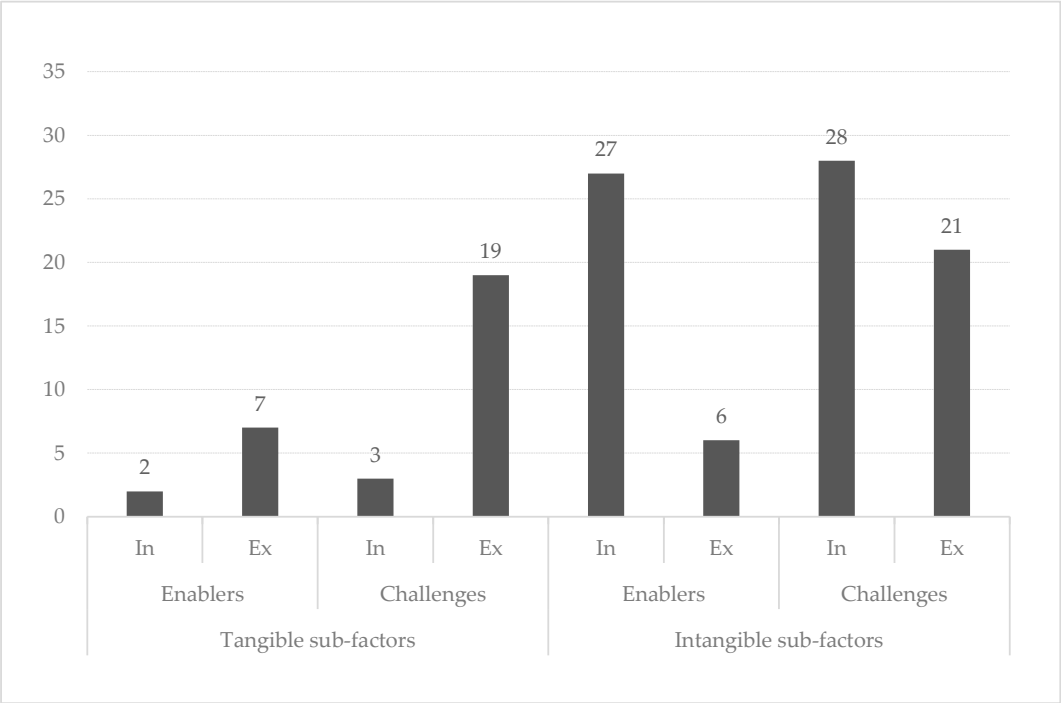

Figure 3. Summarize of sub-factors of CFs.

After CF06, CF01 (networking) and CF 09 (marketing) were the most important factors. Several studies mentioned challenging sub-factors relating to networking, particularly BIs' and tenants' increased opportunities of BIs and tenants for enhancing recognitions and gaining inaccessible resources (e.g., [16,33]). This high frequency implies that BIs' most substantial problems related to networking issues. The most frequently cited challenge to networking was insufficient professional assistance (e.g., [23,37]). In light of earlier studies' findings, we recommend that robust relationships be forged between BIs and both industrial sector experts and financial investors to deal with this issue, because strong relationships with professional stakeholders could help address the issue of inadequate professional and resource support (e.g., [33,50]). Professional assistance may be sought from universities, particularly regarding ideas for new product development processes during the later stages of BI programs as well as spin-off creation [16,67]. Therefore, the regulation of universities will affect entrepreneurship, particularly with respect to their relationships with enterprises [85]. Universities, therefore, should understand the impact they may have on entrepreneurship, as they implement practices and regulations [85]. In our review, we unexpectedly detected a significant improvement opportunity in association with the networking issue. Although various studies have acknowledged the importance of networking (e.g., [48,50]), most studies still lack insight into the BI ecosystem, the specific roles fulfilled by stakeholders, and their activities to support BIs. A study by Redondo and Camarero [86] focused on identifying stakeholders in the BI ecosystem and their relationships, but their study had several limitations with respect to identifying their activities. On this basis, we argue that a gap remains in the scholarship with respect to the improvement of networking through the exploration of stakeholders' activities or relevant factors as well as the effects on BIs. The present study will help analyze the roles and activities of each stakeholder and identify the benefits that may be obtained from them.

Marketing is another sub-factor frequently cited in earlier studies. Similar to networking, the aspects mentioned pertained primarily to the challenges, and the main issues identified by past studies were the limited size of the market and high competition in markets (e.g., [71,74]). In most situations, tenants are confronted with limited market size along with high competition intensity [75], and BIs are unable to assist them in solving problems, particularly when tenants are unfamiliar with market situations. Therefore, BIs should help their tenants address this issue with the aim of turning their ideas and knowledge into market success [75]. To successfully support tenants, we agree with Lamine et al. [55] that market orientation should be embedded in BIs' knowledge and expertise. Their study analyzed preparation for investors, selling, and collaboration with stakeholders [38]. Good preparation could support entrepreneurs in occupying their positions in the market [57]. BIs should support each business in identifying its position by analyzing with the surrounding agents, then try to connect the business with market requirements [74]. In addition to the first challenge, high market competition represents another frequently cited challenge. To increase competitive capabilities, the business' uniqueness is identified as a critical part of value creation. It is now necessary to stimulate R&D activities and to protect business ideas using patents [71,75] to ensure that intellectual assets—especially new technology and business innovations—are protected [8]. Regarding this challenge, we agreed with Grimaldi and Grandi [15] that the businesses' values could enhance their chances to scale up and offer contributions to local economies. R&D activities are considered to be a form of technology transfer that is linked to collaboration between research institutions and enterprise sectors in which BIs play an intermediary role [71,74]. From the problems of marketing, we would like to suggest academic researchers continue identifying required knowledge and skills for BIs, especially in supporting R&D activities in firms. BIs not only assist cooperation among partners but also participate in R&D activities to increase businesses' value [15]. Therefore, it is necessary to strengthen product value by focusing on R&D activities from the beginning during the incubation program's early stages. It is evident that basic research and the development of a prototype must be considered from the pre-incubation stage [87,88]. It is thus necessary to strengthen businesses' value from the beginning, which may, in turn, support business in scaling up.

CF02 (knowledge sharing) and CF08 (performance measurement system) were the least frequently mentioned sub-factors in earlier works. Our review indicated that most scholars failed to focus on knowledge sharing in business incubation, since they generally considered this activity to be an aspect of networking [49]. Only a few focused specifically on this topic, despite its identification as a key factor in BIs' success. However, we detected one critical sub-factor of knowledge sharing: mutualism. Several earlier studies indicated that BIs have been affected by a lack of knowledge sharing from incubated firms based on their dissimilar trusts [35,59]. Mutualism is thus identified as a crucial sub-factor of knowledge sharing. Hong et al. [58] emphasized the significance of mutualism and its effect of increasing cooperation among organizations to diffuse knowledge. However, the approach adopted to construct mutualism was unclear. The study mainly emphasized the importance of mutualism in improving resource acquisition and diffusing BIs' knowledge. It merely suggested that mutual trust increases when companies share some similarities. Therefore, to properly create or enhance mutualism, we recommend the creation or enhancement of networking activities as identified in past studies [47,86]. Moreover, to better understand and improve the effectiveness of knowledge sharing, factors influencing knowledge sharing either inside or outside organizations should be investigated alongside the consideration of mutual trust.

Another group of infrequently mentioned sub-factors was related to the performance measurement system. Earlier BI studies have relied primarily on the measurement of financial performance (e.g., [7,89]). It has been widely acknowledged that BIs were established to support business growth and contribute to economic development [61]. Therefore, several studies consider it sufficient to report BIs' performance based exclusively on tangible assessment. Moreover, BIs that receive funding from the government must also commit to

assessment criteria [76]. This may explain why few studies have mentioned or focused on the development of BIs' performance indicators. The review indicates that most studies have focused on tangible assessment, owing to its ability to provide clear indicators for performance improvement. BIs that receive public support are obliged to provide tangible evidence of their performance progress to funders [35]. However, our review indicated that BIs' exclusive focus on financial assets may result in pitfalls because BIs can limit their abilities to improve themselves or shape the direction of their strategies (e.g., [8,13]). We also wish to highlight that one major factor of intangible assets—human capital—has been neglected in earlier works, although Fukugawa [84] identified human capital as a critical aspect of BIs' performance. BIs may fail to measure how staff apply their knowledge and skills to support tenants or improve their performances. Several studies have emphasized the performance measurement of intangible assets in recent years. However, intangible indicators remain unclear in the context of BIs. Several studies have focused on intangible measurement (e.g., [8,13]) and have highlighted the importance of intangible assets as critical elements that contribute to organizational sustainability. However, the intangible assessment of BIs remains in the initial stage. It is also unclear how indicators for measuring intangible assessment may be identified. Therefore, practitioners and BIs may not know how to apply intangible indicators to their assessment. In light of the performance measurement system's underexplored status, we suggest that it presents a good opportunity to contribute more knowledge, focusing on intangible assets in the BI context. A study of this nature may be expected to convey clearer indicators for each construct, such as human capital, structural capital, and relational capital, in addition to considering the different characteristics of each stage to determine the most suitable assessment method. Practitioners may then apply these indicators to evaluate overall activities for long-term operations and competitiveness in the market, highlighting the role played by BIs' stakeholders and how they might participate or support the program in the long term [4]. Clearer measurements of intangible indicators will likely lead to an increase in the studies that consider this aspect to be a CF for BIs' success. Consequently, BIs themselves may apply intangible indicators to measure their performance in long-term operations.

This RQ targets the summarization of both CFs and their sub-factors, which may be divided into tangible and intangible components. We have further categorized all factors into internal and external perspectives so that BIs could perceive both controllable and uncontrollable factors. Based on our findings, we recommend that practitioners focus on improving several internal and controllable activities so that they are more manageable for BIs [38]. However, external factors are more difficult to manage because they directly depend on the external stakeholders [33]. Regarding the external aspect, therefore, several broad areas for improvement are evident, especially for academics of topics such as the development and improvement of business incubation processes, systems, or policies. In conclusion, the findings and suggestions provided above would be beneficial for both academics and practitioners interested or involved in business incubation.

3.3. RQ2: How Do BIs Measure Their Performances?

Of the 74 studies, 44 were relevant to RQ2. As noted above, RQ1 shed light on the CFs in business incubations. Although RQ1 yielded significant findings with respect to BIs, the advantages of CFs remain largely limited to mainstream management. The measurement of BIs' performance, which is another critical aspect of business incubation management, was not considered or included as part of RQ1. Therefore, to cover this crucial aspect, RQ2 aims to identify a current performance measurement of BIs and especially their measures used in past literature. Intensive literature reviews revealed that several earlier studies have mentioned the measurement of BIs' performance. Each study used performance indicators that were either similar or dissimilar to other works depending on the study's scope and perspective. However, various studies have similarly classified the performance measurement of business incubation performance into six dimensions according to the classification implemented by Obaji et al. [54]. Therefore, to present all

performance measurements in similar terms, performance measurement categories and indicators that are not classified into groups or that are categorized in dissimilar manners, are rearranged in this study according to the performance dimensions following Obaji et al.'s classifications. Six performance measurement dimensions of business incubation and BIs are presented in Table 10. We categorized a group of performance indicators (PIs) extracted from reviewed studies following these six performance dimensions of BIs and present them as resource-based perspectives, which are tangible and intangible measures, in Tables 11 and 12, respectively. We have separated the tables into tangible and intangible performance. Tangible performance measurement has been categorized into financial assets, operating costs, and physical assets (e.g., [2,90]), whereas the consideration of intangible performance measurement is based on value-adding services in addition to financial and physical assets [2,13].

Table 10. Performance dimensions of business incubation.

No. *	Dimensions of BI Performance
1	Entry and exit criteria
2	Managerial skills
3	Service providing
4	Policy and structure
5	Social capital
6	Resources

* Number of articles referring to the particular dimension of BI performance.

Table 11. Measurement of tangible performance in reviewed studies.

Performance Dimensions	Performance		Category of Performance Indicator	No. of Articles *
	In	Ex		
Entry and exit criteria		✓	Tenants' exit [2,57,68,77,90–92]	7
Managerial skills	✓		Incubator profitability [68]	1
		✓	Growth of startups [2,7,22,24,33,42,54,57,67,70,74,82,89,91–94]	17
Service providing	✓		Financial support by incubators [2,42,54,75,77,90,95–99]	11
Policy and structure			-	-
Social capital			-	-
Resources	✓		Physical assets [2,4,42,54,70,93,95]	7
	✓		Financial resources [2,42,57,68,75,77,90,95–99]	12
Total	4	2		

* Number of articles referring to the particular dimension of BI performance.

Tables 11 and 12 show broad categories of PIs that follow the six major dimensions of BI performance that were applied or mentioned in the past studies. To explore and understand business incubation performance measurement in greater depth, we have also extracted PIs from the review process. Details of the PI categories and their references are presented below.

Table 12. Measurement of intangible performance in reviewed studies.

Performance Dimensions	Performance		Category of Performance Indicator	No. of Articles *
	In	Ex		
Entry and exit criteria		✓	Tenants' entry [2,54]	2
Managerial skills		✓	Innovation [34,62,67,82,89,98,100,101]	8
Service providing	✓		Differences from competitors [18,42,53,75,90]	5
	✓		Mentoring, consulting, and networking support [4,75,77,90,95]	5
		✓	Incubatees' satisfaction [2,4,7,8,53,82,90,91,95]	9
Policy and structure	✓		BI Governance [2,4,7,8,12,13,18,42,54,75,77,82,93,96]	14
		✓	Government policy [2,54,89,93]	4
Social capital	✓		Internal relation [4,7,8,53,56,71,73,77,78]	9
		✓	External relation [4,7,8,18,53,67,70,75,77,91,96,102,103]	13
		✓	Recognition [7,53,54,77,95,104]	6
		✓	Community impact [2,42,45,54,62,70,75,77,82,89,93,97,100]	13
Resources	✓		Staff capabilities and expertise of staffs [7,8,33,77,82,89,90,98]	8
Total	5	7		

* Number of articles referring to the particular dimension of BI performance.

3.3.1. Entry and Exit Criteria

This major dimension primarily measures new ventures' potential. It also considers different incubation stages—specifically, the entry and exit stages [13]. The entry and exit stage criteria are divided into tenants.

Tenant's Entry

This concerns BIs' requirements in selecting potential firms for entry into the program. BIs can generally predict tenants' business situations from the entry criteria. This provides business founders with their first opportunity to explain their ideas to BIs [47]. BIs establish criteria to determine firms' potential to make a profit and achieve their business goals [54]. These criteria can identify the best candidates in the BI process and predict BI teams' abilities to support tenants [90,91]. Stronger entry criteria will enable BIs to better support the firms [105]. Tenants' performance during the entry stage may be measured as follows:

- Assessing the innovativeness of candidates' projects, for example, the adoption of advanced technologies or participation in R&D [2,54].

Tenant's Exit

This evaluation method assesses tenants' success before they graduate from the BI program [34]. Exit criteria can also be used to evaluate BIs' success since BIs were established to support the growth of new business ventures and assist them in building networks [53]. Exit criteria for tenants' graduation typically include the following:

- Tenants' growth as evidenced by increased sales and jobs and increased adoption of technologies or R&D [57,77,90,92].
- Profitability, including return on investment (ROI), revenue generation, internal rate of return (IRR), the net present value (NPV), cost/benefit ratio, acquisition of equity capital, and seed money [57,68,90].
- Reduction in business operation costs, since tenants are supported by rental subsidies, subsidies for telecom/computer network access, and other subsidies during their time with BIs [2,77,90].

3.3.2. Managerial Skills

BIs' managerial skills are generally represented by the management team's proactive approach to providing high-quality outcomes [94]. Tenants' good performance is directly correlated with BIs' experience and efficiency. This is because good managerial skills can

help identify the practical support that is most relevant to tenants' requirements [91]. This aspect covers the tenants' abilities to evaluate their financial management and technology adaptation, which are both correlated with BIs' experience and functional skills [91]. This dimension also covers the flow of the overall management system [4,54]. Performance and management PIs may be classified into subgroups, which are presented in detail below.

Growth of Startups

Growth, as it pertains to startups, involves the companies' ability to survive and thrive through their own operations [2]. Business growth is an effective economic development tool. One major reason for this is that local businesses can enhance their potential for long-term operation. They will generate more local income, resulting in higher local tax revenue [2]. The following indicators from past studies may be said to represent startup growth.

- Enhanced client bases, firms' graduation from incubation programs, achieved targets, sustained operations, businesses' survival rates, and increased business profits [7,24,33,42,57,70,82,89,91–93].
- Business occupancy rates [2,42,54,89,91,92,94].
- Number of spin-off companies [2,22,42,67,74].
- Number of patents incubation activities [2,22,42,57,67,70,74,92].

Incubator Profitability

Profitability is a significant element of business incubation management that directly affects the continuity of BIs' and incubatees' operations and their market growth [21]. According to several related studies, clear measurement of BIs' profitability are mainly derived from the study of Sentana et al. [68], which can be seen as follows:

- The total revenues exceed the expenses.
- Return on investment (or social return on investment).

Innovation

Innovation in the BI context is perceived as a high technology use by startup companies, which leads to economic development [67]. This can be measured using the following indicators:

- Technology transfer or R&D contribute to new products or services [34,67,89,101].
- Commercialization of new products or services which come from R&D [34,67,89,101].
- Numbers of potential innovative enterprises creation [34,82].
- Innovation and entrepreneurship funds [34,67,82,89,101].
- Percentage of R&D in the regional gross domestic product (GERD) [62,98,100].

3.3.3. Service Providing

Apart from measuring financial support, service provision is seen as a form of value creation that incubators offer to their tenants for the businesses' development or improvement [4]. The measurement of service provision can help identify the quality and diversity of services that tenants receive in accordance with their needs [90]. Measurement of services is categorized as follows:

Mentoring, Consulting, and Training Support for Tenants

Generally, the learning curve that incubated firms experience may be shortened via mentoring, consultation, and training in how to cope with challenges [8]. Mentoring and consultation include one-to-one support from mentors, which is normally provided free of charge to enhance understanding in both scientific and managerial expertise [8]. The perception of business mentoring relates to the incubatees' value creation needs. This is reflected in interventions in venture creation [106]. Meanwhile, training includes BIs' networking activities conducted with the aim of engaging in exchange with external agents,

transferring knowledge, or gaining access to new and inaccessible resources [8,33]. Previous studies have mentioned the following indicators:

- Proportion of in-house and external consultations provided to tenants [77,95].
- Total number of consultancies, measured as events and/or hours, per individual resident [90].
- Number of follow-up questions raised during consultations [4].
- The provision of intense and proactive counseling services to tenants, which may result in the development of new ideas or the improvement of existing products and services [4,75,77].

Financial Support by Incubators

Financial support is a tangible factor in monetary terms [17]. It is critical in strengthening the business environment and infrastructure [69]. The criteria used to measure financial support are universally applied and include the following:

- Availability of seed capital [54].
- Ability to provide grants and loans from the government to incubatees [54].
- Linkages to financial capital [2,42,75,77,90,95–99].

Incubatees' Satisfaction and Review

Incubatees' satisfaction is reflected in their feedback on the services provided by BIs [59] and reflects the quality of both services and consultancies [90]. Tenants are allowed to rank the most valuable aspect of the incubation facilities in the following areas:

- Evaluation of tenants' needs in relation to the product, services, relationship, or images that they received after joining the incubation program [2,7,82,90,91,95].
- Satisfaction with resources provided [53,82,90,91].
- Satisfaction with individual or group meetings [4].
- Satisfaction with staff expertise as experienced in knowledge sharing activities [4,8].

Differences from Competitors

This concerns the services provided by BIs that distinguish them from competitors. BIs may ensure competitive advantages when they can provide special services [75]. Measures relating to the different services include the following:

- New product creation from new projects [75].
- Ability to provide scarce resources that can be measured based on knowledge or resource exchanges among firms [53].
- Results in the attraction of investment as evidenced by the number of funders from public, private, or non-profit sectors [42,53,75,90].
- Benchmarking with other incubators in terms of network size (total connections), occupancy rates, number of inquiries turned into tenants per year, average capital investment costs, percentage of managers' time spent advising clients, and number of business plans (yearly average) to define the best player and represent BIs' service attractions [18,42].

3.3.4. Policy and Structure

This part is referred to the formulation or proposition which could determine resources allocation and planning process [13,68]. This study is divided into incubator governance and government policy.

BI Governance

BI governance refers to the importance of the BI's structure with respect to planning, human capital, the advisory board, and BIs' activities to support incubated firms for their business growth [13,54]. Furthermore, this aims to ensure that the available staff expertise

is properly used to support the practices implemented by BIs and tenants [7]. This aspect may be measured as follows:

- Years of experience as incubator manager [7,12,13,54].
- Data record of feedback provided to the board of management team [7,54].
- Proportion of staff who have completed a bachelor's degree relative to the total staff; staff with more than three years' experience in the relevant business area [13].
- Performance monitoring criteria, which may be measured by incubator occupancy rates, the turnover rate of tenants, and the number of companies graduating from BIs [13,54].
- Number of full-time employees in an incubator, as it seems reasonable to assume the availability of more staff to serve resident entrepreneurs [96].
- Number of staff who have undergone training [13,75,77].
- Total training expenditure per staff member [13].
- Staff participation in events and learning activities [4,77].
- Ratio of staff to tenants [2,42,93].
- Time taken to establish the business [18,42].
- Network planning measured by the number of networking activities in which incubatees have participated [2,8,42,82].

Government Policy

This is the government's role in supporting BIs [54]. The government policy implemented depends on the incubator's characteristics, including public-sponsored, non-profit-sponsored, university incubators, or private incubators. [2]. The government typically plays an important role in financial support and tries to indicate and set the achievements of BIs [54]. Government policy relating to BIs may be measured as follows:

- Number of BIs in regional locations [2,54,89,93].
- Government commitment funding [54,89].
- Emergence of new high-quality businesses [2,54,89,93].

3.3.5. Social Capital

Social capital may be approached from diverse perspectives. This study defined it as a network relation that supports businesses and the relation of entrepreneurship in the region [53,54]. Details of its measurement may be explained as follows:

External Relationships

External relationships include the relationships between BIs and other organizations, such as universities or the government [8]. External relationships can help entrepreneurs join professional networks [82]; transfer intangible assets, such as information and knowledge [12,47]; and open new funding opportunities for incubated firms [37]. The results of external relationships may be measured in terms of the following indicators:

- Continued support from major stakeholders, including universities, financers, and governmental institutions, as represented by building laboratories, signing training agreements, seed funding, and the commercialization of technology [4,7,8,18,67,75,77,91].
- Professional services—that is, the number of external experts who support incubated firms, such as consulting companies, law firms, and accounting firms [4,7,8,53,77].
- Technological development as an outcome of the collaboration, as evidenced by numbers of patents and scientific publications [8,53,67,77,102].
- Licensing from strategic alliance [8,96,102,103].
- Mobility of research personnel to collaborate with industries [8,67].
- Availability of knowledge to new ventures, as evidenced by several collaborations with research institutions and spin-off companies [67,77,96].
- Benefits that incubated firms obtain from networking, including greater access to clients, suppliers, or investors [70].

Internal Relationships

This concerns the relationship between incubators and incubatees and the relationships among incubatees themselves [8]. Good internal relationships are positively correlated with knowledge sharing, which affects BIs' capacity for resource acquisition [58,59]. They can be measured in the following areas.

- Trust, as evidenced by engagement in social exchange and the formation of new alliances among actors [8,53,56,71,73,78].
- Incubator referral and shared recognition and symbolism [8].
- Number of participants in counseling and networking interaction [4,7,8,77].
- Knowledge exchange and internalization [8].

Recognition

Recognition concerns other peoples' feelings about the BI program [53]. Good perceptions of the BI program lead to increased recognition, which may enhance opportunities to obtain and exchange resources [36]. Generally, external parties' perceptions can be measured based on the following indicators:

- Numerical statistics pertaining to incubated firms' engagement in networking events [7,53].
- Number of tenants in the BI's program each year [104].
- Referrals of BIs or affiliation of incubators in the region [54,77,95].

Community Impact

This is the impact on the BI's ecosystem that occurs as a result of business operations [52] and the community's engagement beyond the organization's boundary [46]. Business ecosystems are now a popular concept since they represent an attempt to create an environment that can help new ventures attain success through cooperation among various stakeholders, such as new ventures with small, medium, and large enterprises [52]. The consideration of community impact, which involves local interaction, is a key aspect of BIs' performance [13,70,75]. This is because knowledge derived through relationships with various stakeholders in the community reflects economy and society [13,75]. Community impact is considered by the following indicators:

- Skilled laborers created to community [38,42,45,54,70,77,93,97].
- Supporting network via the number of partnerships between tenants and other technology firms [45,75,77,97].
- Numbers of new companies created and jobs generated and the extent of unemployment reduction [2,42,45,54,62,70,75,77,82,89,93,97].
- The return of failed entrepreneurs with new projects [82].
- National business closure rate [100].

3.3.6. Resources

Resources comprise the stocks of tangible and intangible assets [45] that BIs provide to their tenants [90]. These may be used for the BI's process and strategic development [90]. Both the tangible and intangible assets that BIs provide to tenants can help identify value added to firms for enhancing company visibility and credibility [33,35]. In the BI context, resources may be measured as follows.

Financial Resources

BIs' financial resources are generally derived from capital investment, bank loans, or government support [12,66]. Adequate financial resources can provide continuous activities with the aim of supporting tenants [37]. Financial status is typically measured based on the following indicators:

- Cost of BI activities, calculated based on expenditure from rental subsidies or access to the network [42,77].

- The rate at which funding from VC, bank loans, or other funding sources is accessed [2,42,75,77,90,95–99].
- Profits such as ROI, revenue generation, IRR, etc. of new projects that the BI has invested in [57,68].

Physical Assets

Physical assets are the resources that BIs own as tangible services provided to tenants [54,90]. This is a basic requirement that influences businesses' desirable outcomes [91]. Generally, the availability of physical assets is measured based on the following:

- Physical spaces for tenants, sharing of workshop facilities, and sharing of laboratories or equipment that tenants can use during their time in the incubation program [2,4,54,93,95].
- Adequate working and sharing spaces compared with occupancy rate [42,70].

Staff Capabilities and Expertise

Staff capabilities concern the ability to implement good practice and deliver knowledge to achieve individual and organizational goals [60]. Staff members offer their qualified knowledge and skills to support tenants [33], and this constitutes the BI's internal value, since each staff member will have their own characteristics. The following indicators may be applied to measure BIs' staff expertise:

- Number of training activities and events and conference attendance rates [77,90].
- Measurement of growth in expertise, advisors' multi-skills, and innovation creation from staff members, as evidenced by product development and prototypes from R&D that may be commercialized [7,8,33,82,89,98].

All the information provided above explains the categories and indicators used to measure BIs' performance. We have assembled these to provide an overview of current performance measurement. To obtain more in-depth information and identify potential improvement opportunities, we analyze data and information in the sub-section that follows.

This section will discuss measurement in relation to BIs to provide an overview of the measurements currently used in studies of incubators' performance. This section will be useful for both academic researchers and incubators themselves in the application of specific points that are relevant to their own interests.

Figure 4 clearly shows that most relevant articles focused on the dimension of social capital followed by the dimension of managerial skills, whereas the least commonly mentioned category was tenants' entry and exit.

First, the measurement of social capital depends primarily on external relationships and community impacts (e.g., [7,70]), since these aspects are significantly related to the exchange of resources for both tangible and intangible assets via networking activities (e.g., [7,52]), particularly physical infrastructure, finance, or talents that are recognized as fundamental to business ecosystems [107]. From the findings, we also realize that external experts have taken a major role in assisting businesses or incubatees [96]. Therefore, in our perspective, the performance measurement of the ability to access external experts is necessary for supporting the businesses. Another mainly measured performance in this dimension is community impact. Generally, scholars considered the impact to the community as being surrounded by a supportive environment for business operation [52]. Hence, it is directly linked to exchanging resources with other parties such as public or private sectors [53]. Therefore, from this finding, we have seen it is important to take consideration and measurement on stakeholders' engagement since the supportive business ecosystem within the community could consequently contribute to economic growth [75]. Therefore, recent studies of BIs have emphasized the measurement of relationships. This is relevant to the latest generation of BIs, which has realized the value of building networks with business partners [96].

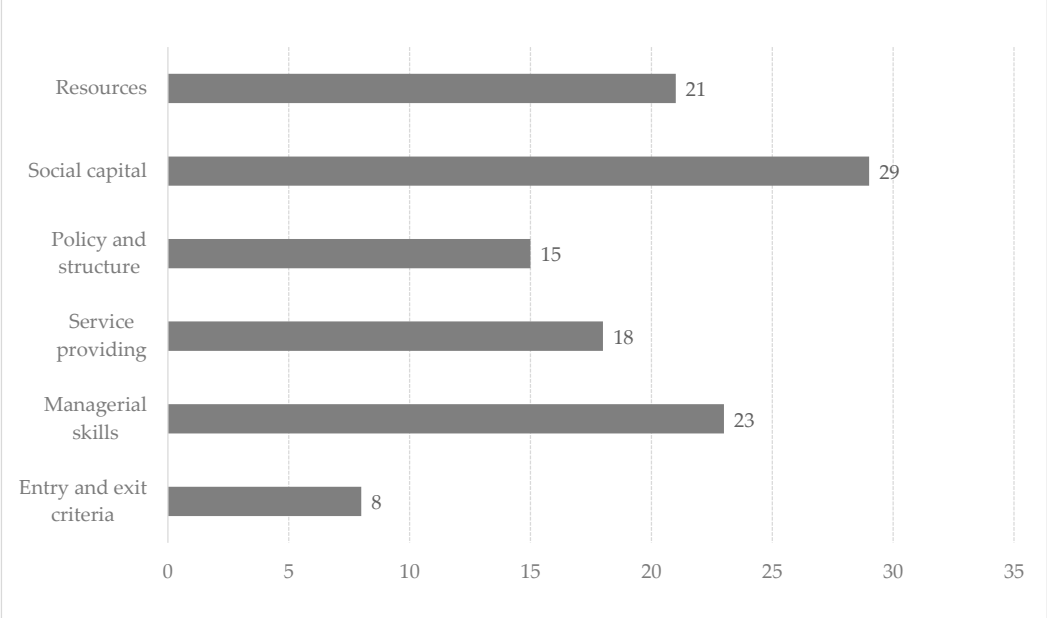

Figure 4. Frequencies of measurement found in articles.

Apart from social capital, the second most frequently mentioned dimension is managerial skills. Most PIs are classified as tangible assessments (e.g., [7,70,89]). The focus on tangible measurement is similar across most businesses or industries (e.g., [7,68]). Nevertheless, apart from financial assessment, several studies have gradually emphasized the measurement of intangible assets, primarily in relation to innovation (e.g., [67]). Innovation is recognized as required performance for startup businesses [91,96]. It is thus important to consider innovation along with technology adaptation, which is a measurement indicator of BIs' managerial skills [91]. They must deliver innovative firms to achieve the objective of incubating activities [21]. One of the most widely applied PIs of BIs relating to innovation is the number of funds received from investors interested in firms' innovation (e.g., [67,82]). This finding highlights the significance of innovation development. Therefore, BIs should provide resources and systems that support their tenants to innovate. Moreover, BIs should use proper indicators that can support them in continuously tracking and monitoring the successes of incubated companies. Nevertheless, hitherto, all innovation-based indicators still focus exclusively either on the first inputs (e.g., amount of innovation funds) or final outputs (e.g., number of innovative products) of innovation, whereas indicators relating to performance tracking and innovation success levels are lacking. This gap suggests that it may be beneficial for companies and BIs to identify PIs that can track the level of readiness of innovation commercialization to the market.

Aside from this, the indicators of innovation vary across different studies. Similar to other businesses, BIs tend to implement only the traditional indicator of innovation in relation to product development (e.g., [89]) while overlooking other innovative PIs. This may indicate an opportunity for researchers to expand studies of BIs' innovation performance to other areas or dimensions such as service innovation, since innovation of this nature also brings advantages that add value to BIs [4]. We have also seen an opportunity to place greater emphasis on the measurement of innovation on the part of different actors, such as universities and research institutions, or researcher mobility, because each actor provides different interactions with BIs [67], for example, emphasizing spin-off companies from academic institutions or transferring technology from R&D institutions [67]. Consequently, emphasizing the measurement of innovation from each actor could build an effective innovation system [67].

On the other hand, the entry and exit of tenants are the least mentioned or studied dimensions. From our review, we realize that this dimension directly depends on another low attended dimension, policy, and structure. Fundamentally, BIs must recruit entrepreneurs

into incubation programs and then report revenues and other PIs of incubatees to the funders following their agreements [54,90]. Therefore, entry and exit criteria are generally based on government strategies, and the government's policies consequently influence the management and measurement of the BI's program [54]. Therefore, incubators' success generally depends on governmental targets, and tangible achievements are generally mainstream requirements for governments and policy makers [54]. Generally, BIs are directly associated with science parks, since both types of organization play major roles in supporting the development and transfer of technology [42]. Therefore, science parks and BIs are key policy instruments that governments can use to support entrepreneurship [55]. Therefore, in past works, the performance criteria of the lowest focused dimension are quite specific and largely dependent on tangible performance. However, a small number of existing studies mentioned intangible measurement without clear performance criteria (e.g., [34,82]). Owing to the general neglect of this dimension and its indistinct intangible measurement, therefore, we recommend that more studies examine this underexplored dimension and consider clearer PIs.

Although intangible measurement was largely underexplored in some performance dimensions, several intangible performance dimensions were more thoroughly examined by most past studies. This concentration can perceive from the number of their adoptions or mentions presented in Table 13. The focus of this analysis differs from that of the major performance dimensions mentioned above. This table provides sub-dimensions of performance divided into two perspectives: in-depth information on the (1) tangible and intangible categories as well as (2) internal and external performance are provided in Table 13. The data from Table 13 are further summarized and visualized in Figure 5.

Table 13. Number of articles classified by sub-dimensions of BI performance.

Performance Dimensions	No. of Articles					
	Tangible Performance			Intangible Performance		
	Internal	External	Total	Internal	External	Total
Entry and exit criteria	0	7	7	0	2	2
Managerial skills	1	17	18	0	8	8
Service providing	11	0	11	8	9	17
Policy and structure	0	0	0	14	4	18
Social capital	0	0	0	9	25	34
Resources	16	0	16	8	0	8
Total	28	24	52	39	48	87

Figure 5 demonstrates that the measurement of intangible performance received greater attention from scholars, reflecting earlier findings (e.g., [2,8]). Although tangible measurements provide clear and direct indicators for measuring BIs' ultimate success, intangible assessment representing organizations' hidden values has begun to attract more attention (e.g., [8,13]). The social capital dimension is outstanding in terms of the number of interests relating to the intangible sub-dimensions. This finding emphasizes value added as a result of networking, which is relevant to objectives of the latest generation of BIs [22]. This finding suggests that most scholars have recognized the importance of social capital in supporting business sustainability. We have further realized that most studies have endorsed the community as a supportive environment (e.g., [52]). Therefore, in our opinion, which is also supported by earlier findings (e.g., [8,91]), we believe that social capital would become a crucial part of BIs' performance. This is also considered a good approach for BIs to focus on and measure the external relationships and resources, particularly funding and knowledge sharing [12]. This finding is also consistent with our discussion relating to the previous RQ.

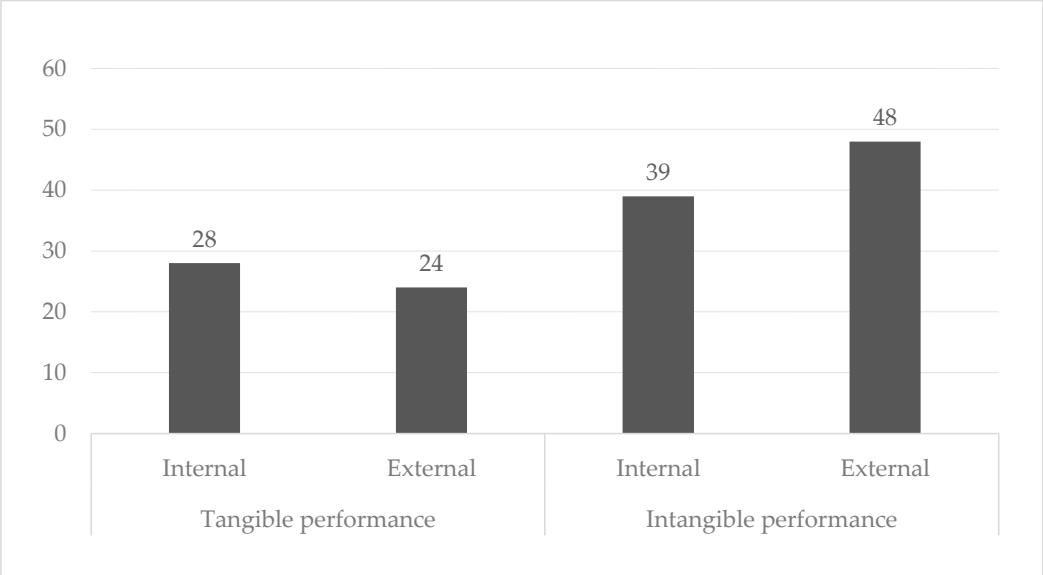

Figure 5. Summarize of articles with sub-dimensions of BI performance.

From another perspective, Figure 5 also demonstrated that external performance is the most widely examined performance. We found that earlier studies' focus on external performance resulted mainly from the demand for key resources from external parties, such as skills and knowledge, supplier systems, or funding sources (e.g., [96]). Moreover, to foster significant growth in the incubatees, external stakeholders are identified as the critical part of business incubation [96]. Several studies emphasized the measurement of external relationships (e.g., [67,91]), and one of the key suggestions to emerge from our review relates to the exchange of external resources (e.g., [8,33]). Moreover, to better achieve the goals of both BIs and incubatees, we recommend that incubators monitor and measure their tenants' financial support (e.g., [42,75]). Progress tracking and fund acquisition would help BIs to promptly support incubatees in securing financial support from investors.

Aside from the analytical dimensions and sub-dimensions mentioned above, we further deeply analyze data related to the application of PIs. Similar to the findings presented in Figure 4 pertaining to tangible measurement, most PIs of BIs are classified under managerial skills, and most of the articles (17 papers) similarly focused on one specific indicator: startup growth. Moreover, most of these articles (11 papers) agreed that increased clients, sales, and business profits are appropriately used to represent business growth (e.g., [7,89]). Another widely applied indicator in this dimension—the number of patents—was mentioned by eight related articles because patents are now recognized as critical intellectual assets of organizations [2], and businesses can scale up their business from the IC that they own. These two well-attested KPIs directly represent the achievements of businesses and of incubation programs. In light of their importance and popularity, we suggest that these two KPIs should be included in the performance measurement, not only to assess BIs' performance but also to further benchmark the BIs' performance for future improvement.

As mentioned above in relation to funders' and regulators' regulations, one tangible indicator that can provide clear measurement and represent the direct successes of BIs' operations has been used for many years. Nowadays, however, intangible measurement has received more attention than traditional, tangible measurement. The findings presented in Table 13 indicate that social capital is the most frequently mentioned or applied performance assessment aspect in the reviewed articles. This dimension also received the most attention in the assessment of intangible performance. A total of 34 articles mentioned or used this performance dimension, and approximately 70% (25 papers) used social capital-related indicators to measure BIs' external performance. The measurement of external social capital can be divided into community impact, external relations, and external recognition. Of

these, community impact and external relations are the most frequently mentioned and measured PIs (13 papers). Regarding external relations, most scholars focused on the measurement of continuous support from major stakeholders (e.g., [4,77]). However, most of the studies related to external relationships still focused on general relationships without examining specific partners. On this basis, we recommend that future work measure and analyze specific relational strategies, similar to suggestions offered by past studies [53]. For community impact, scholars mostly applied indicators that measure contributions to or impacts on the community, such as the number of companies created (e.g., [70,89]) and the employment rate in community (e.g., [45,70]). The efficient management of the community from BIs' operations directly enhances social capital and, at the same time, positively affects economic wealth [70]. Community impact also supports the businesses themselves, since they can exploit opportunities from resource exchange and operate businesses in the supportive environment (e.g., [70,96]). Therefore, economics is directly supported by tangible management and indirectly assisted by intangible aspects or social capital. From this finding, it could be realized that current management and measurement of BIs' performance could comprehensively handle most parts of sustainability. Nevertheless, the review results indicate that one dimension of sustainability—environment—is still neglected in performance measurement. It is thus recommended that, to enhance BIs' sustainability, indicators of BIs relating to environmental performance should be developed and applied.

Another major performance dimension that focuses on the measurement of BIs' intangible assets is the policy and structure dimension. Most articles (14 papers) focus on internal performance, which relates to BI governance. Analysis of the data from the reviewed articles clarified that this dimension is largely regarded as measuring internal structure within organizations, since it could represent the overall flow of BI management [54], such as staff members' roles and responsibilities [13] or capability building for staff [77]. Regarding the dependence on employee capabilities, we suggest that BIs should focus on the investment of human capital. This could support the increase in staff members' abilities to design the BI program structure [11]. Consequently, the BI programs would be well-regarded and attractive to future candidates [53].

Entry and exit criteria were the least explored dimensions, and the intangible performance aspect of this dimension was particularly neglected by most scholars. Nevertheless, similar to other highly studied dimensions, this performance dimension was also recognized as important and directly representative of the potential benefits that BIs could provide to tenants [47]. The neglect of selection criteria could thus impact poorly defined exit criteria [108]. Entry criteria could predict the potential growth of the business during the incubation program [105], whereas exit criteria could show the BIs' achievement in relation to the support of business growth [53]. The lack of scholarly attention to this dimension and findings reported in earlier studies indicate that BIs should afford greater consideration to the measurement of business benefits that contribute to the community as part of tenants' exit criteria. This may present an opportunity for business partnership or investment after graduation from the BI program [45,77]. Considering the potential contributions from businesses to the community as input for BI programs is necessary since BIs can predict the nature of relationships between businesses and communities [52]. Innovation is also identified as a critical aspect that supports another major performance dimension—entry and exit criteria, particularly the former [2,54]. However, Table 13 indicates that only two articles mentioned and focused on the performance of entry-related activities, and its measurement indicators remain unclear [2,54]. Nevertheless, all mentions of performances in this dimension in earlier studies related to innovation and R&D, which emphasizes the significance of innovation for this major performance dimension. In light of earlier studies' meager attention to the measurement of innovation in entry-related activities and its significance for the improvement of BIs' performance, we recommend increased development of clear PIs and enhanced implementation of measurement in this area, because unclear innovation indicators for both entry and exit criteria may pose chal-

lenges to innovative supporting activities during BI programs [23], and BIs will also lack direction to support business as well as professional, scientific, and technical activities [68]. Our suggestion is expected to support BIs to better recruit potential firms into the program and deliver future innovative outcomes to attract investors [89,101].

Aside from the RQ, upon analyzing BIs' performance measurement and indicators thereof, we realized that most studies applied the management methods or frameworks to support their assessment of BIs' performance. Surprisingly, only three management concepts were applied to manage and measure BIs' performances, including the RBV, balanced scorecard (BSC), and IC. Moreover, all these concepts could better support the BIs in measuring intangible assets.

According to Table 14, a similar number of articles lack management methods and adopt an RBV perspective (21 and 19 articles, respectively). In this review, we classified works that applied an RBV based on the definition of tangible and intangible resources within BIs, which could be used to supporting tenants' growth, including human resources, technological resources, financial resources, and organizational resources [12,45]. Therefore, some works that we have reviewed did not directly mention RBV explanations. However, we classified these as RBV perspectives in light of their relevance to the definition. Meanwhile, articles that emphasized external relations were excluded from the RBV perspective (e.g., [53,71]).

Table 14. Comparison articles with management methods.

	No. of Articles	Percent of Articles		
		Tangible	Intangible	Both
Without management method	19	26.32	63.16	10.53
RBV	21	14.29	14.29	71.43
BSC	2	0	0	100
IC	2	0	100	0

Literature without management methods focuses primarily on intangible measurement, particularly in external relations and community impact (e.g., [53,70]). This may be because the measurement of the latest generation of BIs relies significantly on external relations and the support of the BI's ecosystem [42]. Meanwhile, articles that adopted the RBV perspective mostly considered tangible and intangible measurement. Most RBV works mentioned the measurement of financial resources within an organization (e.g., [57,77]). Financial resources can ensure the continuation of activities aimed at supporting tenants [37]. Apart from this, BI governance has also been the subject of scholarly attention (e.g., [7,12]). We have seen that BI governance relies on the capacity of resources within an organization to assist planning programs, particularly human abilities [7]. It is true that financial resources are essential for BIs' performance. However, intangible assets could not be neglected, particularly when the human capital perspective is emphasized [11]. Human capital is recognized as one of the most important aspects of BIs' performance [84]. However, studies that emphasize BIs' human capital BIs remain limited [11,84]. We recommend that researchers develop indicators for measuring human capital to support the development of BI performance.

Few articles have focused specifically on BSC and IC methods (2 articles found in each method). Articles using BSC emphasized both tangible and intangible measurement [4,82]. Aside from the financial perspective, studies incorporating BSC have indicated that incubators' internal business processes should be addressed rather than merely considering traditional financial measurement to support strategic objectives [4]. The existing BSC literature, however, lacks multi-stakeholder evaluation [4,82] while emphasizing the incubatees' perspective, particularly their satisfaction. Researchers, therefore, can analyze the BI ecosystem in depth by applying the BSC concept [4]. Meanwhile, articles incorporating IC may focus on intangible assets. This is because IC components consider various intangible

assets that might contribute to competitiveness performance [8,13]. This method, from our perspective, has provided a broader perspective on BI performance. Studies incorporating IC could fill the abovementioned literature gap since human capital, which is an aspect of the IC component, has been considered for the measurement. However, IC studies are merely within the conceptual framework (e.g., [8,13]). This might be because the IC concept is novel in the BI context. Researchers thus have plenty of opportunities to further consider IC's implications in the BI context by combining categories from our studies as an initial step.

This finding aligns with the numerous reviewed studies relating to intangible factors and measurement of non-financial performance. Studies applying these methods can be classified into two groups: (1) those in which the methods are intentionally used to support the consideration of intangible measurement, and (2) those in which the measurement of intangible assets is unexpectedly carried out following the procedures of the methods in question. This finding highlights the advantages of these business management concepts for BIs, since they can directly support BIs or scholars in measuring the intangible performance of business incubation activities, which is identified as a crucial aspect of BIs. However, despite attempts to use these methods to measure BIs' performance, existing studies lack intentional application of management concepts to measure intangible assets. Existing studies that employ management concepts, moreover, still require further analysis of stakeholder relationships. We have found that articles without management methods did not cover all dimensions of intangible assessment. They merely considered the specific tasks that emphasized social capital [53]. Therefore, an emphasis on covering all aspects of intangible assessment, including the IC dimension, is crucial for further studies.

To summarize, social capital has attracted most scholars' attention. It is also one of the most noteworthy topics relating to CFs in the previous RQ. This is consistent with the objectives of BIs in the latest generation, which refer to stimulating the role of networking for accessing external resources [42]. Although entry and exit criteria are the least frequently mentioned aspects of performance measurement, they remain crucial for BIs' success [47]. We also provide details on the measurement of sub-factors in each dimension. Consequently, we have offered suggestions for academic researchers and highlighted implications for BIs themselves. Our study, furthermore, may offer a guideline for the development of intangible indicators for measurement, particularly the emphasis on resource-based inside organization. Consequently, the organization will have the direction to develop its value [12].

4. Conclusions

This study applied an SLR to examine business incubation. The SCOPUS database was used to find studies relevant to our two RQs. We summarized 47 articles for RQ1 and 44 articles for discussion in RQ2.

The study responded to each RQ using the same structure, with tables representing the perspectives of (1) internal and external and (2) tangible and intangible categories.

The first RQ was 'What are the critical factors for BIs?'. This research question aims to identify the CFs that can enhance or delay BIs' performance. Ten CFs that were individually explored as enabling and challenging views. Most scholars have focused on financial resources (CF06), since these tangible resources can clearly indicate BIs' success, particularly regarding the continued support of activities. We have suggested that financial resources could be linked with BIs' budgeting strategies to ensure adequate financial resources. Interestingly, aside from financial resources, networking and marketing factors—considered non-financial CFs—were mentioned by most scholars. Networking could support BIs for resource exchanges with external parties. Meanwhile, marketing factors can reduce the businesses' market failure. Based on these findings, we suggest that knowledge sharing is essential for emphasizing networking activities and transferring know-how among businesses.

Knowledge sharing (CF02) and performance measurement systems (CF08) were the least frequently mentioned CFs. We have seen that knowledge sharing may be influenced by networking. Therefore, some scholars may consider CF to be an aspect of networking. We thus suggested that the creation of mutual trust could increase this factor's significance. For measurement systems, the intangible assessment was mentioned in a few studies. The findings provide researchers with opportunities to further explore the measurement of intangible assets, particularly human capital, which is a critical aspect of BIs' performance. This could lead to implications for BIs.

The findings from RQ1 also indicated that tangible sub-factors are highly linked with BIs' external activities because external parties are significantly associated with funding sources. BIs should thus have proper management for dealing with external parties, especially for acquiring funding. On the other hand, intangible sub-factors are mostly related to internal activities, since intangible sub-factors mainly refer to resources within the organization such as BIs staff or incubation services.

For the second research question, the author asked, 'How do business incubators measure their performances?'. This research question aims to identify the current evaluations of BIs and to find criteria for goal achievement. The most frequently mentioned CF is social capital, which emphasizes external relations and community impact. These measurements could explain BIs' ability to access external resources and the supportive environment in which the businesses can exchange resources with other parties, such as the public or private sectors. Meanwhile, tenants' entry and exit and policy and structure were mentioned least frequently. Entry and exit criteria are generally based on government policy, which, in turn, influences the planning of the BI program. It may be difficult to suggest or determine criteria from the government. Therefore, we recommend that BIs strengthen their policy by considering critical indicators with entry and exit criteria, such as the potential impact on the community and more precise innovation indicators for identifying a strategic direction for incubating businesses.

We also found in RQ2 that intangible performance received more attention from scholars. Therefore, we recommended that BIs focus on relationships as a means of accessing resources. External performance, moreover, was frequently mentioned, perhaps because performance development, particularly innovation, relies heavily on key resources from external parties, such as skills and knowledge, supply systems, or funding sources. Thus, we recommend that BIs support their tenants in attracting investors.

Regarding tangible measurement, most articles focused on the dimension of managerial skills with the sub-dimension of startup growth, which may be the criteria for benchmarking. Meanwhile, numerous scholars have recognized intangible assessment for managerial skills, which is the measurement of innovation. We thus recommend that BIs consider tracking innovation levels during the BI process, aside from merely inputs or outputs of their performance. Different actors should consider innovation performance to create an effective innovation system. BIs should also consider clearer innovation for entry and exit criteria.

Aside from this, we found that few scholars considered management methods—particularly BSC and IC—for performance measurement. However, those management methods are essential for BIs' core competence. Therefore, there are plenty of areas in which researchers might give greater consideration to the implications for IC and BSC in the BI context.

The analysis of this study provides scholars with guidelines for future studies and BIs themselves for implementation. For example, the findings tend to emphasize intangible factors, which represent the organization's hidden value. This paper, however, has assembled the literature on BIs in several contexts and identified research gaps for future studies. However, this study was not without its limitations. First, the study presents an overview of previous BI studies. It did not specifically mention any incubator types. It is thus necessary to consider incubator types, stages, and contexts when designing BI programs because each characteristic favors different points of focus—for example, designing strategies for

different funding sources for for-profit and non-profit BIs. The level of government role also differs across specific contexts, such as developed and developing countries. Some countries may require basic facilities for their tenants before moving to value addition (i.e., intangible resources). Second, some papers were inaccessible, which may have limited the study's findings. Finally, in this study, we utilized only the Scopus database, which may have caused us to miss some papers relevant to the BI context that may have been available from other databases, such as the Web of Science (WoS). However, we believe that readers can select key aspects as well as findings of this literature review and apply them to specific incubation programs, particularly the development of BIs' hidden value. Regarding future opportunities for improvement, we envisage considerable challenges to the study of critical factors and performance indicators of specific BI types (e.g., university BIs, private BIs, etc.). As mentioned above, profit and non-profit BIs use different models. Various factors might affect each type differently in terms of advantages or impact levels. Moreover, different BIs may require different sets of indicators depending on their characteristics and goals. Finally, to better understand the relationships and patterns that are at play in this area, VOS viewer software should be utilized to conduct a bibliometric analysis in future research.

Author Contributions: Conceptualization, P.P., T.A., B.P. and R.W.; methodology, P.P., T.A., B.P. and R.W.; validation, P.P., T.A., B.P. and R.W.; formal analysis, P.P. and R.W.; investigation, P.P. and R.W.; resources, P.P. and R.W.; data curation, P.P. and R.W.; writing—original draft preparation, P.P., T.A., B.P. and R.W.; writing—review and editing, P.P., B.P. and R.W.; visualization, P.P. and R.W.; supervision, T.A., B.P. and R.W.; project administration, P.P. and R.W.; funding acquisition, R.W. All authors have read and agreed to the published version of the manuscript.

Funding: This research is funded by the National Research Council of Thailand (NRCT) under grant number: N41A640087 (The Middle Age Researcher Genius Scholarship) and Chiang Mai University.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Soltanifar, E.; Keramati, A.; Moshki, R. An innovative model of business management in knowledge-based organisations: The case of the business incubators. *Int. J. Bus. Innov. Res.* **2012**, *6*, 573–596. [CrossRef]
2. Hausberg, J.P.; Korreck, S. Business incubators and accelerators: A co-citation analysis-based, systematic literature review. *J. Technol. Transf.* **2020**, *45*, 151–176. [CrossRef]
3. Vedel, B.; Gabarret, I. The role of trust as mediator between contract, information and knowledge within business incubators. *Int. J. Entrep. Small Bus.* **2014**, *23*, 509–527. [CrossRef]
4. Vanderstraeten, J.; Matthyssens, P.; Van Witteloostuijn, A. Toward a balanced framework to evaluate and improve the internal functioning of non-profit economic development business incubators. A study in Belgium. *Int. J. Entrep. Small Bus.* **2014**, *23*, 478–508. [CrossRef]
5. Iyortsuun, A.S. An empirical analysis of the effect of business incubation process on firm performance in Nigeria. *J. Small Bus. Entrep.* **2017**, *29*, 433–459. [CrossRef]
6. Kuryan, N.; Khan, M.S.; Gustafsson, V. Born globals and business incubators: A case analysis. *Int. J. Organ. Anal.* **2018**, *26*, 490–517. [CrossRef]
7. Voisey, P.; Gornall, L.; Jones, P.; Thomas, B. The measurement of success in a business incubation project. *J. Small Bus. Enterp. Dev.* **2006**, *13*, 454–468. [CrossRef]
8. Indiran, L.; Khalifah, Z.; Ismail, K. A model for intellectual capital of business incubators. *Adv. Sci. Lett.* **2017**, *23*, 8450–8457. [CrossRef]
9. Chandra, A.; Fealey, T. Business incubation in the united states, china and brazil: A comparison of role of government, incubator funding and financial services. *Int. J. Entrep.* **2009**, *13*, 67–86.
10. Romanovich, L.G.; Evtushenko, E.I.; Romanovich, M.A.; Kudinov, D.V. Innovation activity and business incubators based on institution of higher education-the experience of Russia. *J. Appl. Eng. Sci.* **2015**, *13*, 161–166. [CrossRef]
11. Bakkali, C.; Messeghem, K.; Sammut, S. Toward a typology of incubators based on HRM. *J. Innov. Entrep.* **2014**, *3*, 3. [CrossRef]
12. Somsuk, N.; Wonglimpiyarat, J.; Laosirihongthong, T. Technology business incubators and industrial development: Resource-based view. *Ind. Manag. Data Syst.* **2012**, *112*, 245–267. [CrossRef]

13. Calza, F.; Dezi, L.; Schiavone, F.; Simoni, M. The intellectual capital of business incubators. *J. Intellect. Cap.* **2014**, *15*, 597–610. [CrossRef]
14. Şchiopu, A.F.; Vasile, D.C.; Ţuclea, C.E. Principles and best practices in successful tourism business incubators. *Amfiteatru Econ.* **2015**, *17*, 474–487.
15. Grimaldi, R.; Grandi, A. Business incubators and new venture creation: An assessment of incubating models. *Technovation* **2005**, *25*, 111–121. [CrossRef]
16. Rubin, T.H.; Aas, T.H.; Stead, A. Knowledge flow in Technological Business Incubators: Evidence from Australia and Israel. *Technovation* **2015**, *41*, 11–24. [CrossRef]
17. Fernandes, C.C.; Oliveira, M.D.M., Jr.; Sbragia, R.; Borini, F.M. Strategic assets in technology-based incubators in Brazil. *Eur. J. Innov. Manag.* **2017**, *20*, 153–170. [CrossRef]
18. Wann, J.W.; Lu, T.J.; Lozada, I.; Cangahuala, G. University-based incubators' performance evaluation: A benchmarking approach. *Benchmarking* **2017**, *24*, 34–49. [CrossRef]
19. Covelli, B.J.; Morrissette, S.G.; Lindee, C.A.; Mercier, R. Forming a University-Based Business Incubator for Student and Community Entrepreneurs: A Case Study. *J. Contin. High. Educ.* **2020**, *68*, 117–127. [CrossRef]
20. Yusubova, A.; Andries, P.; Clarysse, B. The role of incubators in overcoming technology ventures' resource gaps at different development stages. *R&D Manag.* **2019**, *49*, 803–818.
21. Masutha, M.; Rogerson, C.M. Business Incubation for Small Enterprise Development: South African Pathways. *Urban Forum* **2015**, *26*, 223–241. [CrossRef]
22. van Weele, M.A.; van Rijnsoever, F.J.; Groen, M.; Moors, E.H.M. Gimme shelter? Heterogeneous preferences for tangible and intangible resources when choosing an incubator. *J. Technol. Transf.* **2020**, *45*, 984–1015. [CrossRef]
23. Sudana, I.M.; Apriyani, D.; Supraptono, E.; Kamis, A. Business incubator training management model to increase graduate competency. *Benchmarking* **2019**, *26*, 773–787. [CrossRef]
24. Villares, M.O.D.C.; Miguéns-Refojo, V.; Ferreiro-Seoane, F.J. Business survival and the influence of innovation on entrepreneurs in business incubators. *Sustainability* **2020**, *12*, 6197. [CrossRef]
25. Franco, M.; Haase, H.; Correia, S. Exploring Factors in the Success of Creative Incubators: A Cultural Entrepreneurship Perspective. *J. Knowl. Econ.* **2018**, *9*, 239–262. [CrossRef]
26. Schaeffer, V. The use of material transfer agreements in academia: A threat to open science or a cooperation tool? *Res. Policy* **2019**, *48*, 103824. [CrossRef]
27. Oriama, R.; Mudida, R.; Burger-Helmchen, T. Capturing niche development in secondary disease prevention through a salutogenesis-bioeconomy framework: Trends from Kenya. *Int. J. Technol. Learn. Innov. Dev.* **2021**, *13*, 341–369. [CrossRef]
28. Singh, S.S.; Singh, B.J.; Khanduja, D. Synthesising TBI-relevance in India through six sigma approach. *Int. J. Entrep. Innov. Manag.* **2015**, *19*, 256–283. [CrossRef]
29. Wolniak, R.; Grebski, M.E.; Skotnicka-Zasadzień, B. Comparative analysis of the level of satisfaction with the services received at the business incubators (Hazleton, PA, USA and Gliwice, Poland). *Sustainability* **2019**, *11*, 2889. [CrossRef]
30. Lagos, D.; Kutsikos, K. The role of IT-focused business incubators in managing regional development and innovation. *Eur. Res. Stud. J.* **2011**, *14*, 33–50. [CrossRef]
31. Theodorakopoulos, N.; Kakabadse, N.K.; McGowan, C. What matters in business incubation? A literature review and a suggestion for situated theorising. *J. Small Bus. Enterp. Dev.* **2014**, *21*, 602–622. [CrossRef]
32. Vasin, S.M.; Gamidullaeva, L.A. Modeling and development of a methodology for assessing the socio-economic processes in the management of business incubators. *Mediterr. J. Soc. Sci.* **2015**, *6*, 212–220.
33. Al-Mubaraki, H.M.; Busler, M. The importance of business incubation in developing countries: Case study approach. *Int. J. Foresight Innov. Policy* **2015**, *10*, 17–28. [CrossRef]
34. Mungila Hillemane, B.S.; Satyanarayana, K.; Chandrashekar, D. Technology business incubation for start-up generation: A literature review toward a conceptual framework. *Int. J. Entrep. Behav. Res.* **2019**, *25*, 1471–1493. [CrossRef]
35. Lyken-Segosebe, D.; Montshiwa, B.; Kenewang, S.; Mogotsi, T. Stimulating academic entrepreneurship through technology business incubation: Lessons for the incoming sponsoring university. *Int. J. High. Educ.* **2020**, *9*, 1–18. [CrossRef]
36. Silva, M.C.D.; Rampasso, I.S.; Anholon, R.; Cooper Ordoñez, R.E.; Quelhas, O.L.G.; Silva, D.D. Critical Success Factors of Brazilian Business Incubators. *Lat. Am. Bus. Rev.* **2018**, *19*, 197–217. [CrossRef]
37. Wonglimpiyarat, J. The innovation incubator, University business incubator and technology transfer strategy: The case of Thailand. *Technol. Soc.* **2016**, *46*, 18–27. [CrossRef]
38. Pettersen, I.B.; Aarstad, J.; Høvig, Ø.S.; Tobiassen, A.E. Business incubation and the network resources of start-ups. *J. Innov. Entrep.* **2015**, *5*, 7. [CrossRef]
39. Bozer, G.; Jones, R.J. Understanding the factors that determine workplace coaching effectiveness: A systematic literature review. *Eur. J. Work Organ. Psychol.* **2018**, *27*, 342–361. [CrossRef]
40. Paoloni, M.; Coluccia, D.; Fontana, S.; Solimene, S. Knowledge management, intellectual capital and entrepreneurship: A structured literature review. *J. Knowl. Manag.* **2020**, *24*, 1797–1818. [CrossRef]
41. Tavoletti, E. Business Incubators: Effective Infrastructures or Waste of Public Money? Looking for a Theoretical Framework, Guidelines and Criteria. *J. Knowl. Econ.* **2013**, *4*, 423–443. [CrossRef]

42. Torun, M.; Peconick, L.; Sobreiro, V.; Kimura, H.; Pique, J. Assessing business incubation: A review on benchmarking. *Int. J. Innov. Stud.* **2018**, *2*, 91–100. [CrossRef]
43. Tahir, T.; Rasool, G.; Gencel, C. A systematic literature review on software measurement programs. *Inf. Softw. Technol.* **2016**, *73*, 101–121. [CrossRef]
44. Bergek, A.; Norrman, C. Incubator best practice: A framework. *Technovation* **2008**, *28*, 20–28. [CrossRef]
45. Ahmad, A.J. A mechanisms-driven theory of business incubation. *Int. J. Entrep. Behav. Res.* **2014**, *20*, 375–405. [CrossRef]
46. Aerts, K.; Matthyssens, P.; Vandenbempt, K. Critical role and screening practices of European business incubators. *Technovation* **2007**, *27*, 254–267. [CrossRef]
47. Patton, D. Realising potential: The impact of business incubation on the absorptive capacity of new technology-based firms. *Int. Small Bus. J. Res. Entrep.* **2014**, *32*, 897–917. [CrossRef]
48. Gozali, L.; Masrom, M.; Zagloel, T.M.; Haron, H.N.; Dahlan, D.; Daywin, F.J.; Saryatmo, M.A.; Saraswati, D.; Syamas, A.F.; Susanto, E.H. Critical success and moderating factors effect in Indonesian Public Universities' business incubators. *Int. J. Technol.* **2018**, *9*, 1049–1060. [CrossRef]
49. Malsch, F.; Guieu, G. How to get more with less? Scarce resources and high social ambition: Effectuation as KM tool in social entrepreneurial projects. *J. Knowl. Manag.* **2019**, *23*, 1949–1964. [CrossRef]
50. Pato, M.L.; Teixeira, A.A.C. Determinants of performance of new ventures located in Portuguese incubators and science parks with a focus on institutional factors: Do rural and urban new ventures differ? *Eur. Plan. Stud.* **2020**, *28*, 1619–1638. [CrossRef]
51. Morrish, S.C.; Whyte, M.C.; Miles, M.P. Incubator mediation in commercialising disruptive innovation. *J. Strateg. Mark.* **2019**, *27*, 177–189. [CrossRef]
52. Carvalho, L.; Galina, S.; Sánchez-Hernández, M.I. An international perspective of the business incubators' perception about business model canvas for startups. *Thunderbird Int. Bus. Rev.* **2020**, *62*, 503–513. [CrossRef]
53. Tötterman, H.; Sten, J. Start-ups: Business incubation and social capital. *Int. Small Bus. J.* **2005**, *23*, 487–511. [CrossRef]
54. Obaji, N.O.; Senin, A.A.; Richards, C.K. The Nigerian business incubation programme: The moderating role of government policy. *Ind. Eng. Manag. Syst.* **2014**, *13*, 330–341. [CrossRef]
55. Lamine, W.; Mian, S.; Fayolle, A.; Wright, M.; Klofsten, M.; Etzkowitz, H. Technology business incubation mechanisms and sustainable regional development. *J. Technol. Transf.* **2018**, *43*, 1121–1141. [CrossRef]
56. Öberg, C.; Klinton, M.; Stockhult, H. Inside the incubator—Business relationship creations among incubated firms. *J. Bus. Ind. Mark.* **2020**, *35*, 1767–1784. [CrossRef]
57. Robinson, S.; Stubberud, H.A. Business incubators: What services do business owners really use? *Int. J. Entrep.* **2014**, *18*, 29–39.
58. Hong, J.; Yang, Y.; Wang, H.; Zhou, Y.; Deng, P. Incubator interdependence and incubation performance in China's transition economy: The moderating roles of incubator ownership and strategy. *Technol. Anal. Strateg. Manag.* **2019**, *31*, 96–110. [CrossRef]
59. Marimuthu, M.; Lakha, P.A. The importance and effectiveness of assistance programs in a business incubator. *Probl. Perspect. Manag.* **2015**, *13*, 79–86.
60. Al-Mubaraki, H.M.; Busler, M. Business incubators: Findings from a worldwide survey, and guidance for the GCC states. *Glob. Bus. Rev.* **2010**, *11*, 1–20. [CrossRef]
61. Caiazza, R. Benchmarking of business incubators. *Benchmarking* **2014**, *21*, 1062–1069. [CrossRef]
62. Fernández, M.T.F.; Santos, J.L.; Jiménez, F.J.B. Performance of business incubators and accelerators according to the regional entrepreneurship ecosystem in Spain. *Investig. Reg.* **2019**, *2019*, 41–56.
63. Sung, T.K. Incubators and business ventures in Korea: Implications for manpower policy. *Int. J. Technol. Manag.* **2007**, *38*, 248–267. [CrossRef]
64. Tengeh, R.K.; Choto, P. The relevance and challenges of business incubators that support survivalist entrepreneurs. *Investig. Manag. Financ. Innov.* **2015**, *12*, 150–161.
65. Binsawad, M.; Sohaib, O.; Hawryszkiewycz, I. Factors impacting technology business incubator performance. *Int. J. Innov. Manag.* **2019**, 23. [CrossRef]
66. Montgomery, J. Creative industry business incubators and managed workspaces: A review of best practice. *Plan. Pract. Res.* **2007**, *22*, 601–617. [CrossRef]
67. Lala, K.; Sinha, K. Role of Technology Incubation in India's Innovation System: A Case of the Indian Institute of Technology Kanpur Incubation Centre. *Millenn. Asia* **2019**, *10*, 91–110. [CrossRef]
68. Sentana, E.; González, R.; Gascó, J.; Llopis, J. The social profitability of business incubators: A measurement proposal. *Entrep. Reg. Dev.* **2017**, *29*, 116–136. [CrossRef]
69. Alpenidze, O.; Pauceanu, A.M.; Sanyal, S. Key success factors for business incubators in Europe: An empirical study. *Acad. Entrep. J.* **2019**, *25*, 1–13.
70. Said, M.F.; Adham, K.A.; Abdullah, N.A.; Hänninen, S.; Walsh, S.T. Incubators and government policy for developing it industry and region in emerging economies. *Asian Acad. Manag. J.* **2012**, *17*, 65–96.
71. Bartlett, W. Knowledge transfer, institutions, and innovation in Croatia and Slovenia. *Drus. Istraz.* **2006**, *15*, 371–399.
72. van Weele, M.; van Rijnsoever, F.J.; Eveleens, C.P.; Steinz, H.; van Stijn, N.; Groen, M. Start-EU-up! Lessons from international incubation practices to address the challenges faced by Western European start-ups. *J. Technol. Transf.* **2018**, *43*, 1161–1189. [CrossRef]

73. Ahmad, A.J.; Thornberry, C. On the structure of business incubators: De-coupling issues and the mis-alignment of managerial incentives. *J. Technol. Transf.* **2018**, *43*, 1190–1212. [CrossRef]
74. Gstraunthaler, T. The business of business incubators: An institutional analysis—Evidence from Lithuania. *Balt. J. Manag.* **2010**, *5*, 397–421. [CrossRef]
75. Alhamawndi, W.A.A.; Almahmoud, A.M. The success of business incubators in promoting entrepreneurial small and medium enterprises: Explorative research in tourism companies. *Afr. J. Hosp. Tour. Leis.* **2020**, *9*, 1–20.
76. Lin, D.; Wood, L.C.; Lu, Q. Improving business incubator service performance in China: The role of networking resources and capabilities. *Serv. Ind. J.* **2012**, *32*, 2091–2114. [CrossRef]
77. Tang, M.F.; Lee, J.; Liu, K.; Lu, Y. Assessing government-supported technology-based business incubators: Evidence from China. *Int. J. Technol. Manag.* **2014**, *65*, 24–48. [CrossRef]
78. Schutte, F. Small business incubator coaching in south africa: Exploring the landscape. *Int. J. Entrep.* **2019**, *23*, 1–13.
79. Belas, J.; Gavurova, B.; Čepel, M.; Kubák, M. Evaluation of economic potential of business environment development by comparing sector differences: Perspective of SMEs in the Czech Republic and Slovakia. *Oecon. Copernic.* **2020**, *11*, 139–159. [CrossRef]
80. Valaskova, K.; Kliestik, T.; Gajdosikova, D. Distinctive determinants of financial indebtedness: Evidence from Slovak and Czech enterprises. *Equilib. Q. J. Econ. Econ. Policy* **2021**, *16*, 639–659. [CrossRef]
81. McAdam, M.; Galbraith, B.; McAdam, R.; Humphreys, P. Business processes and networks in university incubators: A review and research agendas. *Technol. Anal. Strateg. Manag.* **2006**, *18*, 451–472. [CrossRef]
82. Messeghem, K.; Bakkali, C.; Sammut, S.; Swalhi, A. Measuring Nonprofit Incubator Performance: Toward an Adapted Balanced Scorecard Approach. *J. Small Bus. Manag.* **2018**, *56*, 658–680. [CrossRef]
83. Liu, H.; Li, L. Modeling and measuring intellectual capital of business incubator. In Proceedings of the 3rd International Conference on Information Management, Innovation Management and Industrial Engineering, Kunming, China, 26–28 November 2010; pp. 79–82.
84. Fukugawa, N. Is the impact of incubator's ability on incubation performance contingent on technologies and life cycle stages of startups?: Evidence from Japan. *Int. Entrep. Manag. J.* **2018**, *14*, 457–478. [CrossRef]
85. Fini, R.; Grimaldi, R.; Meoli, A. The effectiveness of university regulations to foster science-based entrepreneurship. *Res. Policy* **2020**, *49*, 104048. [CrossRef]
86. Redondo, M.; Camarero, C. Social Capital in University Business Incubators: Dimensions, antecedents and outcomes. *Int. Entrep. Manag. J.* **2019**, *15*, 599–624. [CrossRef]
87. Mian, S.A. Assessing and managing the university technology business incubator: An integrative framework. *J. Bus. Ventur.* **1997**, *12*, 251–285. [CrossRef]
88. Peters, L.; Rice, M.; Sundararajan, M. The role of incubators in the entrepreneurial process. *J. Technol. Transf.* **2004**, *29*, 83–91. [CrossRef]
89. Ndabeni, L.L. The contribution of business incubators and technology stations to small enterprise development in South Africa. *Dev. S. Afr.* **2008**, *25*, 259–268. [CrossRef]
90. Elena, R. The effectiveness of business incubators as the element of the universities' spin-off strategy in Russia. *Int. J. Technol. Manag. Sustain. Dev.* **2014**, *13*, 265–281.
91. Bose, S.C.; Kiran, R.; Goyal, D. Critical success factors of agri-business incubators and their impact on business performance. *Custos Agronegocio* **2018**, *14*, 350–376.
92. Sedita, S.R.; Apa, R.; Bassetti, T.; Grandinetti, R. Incubation matters: Measuring the effect of business incubators on the innovation performance of start-ups. *R&D Manag.* **2019**, *49*, 439–454.
93. Ferreiro Seoane, F.J.; Del Campo Villares, M.O.; Camino Santos, M. Analysis of business incubators in Galicia through the <integral model of economic profitability>. *Investig. Reg.* **2015**, *2015*, 7–31.
94. Dhochak, M.; Acharya, S.R.; Sareen, S.B. Assessing the effectiveness of business incubators. *Int. J. Innov. Learn.* **2019**, *26*, 177–194.
95. Bank, N.; Kanda, W. Tenant recruitment and support processes in sustainability-profiled business incubators. *Ind. High. Educ.* **2016**, *30*, 267–277. [CrossRef]
96. Xiao, L.; North, D. The role of Technological Business Incubators in supporting business innovation in China: A case of regional adaptability? *Entrep. Reg. Dev.* **2018**, *30*, 29–57. [CrossRef]
97. Guan, C.; Fan, Y. The impact of social networks on the operating efficiency of chinese technology business incubators. *Sustainability* **2020**, *12*, 2727. [CrossRef]
98. Haugh, H. Call the midwife! Business incubators as entrepreneurial enablers in developing economies. *Entrep. Reg. Dev.* **2020**, *32*, 156–175. [CrossRef]
99. Kiran, R.; Bose, S.C. Stimulating business incubation performance: Role of networking, university linkage and facilities. *Technol. Anal. Strateg. Manag.* **2020**, *32*, 1407–1421. [CrossRef]
100. Voisey, P.; Jones, P.; Thomas, B. The Pre-Incubator: A Longitudinal Study of 10 Years of University Pre-Incubation in Wales. *Ind. High. Educ.* **2013**, *27*, 349–363. [CrossRef]
101. Gao, Y.; Hu, Y. The upgrade to hybrid incubators in China: A case study of Tuspark incubator. *J. Sci. Technol. Policy Manag.* **2017**, *8*, 331–351. [CrossRef]

102. Soetanto, D.P.; Jack, S.L. Business incubators and the networks of technology-based firms. *J. Technol. Transf.* **2013**, *38*, 432–453. [CrossRef]
103. Sagath, D.; van Burg, E.; Cornelissen, J.P.; Giannopapa, C. Identifying design principles for business incubation in the European space sector. *J. Bus. Ventur. Insights* **2019**, *11*, e00115. [CrossRef]
104. Xu, L. Business incubation in China: Effectiveness and perceived contributions to tenant enterprises. *Manag. Res. Rev.* **2010**, *33*, 90–99. [CrossRef]
105. Gozali, L.; Masrom, M.; Zagloel, T.Y.M.; Haron, H.N.; Garza-Reyes, J.A.; Tjahjono, B.; Irawan, A.P.; Daywin, F.J.; Syamas, A.F.; Susanto, S.; et al. Performance factors for successful business incubators in indonesian public universities. *Int. J. Technol.* **2020**, *11*, 155–166. [CrossRef]
106. Nair, S.; Blomquist, T. Exploring docility: A behavioral approach to interventions in business incubation. *Res. Policy* **2021**, *50*, 104274. [CrossRef]
107. Leendertse, J.; Schrijvers, M.; Stam, E. Measure twice, cut once: Entrepreneurial ecosystem metrics. *Res. Policy* **2021**, 104336. [CrossRef]
108. Bruneel, J.; Ratinho, T.; Clarysse, B.; Groen, A. The evolution of Business incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation* **2012**, *32*, 110–121. [CrossRef]