



ISSN: 2230-9926

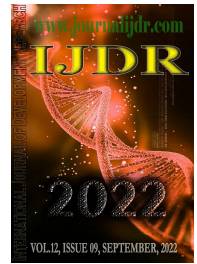
Available online at <http://www.journalijdr.com>

# IJDR

*International Journal of Development Research*

Vol. 12, Issue, 09, pp. 59273-59276, September, 2022

<https://doi.org/10.37118/ijdr.25412.09.2022>



RESEARCH ARTICLE

OPEN ACCESS

## BUSINESS INCUBATORS AND NETWORKS: A REVIEW

<sup>1,2</sup>Samuel Carvalho de Azevedo Marques

<sup>1</sup>SENAI Cimatec University Center, Salvador, BA, Brazil; <sup>2</sup>Instituto Federal de Educação, Ciência e Tecnologia do Sertão Pernambucano (IFSERTA0-PE), Petrolina, PE, Brazil

### ARTICLE INFO

#### Article History:

Received 04<sup>th</sup> August, 2022

Received in revised form

20<sup>th</sup> August, 2022

Accepted 28<sup>th</sup> September, 2022

Published online 30<sup>th</sup> September, 2022

#### Key Words:

Business incubators, Network, Entrepreneurship.

#### \*Corresponding author:

Samuel Carvalho de Azevedo Marques

### ABSTRACT

Incubators support entrepreneurs through the provision of services, access to resources and networks. These interactions foster the generation of new businesses and are an intermediation mechanism used to support the development of small businesses. In this sense, the present study aims to investigate the term network in studies on business incubators. For this, a review study was carried out based on bibliometric techniques, which identifies the application of the network notion. An initial overview emerges from the analysis, which can help to identify the role of networks in business incubators. As limitations, we can highlight the lack of reviews and specific research on the topic. In the end, it is suggested that future works can expand research on networks and business incubation.

Copyright © 2022, Samuel Carvalho de Azevedo Marques. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Samuel Carvalho de Azevedo Marques. "Business incubators and Networks: a review", *International Journal of Development Research*, 12, (09), 59273-59276.

## INTRODUCTION

Network-based incubation provides network resources, knowledge, learning and social capital to startups (Eveleens *et al.*, 2017), with a positive and significant influence of network services (Ahmed *et al.*, 2022) on incubation. The effectiveness of incubators in business development, among other aspects, is due to the development of social and business networks, activities, and relationship opportunities (McAdam *et al.*, 2008). These incubator networks can be regional (Almeida *et al.*, 2011), local, global, real, and even virtual (Carayannis & Von Zedtwitz, 2005). Whether in the traditional context of universities or in technology-based startups, network elements have been observed and theories have been used to explain the phenomenon, such as the resource-based view (RBV), Social Capital Theories and Social Network Analysis (Almeida *et al.*, 2011; Huggins *et al.*, 2012). However, the configurations of this aspect are quite diverse, including formal, informal, and inter-organizational networks (Järvensivu and Möller, 2009; Cap *et al.*, 2019). Studies address the influence of network-based incubation on startup performance, for example, where problems of fragmentation, conceptual inconsistency and theoretical underdevelopment were found (Eveleens *et al.* 2017). Regarding theoretical contributions, Hausberg and Korreck (2020) state that the theory of social capital would complement the resource-based view and include open innovation as a theoretical aspect for this understanding.

Thus, new developments have collaborated to update knowledge about the social support provided by incubators to entrepreneurs (McAdam *et al.*, 2006). From a network point of view, incubators, recognized as intermediaries, can provide resources, knowledge, learning and social capital (Eveleens *et al.*, 2017; Gliedt *et al.*, 2018; Van Rijnsoever, 2022). Relational and intangible factors are therefore important for incubation, and incubation management plays a critical role in optimizing these factors, according to Theodorakopoulos *et al.* (2014). These authors carried out a critical review of the literature on incubation effectiveness and suggest a theoretical deepening in view of these specific deficiencies found. This study started with a question about the application of the concept of network and network incubation in the research of business incubators. Studies on network-based incubators or the relationship role played by incubators (McAdam *et al.*, 2006; Eveleens *et al.*, 2017; Franco *et al.*, 2021). It was found that the relationship between these elements has not yet been analyzed in studies and reviews in a general context, being an opportunity to present a synthesis of this knowledge in business incubation and entrepreneurship. With the absence of systematization on this issue, the research sought, then, to outline the existing studies on incubators with a focus on network incubation and the concept of network. Considering the evolution of studies on business incubators and the focus on network-based incubation, we research about the application of the term "network". This research thus carries out a mapping of this knowledge.

This review aims to identify elements in the application of the term network in studies on business incubators with an emphasis on network-based incubation. The article is structured as follows: Introduction, section 1, introduces the theme, gaps, justifications, and research objective. Materials and Methods, section 2, describes the methodology used for the research, procedures, and materials. Section 3 presents the Results. Section 4 presents the Discussion for the study. Section 5 presents the conclusions and limitations. And at the end the Acknowledgments and References are presented.

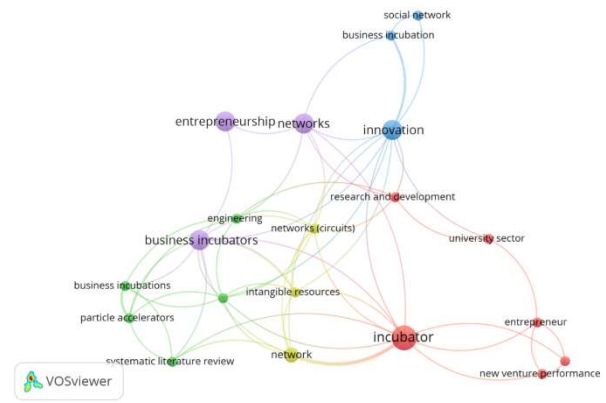
## METHODS

In the study, the bibliometric method is applied analyzing selected studies, strictly in the production of original and review articles published and stored in scientific databases. To investigate the research gap, one research question was formulated for this review: What the application of the concept of network in business incubators research? To this end, steps were defined to be followed. In the initial search, the following search descriptors were used: “business incubator”, “network” (incubation), these terms, to be found in the article title, abstract or keywords. The descriptors used were "business incubator" and "business incubation". The search string was as follows: “(TITLE ("business incubator") OR TITLE ("business incubation") OR KEY ("business incubator") OR KEY ("business incubation"))”. Considering the “business incubator” and “incubation” variations; “networks”, “networked”, “networking”. The network-based incubator descriptors used were based on Eveleens *et al.* (2017). Several combinations of these descriptors with logical operators were tested in the search for review articles and originals relevant to the study and gap, to inform about the literature, using techniques of citation analysis, networking of authors' keywords, and analysis of literature.

As a search step 1, we used an initial String (1) aimed at searching for studies on the research topic "Network of a business incubators" pointed out by Deyanova *et al.* (2022) for knowledge of the fundamental and most influential works. To obtain the results of the search using Strings used with the descriptors in the Web of Science, Scopus and Science Direct, the descriptor was combined, and the logical operator was used. The String 1 literature basically refers to the search for reference articles for the field of studies on business incubators and networks in general. This field even has a literature review study produced by McAdam *et al.* (2006), but with a focus on university incubators. String 1 is used to identify the theme in the most influential studies in the field. String 1 reveals the following number of articles published in the Web of science (n=267), Scopus (n=209) and ScienceDirect (n= 41) databases, totaling 517 studies. The assessment step applied inclusion and exclusion criteria filters to reduce the number of related articles identified during the search step. By combining the following exclusion criteria, we to limit the number of documents identified during the previous step: Excluded articles that did not contain the terms "incubator", "incubation", "intermediaries" or "start-ups" in the Title field. The documents were saved in lists (.ris) through the databases and sent to the Endnote web manager. Based on the identified works and abstracts, studies on networks and incubators were included and those that did not have thematic relevance or did not meet the criterion of the guiding question were excluded. After this step of selection and eligibility, using the guiding question, linking the objective of reviewing and reading the abstracts, titles and keywords, the documents were selected and exported to use in an excel spreadsheet format and for processing and analysis in software VOSviewer.

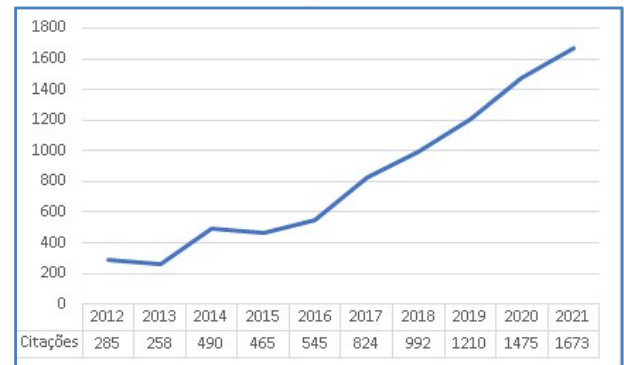
## RESULTS

To find density clusters, the presence of pertinent keywords, and connections between studies, authors, and references, the authors' keyword occurrence analysis was used in the study. Figure 1 shows the keywords network used to visualize the formation of clusters, through the VOSviewer software. As a result, gaps or even potential blocks of research subjects may be discernible.



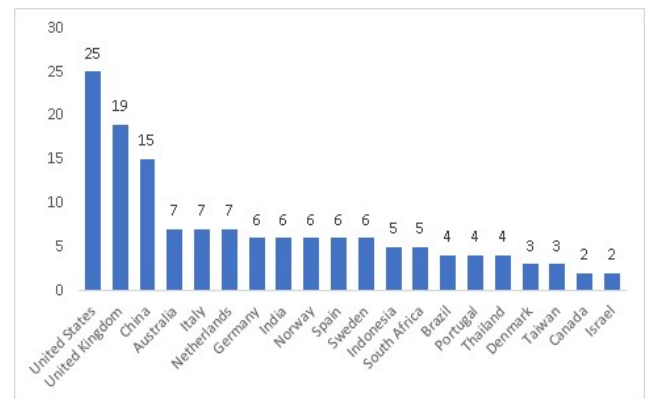
Source: Own authorship based on Vosviewer Software

Figure 1. Occurrence of keywords from Search String 1



Source: own authorship.

Figure 2. Evolution of citations per year (2012-2021)



Source: own authorship.

Figure 3. Documents by Country on Business Incubators and Networks

From here, research on the subject is viewed in this format according to their publication year, citation count, journal of publication, impact factor, most-cited studies and authors, and country of origin. The analysis of the topic considers the citations obtained as an influence criterion, however, it is necessary to indicate that other criteria, such as the journal's impact factor, previous influence of the authors, which gives some relevance and visibility to more recent studies that do not have a high number of citations at the time of writing this review. The influence of more recent studies may be related to the history of influence of works previously published by the most influential authors in the literature. Network-based Incubation is situated by previous reviews in the university context and impact on startup performance (Table 1). In the literature on business incubators, studies on the performance of incubators, the impact of support and the effects of incubation on the growth of incubated ventures are traditional. Based on Scopus data, 563 papers were chosen to represent the field of research on incubators over a 37-year period.

**Table 1. Previous literature reviews published on business incubators**

Author (Year)	Document Title	Times cited
Hackett and Dilts (2004)	A Systematic Review of Business Incubation Research	462
Theodorakopoulos <i>et al.</i> (2014)	What matters in business incubation? A literature review and a suggestion for situated theorizing	75
Eveleens <i>et al.</i> (2017)	How network-based incubation helps start-up performance: a systematic review against the background of management theories	64
McAdam <i>et al.</i> (2006)	Business Processes and Networks in University Incubators: A Review and Research Agendas	45

Source: own authorship.

**Table 2. Ten most cited articles on business incubators networks**

Document title	Authors	Year	Source	Cited
The networked business incubator - Leveraging entrepreneurial agency?	Bøllingtoft and Ulhøi	2005	Journal of Business Venturing	357
Networked incubators. Hothouses of the new economy.	Hansen <i>et al.</i>	2000	Harvard business review	276
Assessing technology incubator programs in the science park: The good, the bad and the ugly	Chan and Lau	2005	Technovation	254
Incubation of incubators: Innovation as a triple helix of university-industry-government networks	Etzkowitz	2002	Science and Public Policy	211
Start-ups: Business incubation and social capital	Tötterman and Sten	2005	International Small Business Journal	184
Architecting gloCal (global-local), real-virtual incubator networks (G-RVINS) as catalysts and accelerators of entrepreneurship in transitioning and developing economies: Lessons learned and best practices from current development and business incubation practices	Carayannis and Von Zedtwitz	2005	Technovation	176
Stimulating Dynamic Value: Social Capital and Business Incubation as a Pathway to Competitive Success	Hughes <i>et al.</i>	2007	Long Range Planning	143
Technological learning for entrepreneurial development (TL4ED) in the knowledge economy (KE): Case studies and lessons learned	Carayannis <i>et al.</i>	2006	Technovation	138
Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany	Schwartz and Hornyh	2010	Technovation	126
The bottom-up business incubator: Leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment	Bøllingtoft	2012	Technovation	123

Source: own authorship.

**Table 3. Descriptors of approach to the category and conceptual elements**

Descriptor - Category	Type of approach	Description of the analytical-conceptual elements
Network based incubator	Actor - Analytical Type	Incubation manager, mentors, researchers, universities, investors, venture capitalists, consultants and service providers.
Network based incubator	Relationship - analytic type	Content, formality, strength of relationships, form of communication in the relationship, type of relationship in the incubator: internal or external

Source: Own authorship based on Evellens *et al.*, (2017).

These articles garnered 9,318 citations between 1990 and 2021. Business incubators have great practical relevance (DEYANOVA *et al.* 2022) and there are no signs that they are being replaced by other models to support entrepreneurship. Incubators remain an effective mechanism to support small business development (MCADAM and MARLOW 2008). In the recent period, shown in Figure 2, the number of citations in the last 10 years is observed. The average publication per year was 40 articles. And these articles had an average of 821.7 citations per year in the period between 2012 and 2021. The topic of networks of incubators has received increasing attention in the field of studies on business incubators. Table 2 lists the most cited articles about business incubators and networks. To contextualize the results, the research demonstrated the spatial distribution of the theme Business and Network Incubator (String 1). Figure 3 shows the number of publications by country. With the publication of 138 original and review articles on the topic "business incubator" and networks, from 2012 to 2021 (10 years) the evolution and increase in the number of citations of articles that situate the current research field is observed.

## DISCUSSION

The basic elements of incubator networks are nodes, categorized as network actors (incubator managers, consultants, financiers, startups, companies, universities, and governments), and ties, which represent types of relationship or relational such as: cooperation, power or exchange of goods and information.

The concept of network, in an analytical approach, would imply an explanation of these ties and nodes, recognized by network structures that could be measured (Eveleens *et al.*, 2017). A certain position in the network and intensity of the relationship would bring advantages to the members of the network, in terms of resources, information, learning and power. And in a network incubation program the incubator would help the business to develop its network. (Eveleens *et al.*, 2017). See Table 3 an approach to the network conceptual elements. The network-based incubation literature approaches the network primarily through the metaphorical approach, without structural specification, network measurements and analysis that would show the influence of the network. The difficulty in collecting formal network data is pointed out as an explanation for the lack of analytical studies on network-based incubation, but there is an increasing availability of data from digital social networks today (Eveleens *et al.*, 2017).

## CONCLUSION

From this literature review, with the objective of presenting a perspective of the literature on network incubators, we verified advances in units of analysis that have been researched on business incubation. More specifically, the discussion of network incubation in studies of incubators in each context, and a possibility for incubators and stakeholders, to invest in the formation of networks as a resource for incubating new businesses is presented. On the question of the application of the term network in business incubators and network incubation, there is a broad use as a function, activity and resource used. The growing application of the "network" construct in studies

on incubators may benefit studies that aim to bring greater clarity to the use of the term. Given that its meaning can be analyzed, considering the type of approach and conceptual elements referring to actors or relationships. The notion of network is relevant in the field of incubators, and it is suggested that future studies can deepen and systematize the topic of incubation of network companies. These studies can influence strengthening the networks of the agents involved and articulations in the context of business incubation and entrepreneurship development.

### Acknowledgment

The authors would like to thank for financial support from the Foundation for Research Support of the State of Bahia (FAPESB), Term of Grant No. BOL0552/2019, REQUEST No. 2116/2019.

## REFERENCES

- Ahmed, N., Li, C., Qalati, S. A., ur Rehman, H., Khan, A., & Rana, F. 2020. Impact of Business Incubators on Sustainable Entrepreneurship Growth with Mediation Effect. *Entrepreneurship Research Journal*, 12, n. 2, p. 137-160, 2022.
- Almeida, M., Borin, E., Álvarez, C. M., TerrA, B., & BIANCheTTI, T. 2011. Analysis of the Rio de Janeiro State Incubator Network ReINC: characteristics and influence on the organization and sustainability of incubators. *Interiencia*, 363, 172-177.
- Bøllingtoft, A. 2012. The bottom-up business incubator: Leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment. *Technovation*, 325, 304-315.
- Bøllingtoft, A., & Ulhøi, J. P. 2005. The networked business incubator—leveraging entrepreneurial agency?. *Journal of business venturing*, 202, 265-290.
- Cap, J. P., Blaich, E., Kohl, H., von Raesfeld, A., Harms, R., & Will, M. 2019. Multi level network management—A method for managing inter-organizational innovation networks. *Journal of Engineering and Technology Management*, 51, 21-32.
- Carayannis, E. G., Popescu, D., Sipp, C., & Stewart, M. 2006. Technological learning for entrepreneurial development TL4ED in the knowledge economy KE: Case studies and lessons learned. *Technovation*, 264, 419-443.
- Carayannis, E. G., & Von Zedtwitz, M. 2005. Architecting gloCal global-local, real-virtual incubator networks G-RVINs as catalysts and accelerators of entrepreneurship in transitioning and developing economies: lessons learned and best practices from current development and business incubation practices. *Technovation*, 252, 95-110.
- Chan, K. F., & Lau, T. 2005. Assessing technology incubator programs in the science park: the good, the bad and the ugly. *Technovation*, 2510, 1215-1228.
- Deyanova, K., Brehmer, N., Lapidus, A., Tiberius, V., & Walsh, S. 2022. Hatching start-ups for sustainable growth: a bibliometric review on business incubators. *Review of Managerial Science*, 1-27.
- Etzkowitz, H. 2002. Incubation of incubators: innovation as a triple helix of university-industry-government networks. *Science and Public Policy*, 292, 115-128.
- Eveleens, C. P., van Rijnsoever, F. J., & Niesten, E. M. 2017. How network-based incubation helps start-up performance: a systematic review against the background of management theories. *The Journal of Technology Transfer*, 423, 676-713.
- Franco, M., Neves, D., Haase, H., & Rodrigues, M. 2021. The importance of intellectual capital in networks formed by start-ups. *International Journal of Organizational Analysis*, 2021. Article.
- Glied, T., Hoicka, C. E., & Jackson, N. 2018. Innovation intermediaries accelerating environmental sustainability transitions. *Journal of Cleaner Production*, 174, 1247-1261.
- Hackett, S. M., & Dilts, D. M. 2004. A systematic review of business incubation research. *The Journal of Technology Transfer*, 291, 55-82.
- Hansen, M. T., Chesbrough, H. W., Nohria, N., & Sull, D. N. 2000. Networked incubators. *Harvard business review*, 785, 74-84.
- Hausberg, J. P., & Korreck, S. 2020. Business incubators and accelerators: a co-citation analysis-based, systematic literature review. *The Journal of Technology Transfer*, 451, 151-176.
- Huggins, R., Johnston, A., & Thompson, P. 2012. Network capital, social capital and knowledge flow: how the nature of inter-organizational networks impacts on innovation. *Industry and Innovation*, 193, 203-232.
- Hughes, M., Ireland, R. D., & Morgan, R. E. 2007. Stimulating dynamic value: Social capital and business incubation as a pathway to competitive success. *Long Range Planning*, 402, 154-177.
- Järvensivu, T., & Möller, K. 2009. Metatheory of network management: A contingency perspective. *Industrial Marketing Management*, 386, 654-661.
- McAdam, M., & McAdam, R. 2006. The networked incubator: The role and operation of entrepreneurial networking with the university science park incubator USI. *The International Journal of Entrepreneurship and Innovation*, 72, 87-97.
- McAdam, M., & Marlow, S. 2008. A preliminary investigation into networking activities within the university incubator. *International Journal of Entrepreneurial Behavior & Research*, 144, 219-241.
- Mian, S. A. 2021. Whither modern business incubation? Definitions, evolution, theory, and evaluation. In *Handbook of Research on Business and Technology Incubation and Acceleration*. Edward Elgar Publishing.
- Schwartz, M., & Hornych, C. 2010. Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany. *Technovation*, 309-10, 485-495.
- Theodorakopoulos, N., Kakabadse, N. K., & McGowan, C. 2014. What matters in business incubation? A literature review and a suggestion for situated theorising. *Journal of small business and enterprise development*.
- Tötterman, H., & Sten, J. 2005. Start-ups: Business incubation and social capital. *International small business journal*, 235, 487-511.
- van Rijnsoever, F. J. 2022. Intermediaries for the greater good: How entrepreneurial support organizations can embed constrained sustainable development startups in entrepreneurial ecosystems. *Research Policy*, 512, 104438.

\*\*\*\*\*