

# PARTNERSHIPS IN BUSINESS INCUBATORS IN BRAZIL

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## KEYWORDS

Business incubators, partnerships, Brazil

## ABSTRACT

For business incubators installed in a developing country with continental dimensions like Brazil, it should act in a collaborative way to join efforts and share experiences - the Brazilian incubation stage is marked by initiatives from different regions and particular contexts. The annual seminar of the National Association of Entities Promoting Innovative Enterprises (ANPROTEC) is one of the main events held in Brazil on entrepreneurship and incubation of companies in the country. The National Seminar on Business Incubators and Technology Parks annually gathers the greatest contributions of the different elements of the National System of Innovation Brazilian and allows the analysis of the evolution of the themes and the main trends in management and operation of the different incubators presented. The present study aims to analyze the theme of business incubators in partnerships in Brazil, from the analysis of papers presented at the Seminar ANPROTEC in the years 2010 to 2014. The 144 selected works allow the identification of incubators partnerships such as clusters, partnerships with educational institutions, research and government programs. Three main themes were identified: examples of partnerships, technology parks and networking, with the latter registering a growing trend of interest and relevance. At the level of the authors involved, as almost 80.0% of authors published only one article in five editions of the event, a low recurrence and co-authorship is perceived among authors, which suggests a new research development potential in order to understand how these related cooperations and partnerships occur in Brazil.

## BUSINESS INCUBATORS AND PARTNERSHIPS

The first incubator was established in 1959, New York, USA and during the 80s, with the creation of the Bayh-Dole Act law that recognized the importance of innovation and intellectual property (Hackett e Dilts, 2004b) there was a significant expansion of American incubation programs. But what is an incubator?

According to Aaboen et al. (2008), a business incubator is an institution that provides the technology-intensive new technology-based firms (NTBFs) resources such as space, marketing support, management, structure and funding. But one of the initial models for the process of incubation was defined by Brooks (1986). The model starts in supporting the development of the business idea to the marketing of a product developed with the support of research in universities. In this sense, the author pointed out three main elements that must be present in the incubators: (1) a network support that helps start-ups to not commit fatal errors, (2) the provision of shared services daily assistance in business operation and (3) a connection with the university.

In a more recent model, Hackett and Dilts (2004a) suggested as key elements in the process of incubation the selection, monitoring, assistance to business and the availability of resources. This model uses the theory of options to explain the dynamics of the incubator: if one considers the company incubated as an option, the incubator is an investor applying resources and monitors the project to reduce the uncertainty of the new company in the market. Thus, a high degree of availability of resources (good management, access to the external community network, innovation clusters and experienced entrepreneurs) can increase the probability of success of the incubation process.

Hansen et al. (2000) indicated as a hallmark of the incubators that had better results than others, the implementation of partnerships between entrepreneurs and other companies. In line with the cooperation as a key factor, Bollingtoft and Ulhøi (2005) investigated the "incubator networked" proposed by Hansen et al. (2000) and understood that it has the basic feature of the administrative support but also assists in the visibility of companies to market and favors the inclusion of the incubated companies in their specific communities.

In turn, by analyzing the pattern of cooperation 150 incubated companies in Germany, Schwartz and Hornych (2010) identified the informal relationships between companies as fundamental to the emergence of more formal relationships with customers and other partners in research and development projects. A facilitating factor of these relations was the diversity of sectors of the incubated companies, with companies in

the same industry to present more difficulty in sharing information (eg intellectual property). In this study, we identified a reduction connections with universities, which may have resulted on one hand from the reduction of companies focused on technological innovation or on the other hand, from the expansion of the incubators into large regions with a consequent reduction of the technological criteria selection.

The importance of cooperation and partnership was also demonstrated by Vanderstraeten and Matthyssens (2012) when investigating the creation of value offered by incubators. In the study, the need for an incubator have interpersonal relations skills and a more open culture and greater availability of interaction between the incubated companies and other external partners was perceived.

The themes of cooperation or partnership already existed in the early studies of business incubators and, according to Hackett e Dilts (2004b), still present in the current research. Phan et al., 2005 considers that these are relevant factors to the structural point of view incubators as often the creation of an incubator results of public-private partnerships with the involvement of various stakeholders.

In a country as large as Brazil, incubators emerge in a heterogeneous incubation scenario, marked by different initiatives in different regions and with very particular contexts. After 30 years of development of incubators can be identified across the country a total of 400 incubators and technology parks 90 (ANPROTEC, 2014). Many of these initiatives take part in Local Productive Arrangements (APL) (Brazilian expression that is similar to the concept of cluster) in various segments (APL electronics of Santa Rita do Sapucaí (Minas Gerais) is an example of technological segment. In turn, the tourism APL in Paraty (Rio de Janeiro) contained an incubator based on solidarity economy, ie a social segment (Aernoudt, 2004)).

## METHODOLOGY

The presented research objective is to analyze the theme of partnerships in business incubators in Brazil.

In Brazil, one of the most important events at the level of knowledge and incubators practices is the National Seminar on Business Incubators and Technology Parks of the National Association of Entities Promoting Innovative Enterprises (ANPROTEC). The seminar is annual and always takes place in a different city in Brazil. In 2014, a total of 24 issues had already been in at least once in each region of Brazil. Since 2015, the seminar became known as "ANPROTEC Conference".

As the seminar brings together a significant number of elements of the National System of Brazilian Innovation and annually are presented many of the Brazilian experiences about incubators, technology parks and related issues, it can be perceived as an important source of knowledge and practices in Brazil. This research

focuses on the work published in the seminar proceedings in the years 2010, 2011, 2012, 2013 and 2014.

## RESULTS

In the period 2010-2014, were published in the proceedings a total of 451 articles. As the articles were not indexed in a database, the initial analysis was performed using as search techniques in Mendeley Desktop software based on the following search terms:

- partnership,
- cooperation,
- network,
- incubator,
- networking,
- other combinations. For example, the search criteria "incubates\*" AND "\*cooperates" yielded articles with the words "incubator cooperation" and "incubation cooperative".

Research has reduced the analysis to 227 articles. Subsequently, a detailed reading has shown that these, 83 did not fit the theme, which resulted in a final result of 144 articles (31.9% of the 451 published during the period 2010-2014). Table 1 presents the evolution of articles published over the five years.

Table 1: ANPROTEC Seminar: evolution of published articles on partnerships and incubators (2010-2014)

| Theme                     | Years      |           |            |           |           | Total       |
|---------------------------|------------|-----------|------------|-----------|-----------|-------------|
|                           | 2010       | 2011      | 2012       | 2013      | 2014      |             |
| Partnerships & incubators | 23         | 26        | 38         | 30        | 27        | <b>144</b>  |
| %                         | 22,5       | 30,2      | 34,5       | 35,3      | 39,7      | <b>31,9</b> |
| Other themes              | 79         | 60        | 72         | 55        | 41        | <b>307</b>  |
| %                         | 77,5       | 69,8      | 65,5       | 64,7      | 60,3      | <b>68,1</b> |
| <b>Total articles</b>     | <b>102</b> | <b>86</b> | <b>110</b> | <b>85</b> | <b>68</b> | <b>451</b>  |

Although the total number of articles varies, the theme of incubators in partnerships has increased in percentage terms in the Seminar, registering in 2014 a maximum of 39.1%, which indicates the growing relevance of the theme at the event.

In order to identify the most relevant authors, the analysis focused then on the study of the authors involved in the theme.

## Main Authors

The analysis of the 144 selected articles concluded the existence of 345 authors involved. Of these, 266 (77.1%) have published only one article, 59 (17.1%) have published two, 18 (5.2%) published three and only 2 (0.6%)- "Faria, Adriana Ferreira" and "Pimentel Neto, José Geraldo" - published four articles each. Approximately 30% of the 144 articles correspond to 20

authors of assiduous presence in the five editions of the event.

Subsequently, the author analyzes were performed using the software Sci2 Tool (Sci2Team, 2009), resulting in the generation of co-authored mapping with the 345 authors. In view of the numerous detected relationships, and in order to simplify the analysis, this article only illustrates the mapping containing authors with more published articles and more interactions with other authors.

Figure 1 shows the relationship of co-authorship of the two individual authors with the highest number of publications, respectively “Faria, Adriana Ferreira” and “Pimentel Neto, José Geraldo”. With larger number of individual publications, these two authors present interaction with at least two other authors. In the case of “Faria, Adriana Ferreira” stands out the co-authorship with “Gava, Rodrigo” and “Suzuki, Jaqueline Akemi”. In turn, in the case of “Pimentel Neto, José Geraldo” co-authorship leads with “Cato Geraldo Magela Sousa”, “Lira, Marcia Maria Pereira” and “Freitas, Fernanda Lima Catia Santos”. Vertices unnumbered indicate the existence of only one article to the author in question.



Figure 1 a): “Faria, Adriana Ferreira de” co-authored mapping



Figure 1 b): “Pimentel Neto, José Geraldo” co-authored mapping

Subsequently, an analysis of the evolution of articles concluded that “Faria, Adriana Ferreira” had an intense but irregular participation, with the publication of three articles in 2012 and only one in 2014. In turn, the author “Pimentel Neto, José Geraldo” published regularly in

the years 2010, 2011, 2012 and 2013, but did not submit any article in 2014.

As the proceedings of the seminar do not provide the total citations, it was not possible to measure the impact of the authors and their publications. However, based on what has been generated, it is possible to identify groups of authors more “collaborative”. Figure 2 illustrates this situation with two groups of authors. The first group has as its central author “Zen, Aurora Carneiro” directly or indirectly related to eleven other authors. The second group with “Sampaio Neto, Oscar Zalla” as central author appears related with eight other authors.

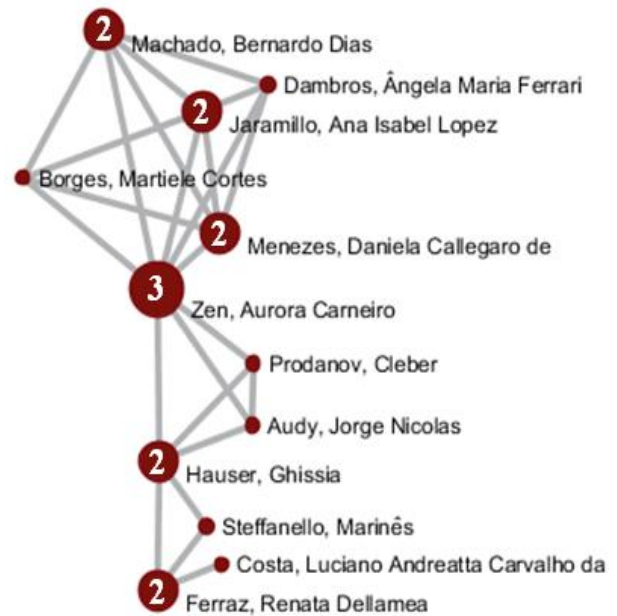


Figure 2 a): Groups of more collaborative authors: example 1

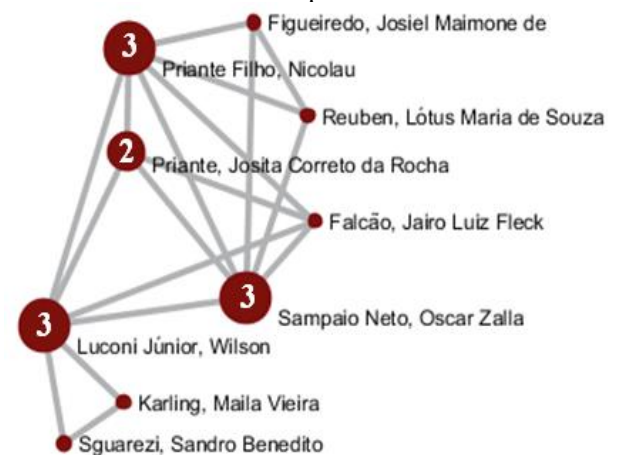


Figure 2 b): Groups of more collaborative authors: example 2

In Example 1, the group focused on “Zen, Aurora Carneiro”, two articles were published in 2011, one in 2012 and two in 2014. Most of its articles presented investigations in southern Brazil - Rio Grande do Sul on initiatives and innovation policies. In Example 2, the

group focused on “Sampaio Neto, Oscar Zall” published an article in 2012, two in 2013 and one in 2014. Their articles focused on research in the Center-West of Brazil - Mato Grosso on social innovation initiatives. A subsequent analysis of the articles concluded that some of the included authors share the authorship of several articles.

### Main Contributions

Present in almost all the 144 selected articles was the theme of the interaction of the incubator with academic institutions such as universities (ex .: generation of spin-offs) and other educational and research centers. For example, it is possible to refer to the article Faria et al. (2012) which introduced a reference model for the process of innovation dynamics between the Federal University of Viçosa (UFV) in Minas Gerais (MG), the technological incubator and the Technological Park of Viçosa (tecnoPARQ).

It was also identified that most of the articles used the concept of Triple Helix presented by Leydesdorff and Etzkowitz (1996), a concept that is very mentioned in Brazil in the context of university-government-business interaction. Other references used were the Oslo Manual (OECD, 2005) and Brazilian law to promote innovation. For example, Carvalho et al. (2014) evaluated 10 years of law of innovation in Brazil and the impact of regulatory frameworks in business incubators and technological parks.

The theme of cooperation between institutions was approached by different authors mainly using governance analysis. For example, Beckert Neto et al. (2012) used the foundations of "corporate governance" as practiced by public companies that needed to demonstrate transparency to investors and their management boards. But other articles in the same issue considered governance as the articulation of actors, formulation and coordination of policies involving incubators and other partners. In this sense there is the example of Zampieri (2014) found that the contribution of governance in APL consolidation of Information Technology in the central region of Rio Grande do Sul (RS). In turn, Freitas et al. (2012) addressed the joint institutions based on the establishment of a business incubator in Petrolina (Pernambuco state).

Among the 144 selected articles, a more demanding analysis revealed the perception of omissions or theoretical gaps in the thematic partnerships in incubators. Nevertheless, it was possible to organize the articles in three research groups on the theme:

- External partnerships: evidence of interaction incubators with external partners;
- Technology parks: report of technological parks with great interaction with incubators;
- Networking: evidence of the importance of a network of potential partners.

Subsequently, and building on this classification was used Mendeley Desktop software to assign each article a set of tags to identify the research group on the subject. Table 2 shows the distribution over the years.

Table 2: ANPROTEC Seminar: Partnership research groups evolution (2010-2014)

| Research group        | Years     |           |           |           |           | Total      |
|-----------------------|-----------|-----------|-----------|-----------|-----------|------------|
|                       | 2010      | 2011      | 2012      | 2013      | 2014      |            |
| External partnerships | 18        | 15        | 24        | 20        | 13        | 90         |
| Technology Parks      | 3         | 9         | 12        | 7         | 5         | 36         |
| Networking            | 2         | 4         | 7         | 4         | 8         | 25         |
| <b>Total articles</b> | <b>23</b> | <b>28</b> | <b>43</b> | <b>31</b> | <b>26</b> | <b>151</b> |

The analysis sought to identify the origin of the articles on partnerships. For this purpose the 144 articles selected were classified according to the five Brazilian regions:

- North;
- Northeast;
- Midwest;
- Southeast and
- South.

After classification, it was found that 13.0% of the articles were more theoretical analyzes or comprise more than one condition at the same time, which resulted in "no category". The region with the highest number of articles (33.1%) was the Southeast (Minas Gerais, Rio de Janeiro and São Paulo). This was followed by the South (Paraná, Santa Catarina and Rio Grande do Sul) with 22.1% and Northeast (Maranhão, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe and Bahia) with 21.4%. Figure 3 summarizes the distribution of articles in the five Brazilian regions.

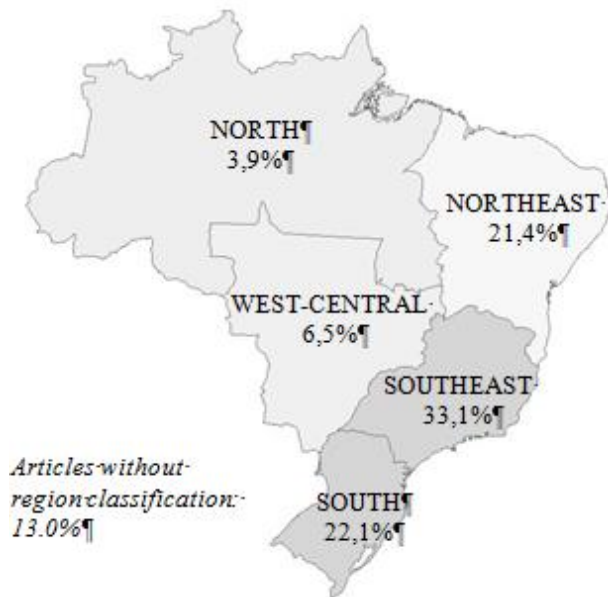


Figure 3: ANPROTEC Seminar: partnership articles distribution by Brazilian Regions (2010-2014).

The results are not at all surprising because the South and Southeast regions concentrate a significant portion of the incubation movement in Brazil, as demonstrated in the study by the Centre for Technological Development of the University of Brasilia (CDT / UnB, 2013). According to this study the two regions concentrate about 84% of Brazilian technology parks.

## CONCLUSIONS AND FURTHER RESEARCH

Brazil has a movement of incubators with 30 years and a set of incentive measures for its implementation. The ANPROTEC Seminar annually allows the presentation and discussion of the different experiences of incubators and technology parks representative of the country. Based on its relevance and importance in the context of Brazil, the analysis of the ANPROTEC Seminar proceedings was perceived as an important source of knowledge of the Brazilian reality.

Thus, taking as its starting point the analysis of articles published during the years 2010-2014, focused on thematic partnerships & incubators, it was found that relative to the seminar:

- During five years analyzed, the theme of partnerships represented 31.9% of the articles submitted;
- The analysis over time suggests a significant upward trend for the subject (minimum of 22.5% in 2010 and a maximum of 39.7% in 2014);
- There is a low recurrence of authors, since most authors showed only one article during the review period of 5 years;

- Analysis by authors suggest the existence of collaborative authorship networks (but still at an early stage);
- It was possible to identify three research groups in the subject (external partnerships, technological parks and networking), with a prevalence of examples or case studies in external partnerships;
- In terms of region, all regions of Brazil were being represented, with particular relevance of the Southwest and Southern Brazil (North represented only 3.9%).

In terms of limitations, the authors of this article recognize that the option to analyze the proceedings had some limitations, for example, have not been possible to study the impact of the authors and / or articles. On the other hand, it was realized that an event like ANPROTEC Seminar notes especially the case studies or examples, in some cases without theoretical support or very based on the specific case of Brazil (without recognition of existing knowledge level outside the country).

## REFERENCES

- Aaboen, L.; Lindelof, P.; and Lofsten, H. 2008. "Towards incubator facilitation of technology transfer". *International Journal of Management and Enterprise Development*, 5(3), 331.
- Aernoudt, R. 2004. "Incubators: Tool for Entrepreneurship?" *Small Business Economics*, 23(2), 127-135.
- ANPROTEC, A. N. de E. P. de E. I. 2014. "30+10: o empreendedorismo inovador em movimento". Retrieved from [http://www.anprotec.org.br/Relata/Anprotec\\_30+10\\_site.pdf](http://www.anprotec.org.br/Relata/Anprotec_30+10_site.pdf) (in portuguese)
- Beckert Neto, A.; Chaves, C. E. L.; and Baumann, J. 2012. "Uma análise da governança corporativa como estratégia de valorização para empresa incubada". In Proceedings of the XXII Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas. (in portuguese)
- Brooks, O. J. 1986. "Economic development through entrepreneurship: incubators and the incubation process". *Economic Development Review*, 4(2), 24-29.
- Carvalho, Z. V. de; Bezerra, A. F. de A.; Silva, W. S. C. da; Lopes Júnior, S. C.; and Brandão, G. B. 2014. "Dez anos da lei de inovação: reflexos no cenário brasileiro de parques tecnológicos e incubadoras de empresas". In Proceedings of the XXIV Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas. (in portuguese)
- CDT/Unb. 2013. "Estudo de Projetos de Alta Complexidade: indicadores de parques tecnológicos". Brasilia. (in portuguese)
- Faria, A. F. de; Gava, R.; and Suzuki, J. A. 2012. "Universidade empreendedora: dinâmica para a inovação tecnológica da Universidade Federal de Viçosa". In Proceedings of the XXII Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas (pp. 1-15). (in portuguese)
- Freitas, C. F. L. S.; Lima, A. S.; and Santos, L. K. A. dos. 2012. "A Influência da Cultura e do Poder Local na Consolidação de uma Incubadora de Empresas de Base

- Tecnológica em Petrolina-PE”. In Proceedings of the XXII Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas (pp. 1–7). (*in portuguese*)
- Hackett, S. M. and Dilts, D. M. 2004a. “A Real Options-Driven Theory of Business Incubation”. *The Journal of Technology Transfer*, 29(1), 41–54.
- Hackett, S. M. and Dilts, D. M. 2004b. “A Systematic Review of Business Incubation Research”. *The Journal of Technology Transfer*, 29(1), 55–82.
- Hansen, M. T.; Chesbrough, H. W.; Nohria, N.; and Sull, D. N. 2000. “Networked incubators. Hothouses of the new economy”. *Harvard Business Review*, 78(5), 74–84, 199.
- Leydesdorff, L. and Etzkowitz, H. 1996. “Emergence of a Triple Helix of university-industry-government relations”. *Science and Public Policy*, 23(5), 279–286.
- OECD. 2005. “Oslo Manual: guidelines for collecting and interpreting innovation data”.
- Phan, P. H.; Siegel, D. S.; and Wright, M. 2005. “Science parks and incubators: observations, synthesis and future research”. *Journal of Business Venturing*, 20(2), 165–182.
- Schwartz, M. and Hornych, C. 2010. “Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany”. *Technovation*, 30(9–10), 485–495.
- Sci2Team. 2009. “Science of Science (Sci2) Tool”. Retrieved from <https://sci2.cns.iu.edu>
- Vanderstraeten, J. and Matthyssens, P. 2012. “Service-based differentiation strategies for business incubators: Exploring external and internal alignment”. *Technovation*, 32(12), 656–670.
- Zampieri, N. L. V. .2014. “O processo de formação do primeiro APL da Região Central do RS a partir do fortalecimento da governança”. In Proceedings of the XXIV Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas. (*in portuguese*)