THE MANAGEMENT OF BUSINESS AND TECHNOLOGY INCUBATORS IN BRAZIL

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ABSTRACT

Objective: This article presents effective guidelines for the management of business and technology incubators in the Brazilian context.

Method: The research covers an analyzed context of 56 incubators located in different regions of the country. The recommended practices were identified based on a thorough analysis of the information available on institutional websites and the incubators' documents.

Results and Conclusion: The study focuses on three key areas: the selection process, the activities carried out by the incubator, and the marketing and dissemination strategies. As far as the selection process is concerned, practices such as the participation of partners in the evaluation of projects, the division of the process into careful stages, the analysis of the internationalization potential of the ventures, and the evaluation of the behavioral profile of the entrepreneurs involved stand out. About the activities promoted by the incubator, it is worth highlighting the offer of courses aimed at business development, the stimulation of innovation through technological support, the sharing of resources such as university laboratories, and the creation of collaborative networks between entrepreneurs. In terms of marketing and dissemination strategies, recommended practices include creating a bank of opportunities for startups, and using the university's institutional media as a platform for visibility and access to online resources to facilitate the exchange of knowledge and information.

Research Implications: This study offers a valuable contribution to the understanding of the successful strategies adopted by Brazilian incubators in promoting entrepreneurship and innovation, providing a solid guide for the effective management of these important centers of entrepreneurial and technological development in the country.

Keywords: Entrepreneurship, Business Incubators, Technology Incubator, Business Innovation.

A GESTÃO DE INCUBADORAS EMPRESARIAIS E TECNOLÓGICAS NO BRASIL

RESUMO

Objetivo: Neste artigo, são apresentadas diretrizes eficazes para a gestão de incubadoras de empresas e tecnológicas no contexto brasileiro.

Método: A pesquisa abrange um contexto analisado de 56 incubadoras localizadas em diversas regiões do país. As práticas recomendadas foram identificadas a partir da análise minuciosa de informações disponíveis nos sites institucionais e documentos das próprias incubadoras.

Resultados e Conclusão: O estudo se concentra em três áreas fundamentais: o processo de seleção, as atividades desenvolvidas pela incubadora e as estratégias de marketing e divulgação. No que diz respeito ao processo de seleção, destacam-se práticas como a participação de parceiros na avaliação dos projetos, a divisão do processo em etapas criteriosas, a análise do potencial de internacionalização dos empreendimentos e a avaliação do perfil comportamental dos empreendedores envolvidos. No que tange às atividades promovidas pela incubadora, merecem destaque a oferta de cursos voltados para o desenvolvimento empresarial, o estímulo à inovação por meio de suporte tecnológico, o compartilhamento de recursos como laboratórios universitários e a criação de redes colaborativas entre empreendedores. No âmbito das estratégias de marketing e divulgação, as práticas

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technology-based business incubators play a crucial role in supporting the development of innovative new ventures. They offer support, resources, and infrastructure to startups and entrepreneurs looking to turn ideas into successful businesses.

One of the pioneering and long-standing initiatives to encourage entrepreneurship in Brazil is incubators, which play a fundamental role and have a responsibility to create an enabling environment for developing companies to thrive. One approach to achieving this is to ensure that there is an effective infrastructure and the implementation of strategies that demonstrate their role in promoting economic growth. Its mission lies in providing an enabling environment for new companies to emerge and grow, by creating a space where knowledge is pooled and resources are shared (Azevedo & Teixeira, 2016).

Therefore, there is a clear need to improve the management of business incubators, which involves solid planning, robust financial and political support, as well as more effective integration with other players involved in the innovation ecosystem. This process can not only boost the success of incubated companies but also contribute to a broader discussion about the role of incubators in the entrepreneurial landscape (Silva et al., 2013; Silva et al. 2017; Pereira et al. 2021; De Almeida Bizarría et al. 2022; De Almeida & Silva 2023; Silva et al. 2023a; Silva et al., 2023b; Golçalves et al., 2023; Silva, Ten Caten & Gaia, 2023b; Maioli & Silva, 2023; Spier & Silva, 2023a; Spier & Silva, 2023b; Dal’Maso et al., 2023; Silva & Palata, 2024).

In Brazil, the incubator scene has expanded significantly, with higher education institutions, technology institutes, and technology parks playing a key role in this process.

The trajectory of Brazilian incubators has evolved from a model aimed at developing high-tech companies to a cooperative initiative focused on lower-tech services. This process of adaptation reflects the ability to reconfigure initial organizational practices, designed to address the deep inequalities that have historically permeated Brazilian society (as highlighted by Etzkowitz in 2013).

This article aimed to identify and analyze best practices in the management of Brazilian technology-based business incubators. To this end, incubators from different regions of the country were analyzed, seeking to understand how they stand out in promoting entrepreneurship and innovation.
2 THEORETICAL REFERENCE

Business incubators are organizations that offer support and resources for the development of startups and innovative ventures, facilitating the development of technology-based companies. They play a fundamental role in promoting entrepreneurship and creating an environment conducive to the growth of new businesses. According to Mian (1997), incubators provide physical infrastructure, access to mentors and consultants, as well as assist in the search for funding, the author emphasizes the importance of these incubators as agents of innovation.

The term "incubator" refers to a space specially designed to provide the ideal conditions for newborns to adapt to the external environment. Similarly, business incubators play a crucial role in offering essential support to entrepreneurial initiatives. These places aim to provide not only physical space but also operational, administrative, and technical infrastructure, guidance, management training, and consultancy for the development of products and services.

Incubators are based on the process of innovation, the dissemination of knowledge, and the promotion of an entrepreneurial culture. They are usually set up by government bodies, universities, or community groups. In Brazil, there are three main types of incubators: those aimed at technology-based companies, those aimed at traditional sectors, and those that cater to companies in various segments. According to Filion (2011), companies are based on the application of scientific and technological knowledge in their products, services, or processes.

The main purpose of incubators is to turn entrepreneurial projects into successful ventures. Given the high mortality rate of companies in the first few years of operation, the role of incubators is vitally important, as they act as facilitators in the process of developing and inserting innovative companies into the job market. According to information from the Brazilian Institute of Geography and Statistics (IBGE), around 20% of companies that open in Portugal "die" in their first year. Some symptoms are poor management, lack of planning, and lack of market knowledge, among others (IBGE, 2020).

The first experience of a business incubator was in the United States in 1938, amid economic difficulties resulting from the New York stock market crash of 1929. Cooperation between government, industry, and educational institutions made it possible to carry out innovative work, such as that carried out by students at Stanford University, whose names became recognized in the business world, such as Hewlett and Packard, co-founders of HP.

In the 1970s, in Silicon Valley in the United States, incubators emerged as a means of encouraging recent university graduates to develop their technological innovations and explore their entrepreneurial spirit. These incubators were generally associated with local universities and research centers, offering young entrepreneurs the opportunity to start companies based on innovation and technical knowledge.

In Brazil, the first incubators emerged in the 1980s, with the support of research centers, universities, and the government. Professor Cavalcanti, then president of CNPq, initiated the creation of five technology foundations in Campina Grande (PB), Manaus (AM), São Carlos (SP), Porto Alegre (RS) and Florianópolis (SC). The International Seminar on Technology Parks held in Rio de Janeiro in 1987 was a landmark event for the consolidation of Brazilian incubators as we know them today. That same year saw the creation of the National Association of Entities Promoting Innovative Enterprises (ANPROTEC), an organization that acts as an intermediary between the public and private spheres, to support and encourage the development of new technologies and products. It currently has more than 300 members, including business incubators, technology parks, accelerators, teaching and research institutions, public bodies, and other entities focused on entrepreneurship and innovation (Anprotec, 2022).

Incubators carry out various activities to improve entrepreneurial projects or incubated companies, such as mentoring and training and access to human, financial, and technological resources. They offer guidance and training for entrepreneurs, as well as facilitating access to
financial resources, laboratories, and networks. Authors such as Chesbrough (2003) highlight the importance of mentoring in accelerating the development of startups. In Brazil, research by Dornelas (2021) addresses the role of incubators in raising funds.

As noted by Mecena & Magacho (2007), the incubation movement plays a fundamental role as a generator of innovations, contributing significantly to the economic and technological results in the environments or arrangements in which they are inserted.

Another important point is the development of strategies, such as networking, partnerships, and internationalization. Establishing collaborative networks is crucial to strengthening projects. Authors such as Powell et al. (1996) highlight the importance of strategic partnerships for the success of incubators. Expansion into international markets is a relevant strategy. Authors such as Oviatt & McDougall (2018) discuss the internationalization process of startups.

The Brazilian Micro and Small Business Support Service (SEBRAE) also emphasizes that the capacity for innovation is essential for the success of companies in an increasingly competitive and globalized world, and incubators play a crucial role in facilitating and speeding up the process of technological innovation in micro and small companies (Sebrae, 2009).

3 METHODOLOGY

From the point of view of its nature, the research is basic. As a methodological procedure, a documentary analysis was carried out of public websites of technology-based incubators linked to public higher education institutions, technology institutes, and technology parks, divided into the five regions of Brazil (north, central-west, northeast, south, and southeast). The incubators were prospected on the Anprotec website, which gathers together the incubators associated with it in documents divided by state and region. Currently, Anprotec indicates the existence of 404 incubators (Anprotec et al., 2021). In the survey carried out between January and March 2023, the websites of 44 incubators were researched, and only business and technology-based incubators were selected; another filter used for selection was the ease with which the information on the respective websites was disclosed.

Based on the information on the names of the incubators, we analyzed their institutional websites, available public notices, internal regulations, events pages, and other available information to effectively identify the practices of these incubators that make them stand out and attract projects, what the patent production process is like, how they stimulate innovation within the Incubator and within the universities to which they are linked.

4 RESULTS AND DISCUSSION

Based on the survey of national incubators, this topic aims to bring together the main and best practices extracted from these incubators. This document will be divided into sections, each section containing a theme and the main practices extracted for this activity: the selection process in incubators, activities developed by the incubator, and marketing and dissemination strategies.

Figure 1 shows the distribution of the incubators surveyed. There was a greater concentration in the northeast, which accounted for 19.43%, followed by the southeast with 10.23% of those analyzed.
4.1 Incubator Selection Process

The selection process is a crucial stage for companies to enter incubators. Several practices have been adopted by the incubators analyzed, such as the participation of partners in the evaluation process, the division into selection stages, the analysis of internationalization potential, and the behavioral evaluation of entrepreneurs.

These practices aim to select projects with the greatest potential for success. Table 1 shows the main strategies for selecting entrepreneurial projects or companies to be incubated.

Table 1 - Selection Process Strategies

<table>
<thead>
<tr>
<th>Selection process strategies</th>
<th>Incubators</th>
</tr>
</thead>
<tbody>
<tr>
<td>All the Incubator's partners can take part in the process of evaluating the business plan of the Incubators that apply.</td>
<td>Redinova/Infro (Rondônia)</td>
</tr>
<tr>
<td>The selection process consists of three stages: presentation of an executive summary; presentation of a business plan and evaluation by the panel. It does not approve companies that are or may become direct or indirect competitors in the market.</td>
<td>Intuel/Uel (Paraná)</td>
</tr>
<tr>
<td>It has separate calls for pre-incubation and incubation, each with a specific objective. For example: in the pre-incubation process, a business plan model must be sent to be analyzed by the board, while in the incubation process, a presentation must be made using the PITCH model.</td>
<td>Intuel/UEL (Paraná)</td>
</tr>
<tr>
<td>Choose the continuous flow model.</td>
<td>Centev/Viçosa (Minas Gerais)</td>
</tr>
<tr>
<td>There must be an oral presentation of the business model.</td>
<td>Incubatec/UNEB (Bahia)</td>
</tr>
<tr>
<td>Six months for the monthly delivery of the business model Canvas. Market study and preparation of Go to go-to-market strategy, Operational Plan, Marketing Mix, and Cash Flow Projection (Valuation), Consolidation of the Business Plan and preparation of the Elevator Pitch.</td>
<td>DeltaInTec/IFPI (Piauí)</td>
</tr>
<tr>
<td>The criteria for analysis and judgment in the selection process also assess the project's potential for internationalization.</td>
<td>SergipeTec (Sergipe)</td>
</tr>
<tr>
<td>Workshops to build a business model (pre-submission of the project) and a behavioral analysis.</td>
<td>InteC-Cetf (Rio de Janeiro)</td>
</tr>
<tr>
<td>Assessment of the business plan in five areas: personnel, technology, capital, market, and management, with different weights. It must have an average of six to pass. Interview with a psychologist to analyze the entrepreneurial profile of the project participants.</td>
<td>ITUFABC (São Paulo)</td>
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<td></td>
<td>Pantanal (Mato Grosso do Sul)</td>
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<tr>
<td></td>
<td>IET/Fejal (Alagoas)</td>
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<tr>
<td></td>
<td>IFCE Business Incubator (Fortaleza)</td>
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</tbody>
</table>
A UERJ calls for proposals for all incubators, including the social incubator. Associate Company category, is a company already on the market, but which needs technical and managerial support in product development. Among the evaluation criteria for incubation, they take into account the level of interaction that the project has with the university and with local entrepreneurship.

**Source:** Own elaboration

### 4.2 Activities Developed by the Incubator

The incubators analyzed offer a variety of activities to support the development of incubated companies. These include courses on entrepreneurship, business planning and innovation, sharing university laboratories, acceleration programs, and creating networks of entrepreneurs. These activities contribute to the growth and training of startups.

Table 2 shows the main activities carried out by incubators for entrepreneurial projects or incubated companies.

**Table 2** - Main activities carried out

<table>
<thead>
<tr>
<th>Main activities</th>
<th>Incubators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering Incubator, Creative Economy, Sales Technique, and English courses for the indigenous community of the Lower Amazon to develop entrepreneurial initiatives</td>
<td>Redinova/IFRO (Rondônia)</td>
</tr>
<tr>
<td>The incubator itself promotes studies and research related to the development and profile of the local and regional market.</td>
<td>Business Incubator/UFT (Tocantins)</td>
</tr>
<tr>
<td>It has the &quot;GO!!&quot; service, an initiative that analyzes and identifies the company's needs for its international insertion and internationalization process.</td>
<td>CELTA/UFSC (Santa Catarina)</td>
</tr>
<tr>
<td>To regularize relations within the Incubator's establishment, it has a Shared Use contract that must be signed when the Incubation begins.</td>
<td>EDETEC/UNIFOR (Ceará)</td>
</tr>
<tr>
<td>Creation of an &quot;Entrepreneurs' Club&quot;. A platform with activities and courses that facilitate networking and contact between entrepreneurs.</td>
<td>INCUBEM/UFMA (Maranhão).</td>
</tr>
<tr>
<td>Possibility of using the University's laboratories, in addition to the agreements with national and international institutions that the University itself has. Close ties with the university.</td>
<td>POSITIVA/UFPE (Pernambuco)</td>
</tr>
<tr>
<td>It has offices in the interior of the state, helping to internalize innovation. All the offices are in line with each other. Forming a network of incubators within INCUBATEP.</td>
<td>INCUBATEP/ITEP (Pernambuco)</td>
</tr>
<tr>
<td>The Lessons Learned Program aims to capture, record, and share the experiences of entrepreneurs linked to the UFG Center for Entrepreneurship and Innovation (CEI).</td>
<td>CEI UFG/UFG (Goiânia)</td>
</tr>
<tr>
<td>Ideation Lab: a set of activities aimed at stimulating innovation and entrepreneurship, advising entrepreneurs on the generation and development of new ideas or pre-conceived ideas.</td>
<td>CRITT/UFJF (Minas Gerais)</td>
</tr>
<tr>
<td>Virtual incubation. It has the PRIME Program, an Institutional Cooperation Agreement to create favorable financial conditions for start-up companies.</td>
<td>ITCP/Paqtcbp (Paraíba)</td>
</tr>
<tr>
<td>It evaluates companies while they are being incubated and issues certificates at the end with evaluations on the following criteria: Attendance; Commitment and Evolution. Incubated companies should, whenever possible, even after graduation, display the logo of the incubator/accelerator.</td>
<td>ISAEBusiness/FGV (Paraná)</td>
</tr>
<tr>
<td>In addition to providing entrepreneurship and innovation courses for the public in undergraduate and postgraduate courses, provide courses in this sense for high school students so that students already have an entrepreneurial culture before they enter university.</td>
<td>SudoTEC (Paraná)</td>
</tr>
</tbody>
</table>
4.3 Marketing and promotion strategies

The visibility of incubators is essential for attracting entrepreneurs and projects. The marketing and dissemination strategies of the incubators analyzed include the creation of opportunity banks, dissemination in university media, making online resources available, and promoting entrepreneurship and innovation events.

Table 3 shows the incubators' main marketing and promotion strategies for entrepreneurial projects or incubated companies.

<table>
<thead>
<tr>
<th>Marketing and promotion strategies</th>
<th>Incubators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of a bank of opportunities for entrepreneurs, such as the best courses, and a calendar of entrepreneurship and innovation events that contribute to the professional development of the projects. Providing a business plan template and a PITCH presentation on the website, both of which must be presented during the selection process.</td>
<td>IFAM Business Incubator - AYT (Amazonas)</td>
</tr>
<tr>
<td>Publicizing companies on the University's website and other institutional platforms</td>
<td>CdTech (Amazonas)</td>
</tr>
<tr>
<td>It has a gallery on its page/website with the products that have already been developed within the Incubator.</td>
<td>(INTECE/CENTEC. Ceará)</td>
</tr>
<tr>
<td>On its website, it has the “Innovation Guide” containing various questions and answers about the innovation process, incubation, and patents.</td>
<td>(ISA/NIT. Pernambuco)</td>
</tr>
</tbody>
</table>

Promoting innovation and encouraging entrepreneurship have been fundamental to Brazil's economic and technological development in recent decades. In this context, technology-based business incubators have emerged as an important environment for fostering these initiatives. However, the selection process in these incubators presents challenges and barriers that require attention and strategies to overcome, as well as the need to improve the activities developed and the dissemination of their results. Based on the survey and analysis carried out, some of the challenges and barriers were identified.

Regarding the Selection Process:
1. Filtering Quality Projects: The main challenge in the selection process for incubators is selecting projects with high innovation and market potential. The careful evaluation of proposals and the identification of qualified teams are fundamental.
2. Access to Financial Resources: Many startups face financial difficulties at the beginning of their journeys. Incubators need to find ways to provide access to funding and resources for early-stage companies.
3. Mentoring and follow-up: The lack of proper guidance and follow-up can lead to the failure of promising ventures. Incubators need to offer specialized support to guide entrepreneurs in areas such as management, marketing, and technology.

Regarding the activities carried out by the Incubators:
1. Networking and partnerships: Incubators play a crucial role in building networks and strategic partnerships for their incubated companies. Facilitating these connections can accelerate the growth of startups.
2. Training and Capacity Building: Offering training and capacity-building programs is essential for developing entrepreneurs' skills. Workshops, lectures, and courses can be incorporated into incubators' activities.
3. Infrastructure and Innovation Environment: Incubators must provide an environment conducive to innovation, with adequate workspaces, laboratories, access to advanced technologies, and collaborative environments.

About Marketing and Publicity Strategies:
1. Online presence: Creating websites, social media profiles, and blogs can help increase the visibility of incubators and attract entrepreneurs looking for support.
2. Events and Conferences: Participating in industry events and organizing conferences on entrepreneurship and innovation is an effective way to attract the attention of the entrepreneurial community.
3. Partnerships with Universities and Companies: Establishing collaborations with higher education institutions and companies can strengthen the incubator's credibility and broaden its network of contacts.
4. Publicizing Success Stories: Highlighting the success stories of incubated startups is a powerful strategy for showing the positive impact of incubators and attracting talented entrepreneurs.

Technology-based business incubators play a vital role in Brazil's innovation ecosystem. However, they face complex challenges in the selection process, need to constantly improve their activities, and adopt effective marketing and dissemination strategies. By overcoming these obstacles, incubators can continue to boost entrepreneurship and innovation, contributing to the country's economic and technological growth.

5 CONCLUSION

Best practices in the management of Brazilian technology-based business incubators reveal the importance of carefully selecting projects, offering training activities, and investing in marketing and dissemination strategies. These practices contribute to strengthening the entrepreneurial ecosystem in Brazil, promoting innovation and economic growth.

In a scenario where technological innovation is crucial for global competitiveness, technology-based business incubators have stood out as drivers of entrepreneurship and the creation of promising startups in Brazil. However, the selection process, the activities carried out and the marketing and dissemination strategies face significant challenges.

Incubators must continue to improve their selection practices, focusing on identifying projects with great potential for innovation and building competent teams. In addition, access to financial resources and support in the form of mentoring and follow-up must be priorities to ensure the success of incubated companies.

As part of the activities carried out by incubators, building networks, strategic partnerships, and offering training programs are valuable strategies for accelerating the growth of startups. The creation of innovation environments that provide adequate infrastructure and encourage collaboration is also essential.

As for marketing and publicity strategies, incubators must adopt a strong online presence, participate in relevant events, and highlight their success stories. Collaborations with educational institutions and companies can further increase their influence and visibility.

For future studies, a more in-depth investigation into the effectiveness of the selection and monitoring strategies used by Brazilian incubators is recommended. In addition, analyzing the economic and social impact of incubated startups can provide valuable insights for measuring the success of incubators. It is also relevant to study how incubators can adapt to ongoing technological and economic changes, such as the digital transformation and the circular economy.

Ultimately, technology-based business incubators play a key role in promoting innovation and strengthening entrepreneurship in Brazil. With strategic approaches and
ongoing research, they can continue to drive the country's economic and technological development and contribute to the creation of a more robust and dynamic entrepreneurial environment.

The study presented here highlights the diversity of approaches adopted by incubators in different regions of the country, showing that there is no single formula for success. Each incubator adapts its practices according to its context and available resources. The analysis of these practices can serve as inspiration for other incubators and institutions seeking to support entrepreneurship and innovation in Brazil.

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