

**UNIVERSIDADE ESTADUAL DO OESTE DO PARANÁ
PROGRAMA DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO
MESTRADO PROFISSIONAL**

**WESTERN PARANÁ STATE UNIVERSITY
PROFESSIONAL MASTER'S IN ADMINISTRATION**

**MECANISMOS DE APOIO OFERECIDOS PELAS INCUBADORAS E SUA
RELAÇÃO COM OS CRITÉRIOS DE SUCESSO DA GRADUAÇÃO DAS
EMPRESAS INCUBADAS**

**SUPPORT MECHANISMS OFFERED BY THE INCUBATORS AND THEIR
RELATION WITH THE GRADUATION SUCCESS CRITERIA OF THE
INCUBATED COMPANIES**

[TRADUÇÃO INGLESA]

ÂNGELA WATTE SCHWINGEL

CASCVEL/PR

2023

Ângela Watte Schwingel

**MECANISMOS DE APOIO OFERECIDOS PELAS INCUBADORAS E SUA
RELAÇÃO COM OS CRITÉRIOS DE SUCESSO DA GRADUAÇÃO DAS
EMPRESAS INCUBADAS**

**SUPPORT MECHANISMS OFFERED BY THE INCUBATORS AND THEIR
RELATION WITH THE GRADUATION SUCCESS CRITERIA OF THE
INCUBATED COMPANIES**

[TRADUÇÃO INGLESA]

Dissertation presented in partial fulfilment of the requirements for the degree of Master of Science in Administration in the Department of Administration, Western Paraná State University. Dissertation Supervisor: Marcelo Roger Meneghatti, PhD
Co-supervisor: Elizandra da Silva, PhD

Dissertação apresentada ao Programa de Pós-Graduação em Administração (PPGAdm) – Mestrado Profissional da Universidade Estadual do Oeste do Paraná, como requisito parcial para obtenção do grau de **Mestre em Administração**. Orientador: Prof. Dr. Marcelo Roger Meneghatti
Coorientadora: Profa. Dra. Elizandra da Silva

CASCADEL/PR

2023

International Cataloging-in-Publication Data
UNIOESTE Library System

Watte, Ângela Schwingel.

Support mechanisms offered by the incubators and their relation with the graduation success criteria of the incubated companies/ Ângela Schwingel Watte; Supervisor: Marcelo Roger Meneghatti; Elizandra da Silva [Translation of Dhandara Capitani], 2023.
108 f.

Dissertation (Degree in of Master of Science in Administration) –
Department of Administration, Western Paraná State University, 2023

1. Innovation. 2. Incubators. 3. Incubatee Companies. 4. Incubation Process. 5. Successful Graduation of companies I. Meneghatti, Marcelo Roger. II. Silva, Elizandra da III. Pavan, Maria Capitani, Dhandara. IV. Title.



unioeste

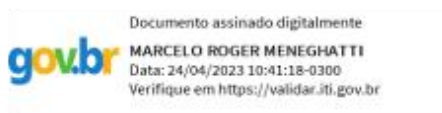
Universidade Estadual do Oeste do Paraná
Reitoria
CNPJ 78.680.337/0001-84
Rua Universitária, 1619, Jardim Universitário
Tel.: (45) 3220-3000 - Fax: (45) 3225-4590 - www.unioeste.br
CEP: 85819-110 - Cx. P.: 701
Cascavel - PARANÁ



ÂNGELA WATTE SCHWINGEL

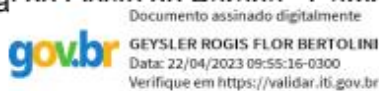
Mecanismos de apoio oferecidos pelas incubadoras e sua relação com os critérios de sucesso da graduação de empresas incubadas

Dissertação apresentada ao Programa de Pós-Graduação em Administração em cumprimento parcial aos requisitos para obtenção do título de Mestra em Administração, área de concentração Competitividade e Sustentabilidade, linha de pesquisa Sustentabilidade, APROVADO(A) pela seguinte banca examinadora:



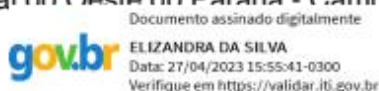
Orientador(a) - Marcelo Roger Meneghatti

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)



Geysler Rogis Flor Bertolini

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)



Elizandra da Silva

Universidade Estadual do Oeste do Paraná - Campus de Cascavel (UNIOESTE)

Luciano da Costa Barzotto

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ (UTFPR)

Cascavel, 19 de abril de 2023

ACKNOWLEDGEMENTS

To God, for my life and for having placed in my path people whom I consider exemplary. To my family, who always gave me all the support and encouragement to follow this journey. To my husband, Fernando de Andrade Cabreira, who was with me from the beginning and was my biggest encourager to not give up on my goal.

To all the professors of the Graduate Program in Administration (PPGAdm) – Professional Master's Degree at the Western Paraná State University, who shared their knowledge and experience.

To my advisor, Prof. Marcelo Roger Meneghetti, PhD., for his mastery in the advising process, for his patience and support, making the conclusion of this work possible. To Prof. Elizandra da Silva, PhD., for her valuable contributions and co-advising. To the members of the qualifying and defense exam boards, my sincere thanks for accepting the invitation and for the scientific recommendations, which greatly contributed to the improvement of this work.

To my classmates of the 2020 class of the Professional Master's in Administration Program, with whom it was possible to exchange knowledge and for making remote classes more light-hearted and enjoyable, especially Jucé Dessanti, for his valuable friendship and the strength given in this journey.

To everyone who, in whatever way, contributed to the making of this study, my sincere thank you.

RESUMO

Schwingel, Ângela Watte (2023). **Mecanismos de apoio oferecidos pelas incubadoras e sua relação com os critérios de sucesso da graduação das empresas incubadas**. Master's thesis professional, Universidade Estadual do Paraná, Cascavel, PR, Brasil.

Este estudo teve por objetivo analisar quais os mecanismos de apoio oferecidos pelas incubadoras de empresas associadas à ANPROTEC, que possuem relação com os critérios de sucesso da graduação das empresas incubadas. Para tanto, a metodologia aplicada foi classificada como descritiva e quantitativa, por meio de levantamento *survey* com coleta de dados através de aplicação de questionário junto a 79 gestores de empresas graduadas em incubadoras brasileiras. A análise dos dados foi feita por meio da realização dos testes da modelagem da Equação Estrutural de Mínimos Quadrados Parciais (PLS-SEM). O estudo mostrou que existe uma forte correlação entre todos os onze mecanismos de apoio levantados com todos os oito critérios de avaliação do sucesso da graduação, além de identificar que os recursos físicos e humanos oferecidos pelas incubadoras são os mecanismos de apoio que menos influenciam no sucesso das empresas que passaram pelo processo de incubação. A partir da realização deste estudo, pode-se afirmar que não há apenas um mecanismo de apoio que pode influenciar o sucesso de um programa de incubação, e sim a relação de mecanismos diversos e os critérios de avaliação de sucesso adotados por cada uma das incubadoras que auxiliam as empresas incubadas e as incubadoras a visualizarem quais são os mecanismos que mais impactam para a melhoria do processo de incubação.

Palavras-chave: Inovação, Incubadoras, Empresas incubadas, Processo de Incubação, Sucesso da Graduação de empresas.

ABSTRACT

Schwingel, Ângela Watte (2023). **Support mechanisms offered by the incubators and their relation with the graduation success criteria of the incubated companies.** Professional Master's Degree, Western Paraná State University, Cascavel, PR, Brasil.

This study aimed to analyze which support mechanisms are offered by the incubators of companies associated with ANPROTEC, which are related to the success criteria for the graduation of their incubatee companies. Therefore, the applied methodology was classified as descriptive and quantitative, employing a survey with data collection through the application of a questionnaire with 79 managers of companies graduated from Brazilian incubators. The analysis of the data was carried out through the Partial Least Squares Structural Equation Modeling (PLS-SEM) tests. The study showed that there is a strong correlation between all eleven support mechanisms raised with all eight evaluation criteria of graduation success, in addition to identifying that the physical and human resources offered by incubators are the support mechanisms that least influence the success of companies that have gone through the incubation process. Based on this study, it can be stated that there is not only one support mechanism that can influence the success of an incubation program, but rather the relation between different mechanisms and the success evaluation criteria adopted by each of the incubators that help incubated companies and incubators to visualize which are the mechanisms that most impact the improvement of the incubation process.

Keywords: Innovation, Incubators, Incubatee Companies, Incubation Process, Successful Graduation of companies.

LIST OF FIGURES

Figure 1. Research model	53
Figure 2. Final analysis model – Graduation Rate	63
Figure 3. Final analysis model – Survival of new companies	64
Figure 4. Final analysis model – Growth in job creation	65
Figure 5. Final analysis model – financial sustainability	67
Figure 6. Final analysis model – Growth of new companies	68
Figure 7. Final analysis model – Occupancy rate / Number of incubatees	69
Figure 8. Final analysis model – Creation of companies by the incubator	71
Figure 9. Final analysis model – Growth and sustainability of the incubation program.....	72

LIST OF CHARTS

Chart 1. Different innovation habitats	29
Chart 2. Support mechanisms offered by the incubator	36
Chart 3. Criteria for the Graduation Success Assessment	38

LIST OF TABLES

Table 1 Respondents by state of the federation.....	60
Table 2 Number of employees per graduated company	61
Table 3 Reliability and validity tests – Graduation Rate.....	63
Table 4 Reliability and validity tests – Survival of new companies	65
Table 5 Reliability and validity tests – Growth in job creation.....	66
Table 6 Reliability and validity tests – Financial sustainability.....	67
Table 7 Reliability and validity tests – Growth of new companies.....	68
Table 8 Reliability and validity tests – Occupancy rate / Number of incubatees.....	70
Table 9 Reliability and validity tests – Creation of companies by the incubator	71
Table 10 Reliability and validity tests – Growth and sustainability of the incubation program	73

LIST OF GRAPHS

Graph 1. Graduation year of the researched companies	61
--	----

LIST OF ABBREVIATIONS AND ACRONYMS

ANPROTEC	National Association of Entities Promoting Innovative Enterprises
PLS-SEM	Partial Least Squares Structural Equation Modeling
AVE	Average Variance Extracted
CC	Compound Reliability

SUMMARY

1	INTRODUCTION	15
1.1	RESEARCH PROBLEM	17
1.1.1	Research question	20
1.2	OBJECTIVES.....	20
1.2.1	General objective.....	20
1.2.2	Specific objectives.....	20
1.3	JUSTIFICATION AND CONTRIBUTION	21
1.4	DISSERTATION STRUCTURE	22
2	THEORETICAL AND PRACTICAL REFERENCES	23
2.1	INNOVATION	23
2.2	SYSTEMS, ECOSYSTEMS, AND INNOVATION HABITATS	26
2.3	COMPANY INCUBATORS.....	29
2.4	COMPANIES INCUBATION AND GRADUATION PROCESS.....	31
2.4.1	Support mechanisms offered by the incubator	38
2.4.2	Graduation success evaluation criteria	45
2.5	SIMILAR EXPERIENCES IN BRAZIL AND IN THE WORLD	49
2.6	CONSIDERATIONS ON THE SECTION AND CONSTRUCTION OF RESEARCH HYPOTHESES.....	52
3	TECHNICAL PRODUCTION RESEARCH METHOD AND TECHNIQUES	56
3.1	RESEARCH OUTLINE	56
3.2	DATA COLLECTION PROCEDURE	57
3.3	DATA ANALYSIS PROCEDURE	59
3.4	LIMITATIONS OF RESEARCH METHODS AND TECHNIQUES	59
4	RESULTS.....	60

4.1	CHARACTERIZATION OF PARTICIPANTS	60
4.2	MODEL ANALYSIS	62
5	DISCUSSION OF THE RESULTS	74
6	CONCLUSION	78
	REFERENCES	80
	ANNEX A – APPLIED RESEARCH QUESTIONNAIRE	101

1 INTRODUCTION

Innovation, in many ways, is understood as a dynamic process and has brought together efforts and competencies that encourage sustainable competitive advantage and economic growth, both for companies and for nations (Teza et al., 2016; Chen et al., 2018; Coad et al., 2019). Innovation and its diffusion enable a strong impact on competitiveness and economic activity, adding value to the organization and its customers, with the use of knowledge that improves or generates new products, services or processes (Dosi, 1982; Dosi, 1983; Freeman, 1987; Lundvall, 1992; Beuren, 2000; Cagnazzo et al., 2008; Reis, 2008; Chen, 2017), or even with structural or paradigmatic changes (OECD, 2010). Therefore, innovation can be understood as a process in which companies transform ideas into new products, services, or processes, in order to succeed in their markets (Baregheh et al., 2009).

The innovation process is more concretely presented in organizational environments, resulting from the systemic efforts of several different actors that make up the so-called Innovation Systems (IS) (Cassiolato & Lastres, 2000; Lundvall, 2011). Therefore, an Innovation System can be defined as a set of companies, universities, research institutions, governments, banking institutions, among others, which create skills to explore the process of innovation and technology diffusion (Freeman, 1987; Nelson & Rosenberg, 1993; Niosi et al., 1993; Cassiolato & Lastres, 2000; Gava & Vidal, 2009).

Innovation Systems are composed of institutions, formal and informal networks, purposes, policies, resource providers and governance, which affect the direction and rate of technological change in society (Lundvall, 1992; Edquist & Lundvall, 1993; Freeman, 1995; Cassiolato & Lastres, 2000; Edquist, 2007; Lundvall, 2011). However, to enable the creation of a virtuous cycle of innovative and technological development, it is necessary that the actors have aligned objectives and carry out articulated actions, in order to structure and consolidate the Innovation System (Nelson & Rosenberg, 1993; Fiates et al., 2017) and that is aimed at the production, dissemination and use of new knowledge, in addition to being economically useful for society (Lundvall, 1992; Edquist, 2007). In other words, it is an innovation model that is no longer linear and adopts a perspective of cooperation and chain interrelations (Dosi, 1988; Lundvall, 1992; Freeman, 2004; Berger & Diez, 2006).

However, the innovation systems approach does not clarify the relation between the innovative structure and the innovation process, due to the static nature of the model. Therefore,

the innovation ecosystem approach was created, which considers the dynamic nature of innovation (Mercan & Göktas, 2011). The term Ecosystem in the business area was derived from the studies by Moore (1993), conceptualizing it as a structure in which companies interact cooperatively and competitively in different sectors, in order to meet the needs of customers (Moore, 1993; Clarysse et al., 2014; Mercan & Göktas, 2011; Jacobides et al., 2018). The ecosystem describes groups of companies that are heterogeneous but complementary, which together generate a result at the system level (Thomas & Autio, 2020), that is, these are collaborative arrangements in which organizations combine individual offers to reach a solution that is customer-oriented (Adner, 2006). Ecosystems are formed by several actors (company, customers, suppliers, entities) that are interdependent and that co-evolve seeking the joint creation of value (Bogers et al., 2019; Carayannis & Campbell, 2009; Gomes et al., 2018; Granstrand & Holgersson, 2020; Ritala & Almpantopoulou, 2017).

Business incubators, technology parks, accelerators and other agents are part of innovation ecosystems and are dedicated to sheltering and supporting companies that have innovation as one of their main differentials. Over the years, offering environments that are conducive to the creation and development of innovative solutions and businesses have been an important instrument to boost technological, economic, and social development. Brazil currently has 363 business incubators, 43 technology parks in operation and another 60 being implemented, and 57 accelerators, which contribute to innovative entrepreneurship acting as a decisive foundation for Brazilian sustainable development (ANPROTEC, 2021).

Business incubation is a relatively recent phenomenon that emerged in support of new ventures, becoming part of the current business ecosystem (Hausberg & Korreck, 2020). Business incubators are organizations that aim to stimulate or support innovative ventures, offering shared resources and support for new companies, whether logistical, managerial, or technological. These have the purpose of facilitating the development or creation of companies that have as a differential the execution of their activities focused on innovation, whose final objective is to create viable businesses, through the incubation process, which in the end are called graduated enterprises (ANPROTEC, 2021; Bollingtoft, 2012; Carmo & Rangel, 2020; Hausberg & Korreck, 2020; NBIA, 2021).

To face the challenges of improving efficiency and leveraging know-how, which also depend on exploring new areas and taking risks, organizations can rely on incubators to foster growth with an entrepreneurial mindset and innovation (Gonthier & Chirita, 2019). The purpose of these is to provide incubated enterprises with an environment in which they can grow reasonably protected, and then become self-sustainable (NBIA, 2021).

Faced with the challenges of starting a new business, incubators emerge to support young companies in the early stages of their development (Minello, Marinho & Bürger, 2018; Gorączkowska, 2020), contributing to personal development, increased product innovations by companies incubated and carrying out R&D activities, which helps economic and social development and to gain market advantage, preserving the autonomy and sustainability of organizations (Minello, Marinho & Bürger, 2018; Gorączkowska, 2020), in addition to fostering internationalization processes through relation networks (Fiates et al., 2013).

Incubators, in addition to contributing to the growth and development of the incubated enterprises, also contribute to the local development in which they are inserted, due to the generation of jobs and income and economic strengthening (Hewitt & van Rensburg, 2020; Raupp & Beuren, 2011). The creation of incubators focuses on providing full conditions for the incubated companies, in order to facilitate their success and also the insertion of new companies in the environment (Raupp & Beuren, 2011). Also for the authors, incubators should use as criteria for selecting these companies the viability of the business, the profile of the entrepreneurs, the target segment of activity, product innovation, the technology used in the product and the entrepreneur's experience in the field in which the company intends to act. Thus, with the support provided by incubators and the reduction of early mortality of several companies, it is expected that the incubated enterprises can obtain better results and be more prepared for their insertion in the market (Raupp & Beuren, 2007).

Several authors (Becker & Gassmann, 2006; Bergek & Norrman, 2008; Bollingtoft & Ulhoi, 2005; Chandra & Chao, 2011; Lee & Osteryoung, 2004; Peña, 2004; Peters et al., 2004; Rothaermel & Thursby, 2005; Soetanto, 2004; Voisey et al., 2006; Wiggins & Gibson, 2003) describe the incubator as a means that intends to transform inputs into outputs, that is, entry of projects into new companies. However, despite being described as a technological enabler, it alone does not necessarily generate results; in other words, the lack of qualitative components can generate an incubator with poor performance (Hackett & Dilts, 2004a). Therefore, the incubation process can be evaluated when the incubated leave the incubator, both in terms of economic performance and growth (Hackett & Dilts, 2004b).

1.1 RESEARCH PROBLEM

In the incubation process, it is not the lack of resources or innovation activities alone that explain the performance of the incubated company (Soetanto & Jack, 2018). By creating

an environment that protects new ventures from unfavorable situations, incubators, in general, only provide symptomatic solutions to these problems, which can cause future challenges to the business ecosystem in which these new companies are inserted (van Weele et al., 2018). Despite this, incubators create innovative projects allowing the implementation of technological advances or new organizational formats, which reduce development time and cost, thus helping incubated companies to create more solid and dynamic innovative projects, reducing the level of uncertainty (Lian, 2020).

Fiuza, Emmendoerfer and Vasconcelos (2010), in their study, sought to identify which managerial skills could help reduce mortality in micro and small companies. As a result, the authors found that although entrepreneurs have some conviction about the importance of managerial skills, many uncertainties may be related to the knowledge, attitudes and skills needed to exercise such skills that could help organizations survive. In line with this perspective, Nair and Blomquist (2019) understand that business incubation practices aimed at the management and prevention of failures can contribute to the prevention and mitigation of failure, whether at a personal, organizational or social level, creating value for the incubated.

When investigating which programs Brazilian incubators offered for the incubated enterprises, so that difficulties and challenges could be alleviated during the incubation period, Raupp and Beuren (2009a) concluded that three stood out: the enhancement of qualities during incubation, the programs designed by the incubator for each incubation phase and programs created by incubator agents for each incubation phase.

In this way, Zapata-Guerrero et al. (2020) analyzed the efficiency, growth-oriented, and job survival of incubators in Mexico through a dual-management approach (incubator and startups). As a result, the authors propose that resources should be changed in order to adopt more efficient management practices for incubators and small startups. In a complementary way, Binsawad, Sohaib and Hawryszkiewicz (2019), in their study of incubators with a technological bias in Saudi Arabia, provide empirical insights into the performance of these incubators by providing a conceptual framework with a view to evaluating incubators based on practices of knowledge sharing and sharing, diffusion of innovation and individual creativity. Its results showed that the donation and collection of knowledge have a positive effect on the incubator's technology business.

Lopes and Sassi (2019) analyzed the degree of importance of the factors that contribute to the development of technology-based companies in the Vale do Paraíba Paulista in the perception of company managers and incubators. The factors analyzed were resources provided by incubators, requirements for selecting incubators by companies, entrepreneurial

characteristics and resources offered in partnership with other development agents, allowing to observe how technology-based entrepreneurship has been practiced in the region, in addition to allowing to analyze the perception of managers about the factors considered.

In turn, Gozali et al. (2018) examined the effect of critical success and moderating factors on business incubators at public universities in Indonesia, noting that success factors have a strong relation with an efficient system and infrastructure, entry criteria, exit criteria and support of financing. The moderating factors, according to the same authors, showed a strong relation with information technology, mentoring and networking, and finally, university regulation had a strong relation with the moderating factors of credit and rewards.

Xiao and North (2017) examined the effects of funding, technical support and business guidance on the graduation performance of new technology-based companies in three cities in China and the results obtained indicated that the effectiveness of an incubator's services is shaped by the level of socioeconomic development in the region where it is installed and that the location of the city of a TBI impacts the graduation performance of its incubated.

Granados (2019), additionally, described the characteristics of an incubation business model, determining 81 characteristics, in a model divided into eight categories: managerial profile, constitutive aspects, management strategies, organizational model, project management, strategic partnerships, operating resources and relation with students. It also concluded that although there are common elements in all incubators, it is possible to determine an identity for each model, with multiple characteristics.

In turn, Siddiqui et al. (2021) developed critical success criteria for business incubators in Saudi Arabia, having presented a list of success criteria for performance. Of these, the main ones are the hours of training and mentoring, the number of services and support offered and the potential access to investment funds. On the other hand, the least important are linked to the affiliation with the university, the time limit for leasing and the number of IPOs launched. The authors also indicated some critical success factors for university business incubators and came up with five, including support services, network support, financial support, economic development, and alumni success.

The authors Mas-Verdú, Ribeiro-Soriano and Roig-Tierno (2015) analyzed the impact of business incubators on the survival of companies and also examined whether the degree of business innovation, sector, size and export activity influence the survival of the company. As a result, they realized that the incubator alone cannot affect the survival of companies, but that when combined with other variables (industry, technology, among others), the size of the

company is a sufficient perspective for its survival, that is, the combination between incubator and other factors is necessary to ensure the survival of the company.

Oliveira and Terence (2018) point out that incubation is a determining factor to minimize or even remedy difficulties of companies in an embryonic stage, leading them to obtain a unique market orientation. As benefits of the incubation and post-incubation process, the authors point out support in finance and marketing, synergy with incubated companies, relation network, support in the conception of strategic planning, infrastructure and also the ease of obtaining financing. As difficulties were pointed out, the lack of support for technical services, little physical space available and lack of guidance for carrying out project financing. They also present low-cost disclosure, administrative and managerial support and the relation fostered with technology centers and academics as differential processes.

1.1.1 Research question

In this context, the research question for this study can be summarized as: What are the support mechanisms offered by the incubators and what is their relation with the success criteria for the graduation of the incubated companies?

1.2 OBJECTIVES

1.2.1 General objective

Analyze which support mechanisms are offered by the incubators of companies associated with ANPROTEC that are related to the criteria for success in the graduation of the incubated companies.

1.2.2 Specific objectives

- a) Characterize the profile of incubators associated with ANPROTEC;
- b) Surveying, together with the incubated companies, the support mechanisms offered by the incubator during the incubation process;

- c) Investigating, along with the incubated companies, the graduation success criteria that they achieved after or during the incubation period;
- d) Analyzing the degree of influence of the support mechanisms adopted by the incubators in relation to the success criteria for the graduation of the incubated companies.

1.3 JUSTIFICATION AND CONTRIBUTION

Business incubators encourage the growth of small businesses through the incubation process, providing opportunities for incubated companies to achieve superior performance when compared to companies that did not go through the incubation process (Fonseca, 2015). Incubation studies bring few empirical contributions that analyze incubator variables in relation to the success of this process (Hackett & Dilts, 2004), or analyze only one incubation success variable, such as performance or graduation rate, leaving many criteria outside the analyses.

In the review carried out by Tietz et al. (2015) identified the main topics researched on business incubators, showing that national research has broadly addressed the general characteristics of incubators, such as internal characteristics, relationships with the external environment and interrelationships between incubators, but the aspects related to the incubation process, such as pre-incubation, incubation, monitoring and capture, need further studies.

Consequently, this study contributes to research in the field of creation and development of companies based on the incubation process, through the analysis of the evaluation criteria of the incubation process and the graduation success criteria adopted by Brazilian incubators, because when identifying possible points to be improved in the management of incubators it is possible to provide insights for solving the challenges faced by these institutions and facilitate the graduation and subsequent success of incubated companies, in addition to identifying potential areas for future research.

The study also contributes with a diagnosis or with a measurable and useful structure to evaluate the success of Brazilian incubators, in addition to serving as a roadmap for improvements to be adopted for the prevention and/or management of failures in the incubation of companies, which managers themselves will be able to verify and carry out the implementation.

Most business incubators are funded directly or indirectly by the government, according to ANPROTEC (2012), which makes it even more important to verify the results and effectiveness of these investments, as well as to identify mechanisms for promoting and

improving results. As promoters of new companies, the performance of incubators is also relevant for stimulating the culture of innovation and job and income generation that new ventures can create for the region in which they operate.

In this way, we hope to be able to contribute to science and practice to analyze which support mechanisms offered by the incubators of companies associated with ANPROTEC are related to the success criteria for the graduation of the incubated companies.

1.4 DISSERTATION STRUCTURE

This dissertation is divided into six sections: introduction, theoretical and practical references, methods and research techniques of technical production, results, discussion of results and conclusion.

The first section brings the introduction, which addresses a brief concept about innovation, business incubators and the incubation process, as well as their importance for development and regional economic growth, in addition to also presenting the research problem, the justification and the structure of the work.

In the second section, theoretical references and work practices are presented regarding innovation, systems, ecosystems and innovation habitats, business incubators, and, finally, the incubation process of incubated enterprises, in which the support mechanisms offered are raised. by the incubators and the evaluation criteria for the success of the graduation. The section also presents a brief account of similar experiences in Brazil and around the world.

The third section addresses the research methods and techniques that will be used in order to achieve the objective of this study, being divided into research design, data collection procedures, data analysis procedures and limitations of research methods and techniques.

In the fourth part of the work, the results found during the research are presented, considering that the section is divided into characterization of the participants and analysis of the model.

The fifth section brings the discussion of the results found and described in the previous section and, in the sixth and last, the conclusions of the work, followed by the references used and the annex with the research questionnaire.

2 THEORETICAL AND PRACTICAL REFERENCES

2.1 INNOVATION

The ability to innovate in context is considered a vital aspect in any organization (Naqshbandi & Singh, 2015). Schumpeter (1942) considered innovation as a critical dimension for economic growth, developing the theory of creative destruction, in which a process of internal change creates a new economic structure by destroying the old one, in an incessant cycle. Rogers (1962) presented the theory of diffusion of innovations, which was centered on the determining factors that an idea or innovation would be adopted, at what pace and in what culture. According to him, four factors could affect the diffusion of an innovation: invention, communication channels, time and social system.

The theory of incremental and radical innovations does not have a defined creator, since many authors used the model with different nomenclature, but with close meanings. Radical innovation requires new technologies and makes existing knowledge obsolete, resulting in superior products with great technological advances. Incremental innovation, on the other hand, involves milder technological changes, relying on previously existing knowledge and resources to improve products (Naqshbandi & Singh, 2015). Freeman and Soete (1997) also separate innovations into incremental and radical, with the first having little impact on how a particular good or service is produced, and the second, in general, consisting of the grouping of several innovations, the which have a profound impact on the production function, as well as having consequences for the entire industry, and may also impact the economy as a whole.

Henderson and Clark (1990), for understanding the theory of incremental and radical innovations as incomplete, developed their model called the Henderson-Clark Model, in which they divided innovation into incremental, modular, architectural and radical. Incremental innovation provides for the improvement of existing components. Modular innovation requires new knowledge for one or more components. In architectural innovation, changes occur in the connections between components, and these remain unchanged. In radical innovation, as the name suggests, changes are drastic and occur in components and knowledge, establishing new concepts.

The Open Innovation Model developed by Chesbrough (2003) consisted of an innovation process in which knowledge flows were conducted with internal and external inputs, aiming at accelerating internal innovation and advancing in external markets through the use of

innovation (Van de Vrande et al., 2009). By adopting open innovation, it is expected that access to resources, skills and knowledge from other sources external to the organization will be facilitated and, furthermore, that companies will reach their strategic and monetary potential in the active commercialization of knowledge (Faems et al., 2010; Gassmann et al., 2010; Huizingh, 2011).

The Disruptive Innovation Theory was developed by Christensen (1997), becoming the most significant of the theories about innovation. This innovation helps in creating new markets and value networks, improving products, services or processes in an unexpected way. In this way, one perceives a process by which a product/service, through simple applications, progressively moves from the bottom to the top of the market, eliminating or displacing competitors (Christensen, 2006).

There is no unanimity in the literature regarding the definitions of innovation, with the Oslo Manual being the most widely referenced and used both by business organizations, to establish parameters of what innovation is and how to articulate actions, such as government institutions, that are used of the manual to establish public innovation policies.

According to the manual, innovation can be through the implementation of a new or substantially improved product, be it good or service, or through a process, or through a new marketing procedure, or even through a new organizational methodology in practices of business, either in the organization or in external relations, thus encompassing product, process, marketing and organizational innovations (OECD Oslo Manual, 2010). However, the literature has an excessive focus on new products and processes, not approaching new management and marketing methodologies in the same way (Gadrey et al., 1995; Gallouj & Weinstein, 1997; Hagedoorn & Cloudt, 2003; Smith, 2005).

Subsequently, the same manual came to consider as innovation those related to Processes, such as new production or distribution methods, Marketing Innovations, such as the implementation of a new marketing method with significant changes in the design of the product or packaging, in product positioning, promotion or pricing or Organizational innovations, which refer to the implementation of a new organizational method in the company's business practices, in the organization of its workplace or in its external relations (OECD Manual from Oslo, 2010).

When analyzing the reciprocal impacts of innovations and economic development, Schmookler (1966) noted that innovations result from the interactivity between consumer demand and the need for technological advances in operations on the supply side. Moving on to distinguish the concept between innovation in product, which aims to meet the needs of

consumers, and innovation in process, which aims to meet the needs of companies, and the two types can be concomitant.

Innovation in companies can result from new ideas that are applied to services, products, processes or the market itself (Damanpour et al., 2009). Innovation precedes invention, but both can be correlated to products, services or processes. However, not every invention becomes an innovation when it reaches the market (Freeman & Soete, 1997; Ernst, 2001; Hagedoorn & Cloudt, 2003; Giuri et al., 2007).

Innovations strengthen regional or national economic growth (Andrade & Gonçalo, 2021), with investments made to create new technologies in products or processes being of paramount importance in order to increase productivity and maintain the competitiveness of an organization or market, also contributing for the growth of its profitability (Padgett & Moura-Leite, 2012; Tidd et al., 2008). With globalization, responsible for the constant dispute over knowledge, information and the development of innovation, the need arises for Brazil to build and preserve a structure for technological development autonomously (Pereira & Kruglianskas, 2006).

In the country, for many years, emphasis was placed on economic growth based on the appreciation of investment in fixed capital. However, now priority is given to intangible and innovative goods, which encourage the promotion of innovation and the generation of knowledge (Arbix, 2010; Cassiolato & Lastres, 2000; Paranhos & Palma, 2010). innovation as a structure of society's progress (Acs, Audretsch & Lehmann, 2013).

It is beyond doubt that tax incentives for organizations that invest in Research, Development and Innovation - RD&I symbolize a strategic milestone of paramount importance for Brazil, since these benefits contribute to encouraging other companies to improve their technological management and to invest in RD&I, which increases the competitiveness of its services and products (Oliveira et al., 2017).

Innovation is one of the main elements that influence the performance of organizations, being translated into the successful creation and development of new ideas that become new products, services or processes or the improvement of existing ones. For the success of innovation within companies, it is essential that it be part of the organizational culture and that it be disseminated among all levels of the company, supporting freedom in exposing ideas, sharing projects in groups and accepting risk (Current et al., 2021).

Among the types of innovation approach that organizations can choose from, the most common are closed innovation and open innovation. Closed innovation is the most recurrent, being a methodology in which organizations can create, develop and improve their products or

services, using technologies and resources that are available in the company itself (Taques et al., 2021). Due to its ease and speed in the development of the presented ideas, this type of approach was considered for a long time the most common form of innovation in companies (Taques et al., 2021).

However, with the significant mobilization of human resources, making it increasingly difficult to retain human capital in organizations, it also became more difficult to control the innovation process (Onea, 2020). In this way, according to Onea (2020), open innovation began to gain strength within companies since, by inserting new actors in the innovative process, opportunities increased considerably. A point that should be considered in this approach is that there is an increase in the flow of information, considering that innovation enters the organization, but can also leave it (Onea, 2020).

The use of innovation practices provides a competitive advantage for organizations, regardless of the model adopted by the organization, since it is through this tool that it is possible to obtain new knowledge and resources. Thus, the formation of strategic alliances with other companies and the creation of a diversified network of contacts are fundamental for the evolution of the entire innovation process (Nappi & Kelly, 2021). However, innovation is only established in a company if there is an incentive for employees, through the division of the gains obtained regarding the verification of the innovation achieved (Dornellas, 2003).

2.2 SYSTEMS, ECOSYSTEMS, AND INNOVATION HABITATS

The innovation system understands innovation as the result of cumulative, complex and interactive knowledge and learning processes, in which several actors participate (Asheim et al., 2015; Asheim et al., 2011; Fiore et al., 2011; Freeman, 1982; Lundvall, 1992; Nelson, 1993; Tang et al., 2015). Innovation systems are made up of various interactions, explored in a broad sense, between public and private actors working with Science, Technology and Innovation (ST&I), in addition to teaching and technological diffusion (Freeman & Soete, 2008), whose interactions establish the innovation performance of organizations in the country (Nelson & Rosenberg, 1993).

An innovation system represents the lasting sustainment and learning that support the performance of companies (Smith et al., 2008). For Malerba (2003), innovation systems have a knowledge base, technologies, inputs, demand and interaction between actors. According to Kuhlman and Arnold (2001), in addition to institutions of a technological nature, these systems

also include schools, universities, research institutes, regulatory entities, political-administrative authorities and intermediary agents, as well as networks belonging to these organizations, whether formal or informal.

For Lundvall (1992), innovation systems are formed by all the components and relations that establish communication during the production, diffusion and use of new knowledge and economic benefits. Cassiolato and Lastres (2000) corroborate this idea and understand that an innovation system is formed by a set of different institutions that, through exchanges, provide contributions to the development and dissemination of new technologies. Freeman (1989) defines an innovation system as a network of public and private organizations that interact with the aim of importing, modifying and disseminating new technologies.

In order to represent this set of institutions and knowledge flow, the term National Innovation System emerges, which is based on the idea that the factors that influence innovation activities are national (OECD, 2005). The National Innovation Systems approach, and later the Regional Innovation Systems approach (Cooke, 1992), is the theory that has the most influence on science and technology policies around the world, and its focus is on strengthening institutions and their relations, in order to establish a mature innovation system (Laranja et al., 2008), in which all actors are fundamental to explore and use knowledge (Laranja et al., 2008; Asheim et al., 2015).

However, the innovation systems approach does not explain the relation between the innovative structure and the innovation process. Due to its static approach, the innovation ecosystems approach was created, which was based on biology and takes into account the dynamic nature of innovation. This concept portrays the characteristics of the process of evolution of interactions between agents and their relations with innovation activities and the environment in which they are inserted (Mercan & Göktas, 2011).

The innovation ecosystem concerns the interorganizational, economic, political, environmental and technological systems of innovation, in which the promotion, support and support for the continuous development of businesses occurs (Jishnu et al., 2011; Russell et al., 2011), in which heterogeneous actors work cooperatively and interdependently (Lemos, 2011).

Innovation ecosystems can be described as complex and adaptive systems of subsystems and mechanisms that enable connections and interactions between different actors, which co-evolve dynamically, leading to the emergence of self-organization and order (Surie, 2017). The ecosystem can be understood as the union of the knowledge economy and the commercial economy (Jackson, 2011), representing a complex web of interdependent agents that interact in

order to create commercial value (D'auria et al., 2016), creating a environment that is intended for co-creation of value through collaboration (Smorodinskaya et al., 2017).

With the approximation of the productive sector and research and development (R&D) developers, new institutional arrangements began to be designed, which were called innovation habitats (Teixeira et al., 2016). Innovation habitats are already part of policies regarding regional and local development and Science, Technology and Innovation in Brazil (Teixeira et al., 2016). The different innovation habitats promote interaction between local actors and disseminate knowledge and disseminate information in order to develop the entire ecosystem (Ishikawa, 2013). Chart 1 shows the different innovation habitats, according to Zen and Hauser (2005) and Pietrovski et al. (2010).

Innovation habitat	What it is	Purpose
Technological Hotel	Space for pre-incubation and incubation of company projects.	To transform ideas into technology-based businesses, job creation, and new products and/or services.
Incubator	Basic infrastructure with administrative and managerial support.	To support new or established companies that develop products, processes or services that aim at technological innovation.
Accelerator	Physical or remote incubator.	To stimulate the consolidation of enterprises in a more accelerated pace, based on raising funds, approaching the market, improving the commercialization structure and insertion into a network of contacts.
Technology innovation centers (NIT)	Nucleus or body constituted by one or more ICT and whose actions are regulated by the Innovation Law.	To establish benefits for researchers through the protection and commercialization of inventions, encourage IESs to enter a technology transfer contract and propose support measures for the building of environments favorable to innovation.
Innovation centers	Community, physical or virtual, which allocates for limited periods entrepreneurs, startups, or specific P&D projects of established companies.	To encourage projects in the areas of technological development, provision of specialized services, applied research, technological information, and technology transfer to the productive sector.
Technology poles	An environment that brings together institutions with related interests, which act in an articulated manner within a given territory.	To create new processes, products, and services from the concentration of human resources, laboratories and equipment.
Technology parks	Initiative that offers favorable location conditions for new enterprises to be implemented, which can contribute to the development process of a region or	To conduct stable private development, assist technology transfer from universities to companies or between companies, and encourage the growth of profitable

	a country.	businesses.
Technopolis	Cities planned to facilitate the generation of knowledge, in order to obtain innovative and competitive products, processes, and services.	To promote the integration of agents from the public sector, business environment and teaching and research institutions, taking advantage of existing capacity, to boost regional development.

Chart 1. Different innovation habitats

Fonte: Adaptado de Pietrovski et al. (2010) e Zen e Hauser (2005).

Innovation habitats are recognized as appropriate and differentiated spaces that aim to encourage innovation, uniting knowledge, creativity and technology to boost the potential of entrepreneurs (Pietrovski et al., 2004). As noted in Chart 1, there are several types of innovation habitats, but this study will focus on technology-based incubators.

2.3 COMPANY INCUBATORS

Incubators or business incubation centers emerged from the 1950s and 1960s in the United States, but only became popular in the mid-1980s (Albadvi & Saremi, 2006; Albert & Gaynor, 2000; Campbell et al., 1985; Campbell & Allen, 1987; Hausberg & Korreck, 2020; Hausberg & Korreck, 2018; Theodorakopoulos et al., 2014). In Brazil, its emergence occurred in the 1980s (ANPROTEC, 2012). It was Lindholm (1994) who described that universities, companies and public organizations can also operate as incubators, helping in its dissemination.

Although there is a considerable trajectory of studies on incubators, the literature is fragmented and the subject is studied as a particular phenomenon in several aspects. Only more recently has there been an increase in the focus on business incubators (Hausberg & Korreck, 2020).

Incubators are innovation environments specialized in supporting entrepreneurship, providing consultancy and support services, development of new technologies, legal support, market knowledge and access to funding sources, seeking to transform companies into success in the market, developing products and services with high added value and creating qualified jobs (Carmo & Rangel, 2020; Bollingtoft, 2012).

One of the definitions of business incubators that is most widely accepted is that they offer support to new companies to establish themselves and grow with tangible and intangible resources, during a certain period (incubation) and must be founded by a generator of development and support (Hausberg & Korreck, 2020). When analyzing the support network that incubators provide by enabling a stable growth environment and the early death of many

companies, it is assumed that incubated companies in general are more prepared for their insertion in the market and tend to obtain better results (Raupp & Beuren, 2007).

Business incubators create an environment that aims to stimulate entrepreneurship and innovation, hosting ventures that create jobs, are innovative and strengthen the economy (Manjama et al., 2019). The creation of these environments that are conducive to business incubation, in addition to helping new companies to generate jobs, also improve human resources and capabilities that are indispensable to stimulate a country's economy and innovation (Brun, 2019).

Business incubators help business managers to better prepare themselves for the market, as they offer administrative, financial and structural support during the incubation process, in addition to enhancing the entrepreneurial characteristics of those incubated (Raupp & Beuren, 2011). Business incubators also stimulate the growth of small businesses through the incubation process, providing opportunities for incubated companies to achieve superior performance when compared to companies that have not gone through the same process (Fonseca, 2015).

Business incubators can be divided according to their type, which correspond to different roles. According to ANPROTEC (2012) and Serra et al. (2011), the following types can be considered: a) Technology-Based Business Incubators, which are those focused, in particular, on innovative services and products and for which technology is considered of high added value; b) Business Incubators of Traditional Sectors, which house companies focused on the traditional sectors of the economy; c) Mixed Incubators, which support companies resulting from the combination of the two types previously described; d) Cultural Incubators, aimed at undertakings in the area of culture; e) Social Incubators, which house companies arising from social projects; f) Agroindustrial Incubators, which support companies of agricultural products and services; and g) Service Incubators, which house companies destined for the service area.

Business incubators help business managers to better prepare themselves for the market, as they offer administrative, financial and structural support during the incubation process, in addition to enhancing the entrepreneurial characteristics of those incubated (Raupp & Beuren, 2011). Business incubators stimulate the growth of small businesses through the incubation process, providing opportunities for incubated companies to achieve superior performance when compared to companies that have not gone through the same process (Fonseca, 2015).

Because it is an essential environment for the development and strengthening of innovative companies, incubators provide support for the implementation and growth of incubated enterprises until they reach maturity, necessary to act alone in the market (Beuren, 2006a). In order to achieve its objective of adding benefits to entrepreneurs by stimulating the

creation and development of innovation (Souza et al., 2015), the incubator has a series of benefits, both physical and intangible, through services, consultancies and advisory services, with the intention of generating managerial, strategic and competitive improvements of the incubated enterprises, in order to improve their expectations of success in the market (Ferreira et al., 2008; Raupp & Beuren, 2009a; Silva et al., 2013; Souza et al., 2015).

For this study, the focus was on the Technology-Based Business Incubator (TBI), which consists of a denomination that encompasses organizations that promote the constitution or creation of a support environment in order to promote new technology-based companies (NTBFs) (Bergek & Norrman, 2008; Chan & Lau, 2005). TBIs therefore play a key role in intermediating and accelerating technology transfer in innovation systems (Armanios et al., 2016; Bergek & Norrman, 2008). As pointed out by Aerts et al. (2007), among NTBFs, it is possible to observe that incubated companies tend to be more successful than non-incubated ones in terms of sales, survival, innovation, technology adoption, marketing efficiency, among others.

The purpose of business incubation is to help nascent companies to grow and to find ways to facilitate the management of businesses for their entrepreneurs, through financial support, facilities and services (Allen & Rahman, 1985). A business incubator has the main objective of maturing the ideas of nascent companies, and it is through an incubation program that it is possible to support the enterprise, with a view to its growth and performance (Al-Mubarak & Busler, 2013).

The main characteristics of the incubation of technology companies include connectivity and interactions between the various subjects who have a link with the incubated organization, which can affect, to different degrees, the behavior and entrepreneurial activities and obtain variable performance results within the incubator (Patton et al., 2009).

The incubation of technology-based companies provides an adequate context that enables a theoretical advance in business incubation, stakeholders and business performance (Liu, 2020); so we can, in the next section, understand the business incubation process until graduation.

2.4 COMPANIES INCUBATION AND GRADUATION PROCESS

The incubation process is a path for entrepreneurs who seek to develop their intangible assets, responsible for leveraging the company's value and its competitive advantage in the

market, in addition to reducing the risks of failure (Castro Júnior et al., 2015). Thus, incubators use strategies that consolidate entrepreneurship and prepare companies to face a risky and competitive scenario (Borges e Silva, Linares & Passador, 2016).

The first business incubation model was created by Campbell et al. (1985). This model was divided into four stages: diagnosis of business needs, selection and monitoring, capital development and access to a network of specialists. Smilor (1987) incorporated different components into Campbell's model and incorporated basic services and results of incubated companies into the incubator system. From these models, Hisrich (1988) applied the approach of the center of enterprise development in order to develop a new model, however with focus on an external network with the participation of the government and the university, for the creation of centers of enterprises and innovation. Rice (2002) sought to verify the impact of incubator managers, as well as the relationship with those incubated, focusing on the external network of business co-production, contributing to the incubation process.

It is in the incubation process that capabilities and resources are developed, as the incubated company receives support from the incubator in order to maximize its possibilities of success, in addition to planning for the incubated to be inserted in the market (Hannon, 2005; Gassman & Becker, 2006; Sun, Ni & Leung, 2007; Souza, Sousa & Bonilha, 2008; Raupp & Beren, 2009a).

The incubation process is a determined period in which the business is built and the innovations of the projects selected for incubation are developed (Iacono & Nagano, 2017). The main function of incubators is to support enterprises in their initial stage of operation (Mas-Verdú, Ribeiro-Soriano & Roig-Tiemo, 2015). Thus, incubated companies acquire adequate skills during the incubation that will help them adapt to the market and prosper after graduation (Andino, 2005), since the incubation process seeks to develop financially viable and self-sustaining companies after leaving the incubator (Santos, 2004).

It is important to highlight that during the incubation process, companies are different and have different needs in terms of their behavioral, strategic, structural and technological characteristics, requiring specific actions during the years of the process (Iacono & Nagano, 2014). Neglecting these differences can jeopardize the growth of these companies, their success and their self-sustainability after graduation (Schwartz, 2013). According to Hackett and Dilts (2004a), the incubation process can be evaluated when the incubated leave the incubator, both in terms of economic performance and growth.

In the literature, it is possible to observe that most researchers agree that incubation is related to the initial phase of a company's life (Aernoudt, 2004; Grimaldi & Grandi, 2005;

Hackett & Dilts, 2004a). Most incubators are responsible for undertakings in the initial stages, in which the ideas have not yet been fully developed into businesses (Klofsten, 2005), and have the role of helping to develop these ideas to make them viable companies. Thus, it is understood that the incubation process aims to fill the gap between the idea and the “trial stage” of the new company (Brooks, 1986).

The business incubation process comprises several distinct phases (Nair & Blomquist, 2019), which aim to develop and strengthen new companies according to their life stage (Almeida, 2015). In the literature there are several divisions of the stages of the business incubation process, the most common are pre-incubation, incubation and graduation. It is in the pre-incubation phase that innovative ideas or projects candidates for incubation become a business with high market potential (Bizzotto, 2003) and are presented to the incubator team through a business plan (Dornelas, 2002). That is, in this first stage, candidates undergo an assessment to verify their suitability for incubation (Bergek & Norrman, 2008), which is necessary due to the limited resources of incubators (Aerts et al., 2007; Merrifield, 1987). Pre-incubation encompasses the idealization and conception of the business, which are the two phases that precede the generation of an enterprise (Parolin & Volpato, 2008).

In the next phase, after project approval, the incubation phase begins, in which the incubated entrepreneur now has strategic support, infrastructure and managerial support for the development of the business (Bergek & Norrman, 2008). In incubation, the incubator acts as an intermediary between the incubated and the external environment, through institutionalized networks, facilitating access to various resources and services (Bruneel et al., 2012; Lynn et al., 1996), aiming at business development more robust and networking that add value to the incubated, whether material or intellectual resources (Cooper et al., 2012). According to Hackett and Dilts (2004b), it is in this phase that the incubator assists and monitors the incubated companies in their initial development, in order to reduce costs and risks, that is, they act with the objective of avoiding problems that cause the failure of the business.

The last phase, which can be called graduation, disincubation, maturation or exit, usually takes place around two years after the start of incubation (Dornelas, 2002), and its objective is to support new companies so that they are able to install outside the incubator structure. For Hackett and Dilts (2004a), after completing the incubation process, companies can be in five situations: surviving and growing profitably; surviving, growing and on the path to becoming profitable; surviving but not growing and making no profit; closed while still in the incubator, but with minimal losses; and, it closed while it was incubating and the damage was high.

With the growth of support and services offered by incubators over the years, new services have been included in the incubation process, such as mentoring, pre-incubation, post-incubation and characteristics of the incubation manager (Eriksson et al., 2016; Giordano Martínez et al., 2018; Voisey et al., 2013). Several studies have analyzed the performance of companies after hatching and the survival of those incubated in the market after graduation (Blok et al., 2017; Hannon, 2005; Mcadam & Marlow, 2007; Patton et al., 2009; Schwartz, 2009); however, few studies focus on examining the difficulties of companies during the incubation process and what factors hinder or prevent their graduation.

The quality in the selection of tenants or incubated is an important factor for the incubator, as it can influence the outcome of the incubation (Bergek and Norrman, 2008; Hackett and Dilts, 2004a). The main incubation phase begins after this selection, offering various support services to the incubated (Gerlach & Brem, 2015). These services, especially training, infrastructure and network influence the number of graduates and consequently the success of the incubator (Hackett and Dilts, 2004a; Peters et al., 2004). During the incubation process and the different stages of development, companies have different needs (Soetanto, 2004), and detecting them is important for the incubator to guarantee the flow of knowledge through exchange with the incubated, discussing the requirements for achieve greater growth (Becker & Gassmann, 2006). Hackett and Dilts (2004a) also point out that monitoring the assistance received by tenants during their development can contribute to increasing the incubation performance.

Chandra and Chao (2011) observed the relation between incubator, incubated companies, government and universities and concluded that the results of incubators are positively influenced, achieving more easily the transfer of technology, economic growth, job creation and commercialization. Although several authors describe the incubator as a means that aims to transform inputs into outputs (Becker & Gassmann, 2006; Bergek & Norrman, 2008; Bollingtoft & Ulhoi, 2005; Chandra & Chao, 2011; Lee & Osteryoung, 2004; Peña, 2004; Peters et al., 2004; Rothaermel & Thursby, 2005; Soetanto, 2004; Voisey et al., 2006; Wiggins & Gibson, 2003), Hackett and Dilts (2004a) describe the incubator as a technological enabler, and only its existence does not necessarily generate results, that is, the lack of qualitative elements can generate an incubator with poor performance.

Binsawad, Sohaib and Hawryszkiewicz (2019) note that knowledge sharing processes improve the performance of technology incubators, pointing to community-related impacts (such as sales, taxes, revenues, graduate experience and employment) and improvement in survival and in incubated growth. Michael et al. (2012) also point out that creativity and

innovation are essential for the success of any company. Therefore, based on the literature, some support mechanisms offered by the incubator were listed, which were previously described and which guided the research (Chart 2).

Criteria	Definition	Authors who use the criteria
Objective / Strategy	Define clear objectives, and establish processes and programs based on them in order to guarantee the success of each one of them (Wiggins & Gibson, 2003).	Lee and Osteryoung (2004); Soetanto (2004); Wiggins and Gibson (2003).
Quality of selection / screening of tenants	Incubators need to choose criteria to select their incubated companies in order to filter the right candidates (Hausberg & Korreck, 2020).	Aerts et al. (2007); Bergek and Norrman (2008); Gerlach and Brem (2015); Hackett and Dilts (2004b); Hausberg and Korreck (2020); Kuratko and LaFollette (1987); Lumpkin and Irlanda (1988); Merrifield (1987); Mian (1994); Peña (2004); Soetanto (2004); Ssekiziyivu and Banyenzaki (2021); Wiggins and Gibson (2003);
Support services	In general, support services cover common areas including sales, legal, accounting, contracts, advertising, media, negotiation, presentation techniques and patent strategies (Aaboen, 2009).	Becker and Gassmann (2006); Bergek and Norrman (2008); Carmo and Rangel (2020); Chan and Lau (2005); Gerlach and Brem (2015); Gillotti and Ziegelbauer (2006); Gozali et al. (2016); Hausberg and Korreck (2020); Lee and Osteryoung (2004); Lundqvist (2014); Maletz and Siedenberg (2007); Mian (1996); Peña (2004); Peters et al. (2004); Phan et al. (2005); Ratinho and Henriques (2010); Schwartz (2013); Xiao and North (2017); Wiggins and Gibson (2003).
Networking	Incubators must manage the interaction between organizations in the external and internal environments (Weinberg et al., 1991), providing business relationships between incubated companies and external companies, government agencies and other companies with commercial relevance, in addition to all sectors of the incubator (Hausberg & Korreck, 2020).	Anholon and Silva (2015); Bergek and Norrman (2008); Bollingtoft and Ulhoi (2005); Buys and Mbewana (2007); Chan and Lau (2005); Chandra and Chao (2011); Dornelas (2012); Gerlach and Brem (2015); Gozali et al. (2016); Lalkaka (1996); Lee and Osteryoung (2004); Maletz and Siedenberg (2007); Peña (2004); Peters et al. (2004); Rothaermel and Thursby (2005); Schwartz (2013); Smilor (1987); Soetanto (2004); Sun, Ni and Leung (2007); Wiggins and Gibson (2003).
Physical / human resources	Physical and human resources include easy access to incubator equipment and facilities,	Buys and Mbewana (2007); Gerlach and Brem (2015); Gillotti and Ziegelbauer (2006); Gozali et al. (2016); Lalkaka (1996);

	specialized organization, business support network and common access to incubator services and available office equipment (Lee & Osteryoung, 2004).	Lee and Osteryoung (2004); Maletz and Siedenberg (2007); Ortigara et al. (2011); Peters et al. (2004); Zapata-Guerrero et al. (2020); Zhang and Sonobe (2011); Zhang and Yin (2010a), (2010b).
Knowledge sharing	Knowledge sharing is the exchange of ideas, information, suggestions, and experiences that are relevant to the organization (Bartol & Srivastava, 2002).	Bandura (1997); Binsawad, Sohaib and Hawryszkiewicz (2019); Gist and Mitchell (1992)
Creativity	Creativity is defined as the creation of problem solving or new and useful ideas (Binsawad, Sohaib & Hawryszkiewicz, 2019).	Amabile (1988); Amabile (1997); Amabile et al. (2005); Binsawad, Sohaib and Hawryszkiewicz (2019); Woodman et al. (1993).
Diffusion of innovation	The diffusion of innovations is centered on the determining factors that an idea or innovation is adopted, at what pace and in what culture (Rogers, 1962).	Binsawad, Sohaib and Hawryszkiewicz (2019); Cefis and Marsili (2006); Othman et al. (2014); Rogers (2003); Sahin (2006); Wagner and Cockburn (2010).
Financial support and access to funding sources	Incubators must guarantee access to venture capital and other alternative forms of financing with the incubated companies, aiming at growth and insertion in the foreign market (Dornelas, 2002).	Buys and Mbewana (2007); Carmo and Rangel (2020); Chan and Lau (2005); Gillotti and Ziegelbauer (2006); Gozali et al. (2016); Hackett and Dilts (2004a), (2004b); Lalkaka (1996); Lee and Osteryoung (2004); Maletz and Siedenberg (2007); Olawale and Garwe (2010); Ramukumba (2014); Smilor (1987); Sun, Ni and Leung (2007); Zapata-Guerrero et al. (2020); Zhang and Sonobe (2011).
Self-sustainability	Self-sustainability aims at total financial independence, in relation to third-party resources, in the shortest possible time, both for the incubator and for its incubatee (Lobosco, 2014).	Anholon and Silva (2015); Dornelas (2012).
Strategic planning	Strategic planning can be seen by incubated companies as a platform that helps them understand the strategies and implementation of the business (Lai & Lin, 2015).	Buys and Mbewana (2007); David-West et al. (2018); Dornelas (2012); Games et al. (2021); Gillotti and Ziegelbauer (2006); Lalkaka (1996); Lee and Osteryoung (2004); Maletz and Siedenberg (2007); Ortigara et al. (2011).

Chart 2. Support mechanisms offered by the incubator

Source: Designed by the author.

Previous studies have mainly focused on identifying criteria and indicators that are suitable for measuring outcomes. Allen and McCluskey (1990), in a study of 127 incubators in the United States, used occupation, jobs created and graduated companies as criteria. In addition to these criteria, Phillips (2002) included, in his research, indicators such as the number of patent applications per company, tenant revenue and number of business interruptions in different types of incubators in the United States. One of the most comprehensive lists of criteria was elaborated by Mian (1996) and Mian (1997), who added management policies and their effectiveness and services and their added value. To guide this study, based on the literature, some evaluation criteria for graduation success were also listed (Chart 3).

Criteria	Definition	Authors who use the criteria
Graduation rate	Evaluates the success of incubators in promoting the graduation of sheltered companies (Jabbour, Dias & Fonseca, 2005).	Al-Mubarak and Schrödl (2011); Becker and Gassmann (2006); Gerlach and Brem (2015); Hackett and Dilts (2004a), (2004b); Hackett and Dilts (2008); Kilcrease (2011); Özdemir and Şehitoğlu (2013); Peters et al. (2004); Phan et al. (2005); Rothaermel and Thursby (2005); Schwartz (2009); Silva and Da Cunha (2018); Voisey et al. (2006); Xiao and North (2017); Zapata-Guerrero et al. (2020); Zhang and Sonobe (2011).
Survival of new companies	Concerns the evolution of the mortality rate of incubated companies (Smilor & Gill, 1986).	Aerts et al. (2007); Al-Mubarak and Schrödl (2011); Becker and Gassmann (2006); Bergek and Norrman (2008); Colombo and Delmastro (2002); Gerlach and Brem (2015); Hackett and Dilts (2004a), (2004b); Mas-Verdú, Ribeiro-Soriano and Roig-Tiemo (2015); Mian (1997); Peña (2004); Peters et al. (2004); Schwartz (2009); Seoane (2016); Stokan et al. (2015); Voisey et al. (2006); Zapata-Guerrero et al. (2020).
Growth in job creation	Generation of new jobs by incubators, via entrepreneurship (Dolabela et al., 1999).	Aerts et al. (2007); Al-Mubarak and Busler (2013); Chandra and Chao (2011); Hackett and Dilts (2004a), (2004b); Lasrado et al. (2016); Özdemir and Şehitoğlu (2013); Seoane (2016); Silva and Da Cunha (2018); Wiggins and Gibson, (2003); Zapata-Guerrero <i>et al.</i> (2020).
Financial sustainability of new companies	It is the ability of the organization to maintain itself in the long-term using available resources (Comini et al., 2020).	Al-Mubarak and Schrödl (2011); Ayatse et al. (2017); Becker and Gassmann (2006); Chandra and Chao (2011); Colombo and Delmastro (2002); David-West et al. (2018); Games et al. (2021); Gerlach and Brem (2015); Löfsten and Lindelöf (2002); Peña (2004); Rothaermel and Thursby (2005); Schwartz (2009); Ssekiziyivu and Banyenzaki (2021); Voisey et al. (2006);

		Wynarczyk and Raine (2005).
Growth of new companies	It is the annual revenue growth index of companies linked to the incubator (Rebelato et al., 2006).	Abetti (2004); Al-Mubarak and Schrödl (2011); Becker and Gassmann (2006); Gerlach and Brem (2015); Mian (1997); Özdemir and Şehitoğlu (2013); Peña (2004); Ratinho and Henriques (2010); Schwartz (2009); Voisey et al. (2006).
Occupancy rate / Number of incubatees	Policies adopted for selecting candidates and the incubator's ability to retain companies until graduation (Jabbour, Dias & Fonseca, 2005).	Hackett and Dilts (2008); Phan et al. (2005); Seoane (2016); Silva and Da Cunha (2018).
Creation of companies by incubator	Promotion, support, and stimulus to the creation of micro and small companies (Vedovello, 2000), offering conditions that favor the emergence and growth of new companies (Andino et al., 2004).	Colombo and Delmastro (2002); Lundqvist (2014); Mian (1996); Peña (2004); Phan et al. (2005); Ratinho and Henriques (2010); Schwartz (2009); Seoane (2016); Stokan et al. (2015).
Growth and sustainability of the incubation program	It is the balance between economic, social and environmental aspects that generate long-term benefits for the organization's stakeholders and the society (Elkington, 2002).	Mian (1997); Silva et al. (2013).

Chart 3. Criteria for the Graduation Success Assessment

Source: Designed by the author.

Most studies focus on outcomes such as the number of new firms, jobs and firm survival; however, they do not relate them to the way different incubators organize themselves and manage their incubation processes (Bergek & Norrman, 2008). It is through the support mechanisms that incubators dedicate their attention to compensating for the deficiency of fundamental resources in the initial stage of the nascent companies, in order to guarantee business stability, long-term company survival and sustainable economic growth (Bergek & Norrman, 2008). Survival is the foundation of organizational success; therefore, it is the most important criterion for company development (Tamásy, 2005; Woywode, 2004). Therefore, one of the main objectives of incubators is to promote the survival and development of their incubated companies (Lalkaka, 1996; McAdam & Marlow, 2007; Schwartz, 2009).

2.4.1 Support mechanisms offered by the incubator

The support mechanisms offered by the incubators that guided this research are presented below. Eleven variables were selected from the literature, which are:

objective/strategy, quality of selection/screening of tenants, support services, networking, physical/human resources, knowledge sharing, creativity, diffusion of innovation, financial support and access to sources financing, self-sustainability and strategic planning.

The first support mechanism selected in the literature deals with the incubator's objective / strategy in relation to the incubated companies, which aims at efficient and successful management. Incubated companies have different needs during the incubation process and their different stages of development (Soetanto, 2004). Therefore, every incubation program needs to establish criteria that help in evaluating its performance. Therefore, incubators must have their objectives well defined, in addition to establishing processes and programs based on them in order to guarantee the success of each of these established objectives (Wiggins & Gibson, 2003).

According to Lee and Osteryoung (2004), the goal or operations strategy, in the sense of clarity and achievement of the objective and the concreteness and achievement of the strategy, disseminates the essence of the primary purpose of the business incubator that can influence the management well. success of the incubated companies and in a stable incubation system.

One of the key factors for the incubator's success is to maintain a constant flow of quality proposals (Patton et al., 2009). Incubators need to choose criteria to select their incubated companies in order to filter the right candidates (Hausberg & Korreck, 2020).

It is important that incubators take into account, as a relevant selection criterion, the strategic alignment between their portfolio of new companies and their parent company, this alignment being several times more relevant than the expected immediate financial return (Hausberg & Korreck, 2020). For Lumpkin and Ireland (1988), and later Aerts et al. (2007), the screening criteria can be separated into three groups, which are financial soundness, the experience of the management team, and market and personal factors. Bergek and Norrman (2008) classify the screening strategies between the selection focused on the idea and the selection focused on the entrepreneur, that is, first the viability of the ideas or the personal characteristics, experiences and skills of the entrepreneurs is observed, and then the Selection is differentiated between winners and survival of the fittest.

Tötterman and Sten (2005) recommend that incubators, when selecting companies, seek a mix of different companies that are in different stages of the life cycle or from different segments of the value chain. Two other points must be observed by incubators when selecting new incubated companies: the first is the dynamics that arise due to the nature of the general portfolio that develops between companies, for example companies that operate in the same

sector may fear competition and be more reluctant to share information and networks with each other; and the second is related to similar knowledge; therefore, it is less likely that there will be exchanges of information with different areas of technology or business (Schwartz & Hornych, 2008).

Support services for new companies have gained more prominence and relevance in the business models of incubators, while the provision of physical spaces is becoming secondary. In general, support services cover common areas including sales, law, accounting, contracts, advertising, media, negotiation, presentation techniques and patent strategies (Aaboen, 2009). According to Hackett and Dilts (2004), the choice of incubated companies can also affect the mix of services provided or the opposite, since the incubator in general seeks to adjust and maximize the offer of its services with the needs of new businesses.

Incubators can also provide support services as needed by companies, providing more effectively monitored business assistance through frequent counseling interactions, also strengthening the relationship between the parties (Scillitoe & Chakrabarti, 2010). For Rice (2002), this interaction between managers of incubators and companies is fundamental for the success of the incubation.

Lee and Osteryoung (2004), in their research, in which they compared the critical success factors in incubators in the United States and Korea, listed the following services offered by incubators: technology transfer, research and development (R&D), education program entrepreneurial activity, business and legal consultancy and financial support. For Bergek and Norrman (2008), some incubators adopt a strong intervention approach, guiding new businesses with a firm hand and even providing complete management teams or requiring certain training, while others prefer a *laissez-faire* regime, which is understood as external facilitators and generally provide resources and assistance as requested by incubators. For McAdam and McAdam (2008), the use of incubator resources happens according to different stages of the incubated companies' life cycle.

Incubators manage the interaction between organizations both in the external and internal environment, in which they connect their incubators (Weinberg et al., 1991). In the external environment, the incubator must provide business relations between the incubated companies and external companies, government agencies and other companies with commercial relevance; already in the internal environment, it should act as a facilitator in the relations between the set of resident companies and all sectors of the incubator (Hausberg & Korreck, 2020). An incubator networking program should encompass institutional networking, networking with finance or business consulting firms, networking between the incubator and

the incubated company, as well as local community and government support (Lee & Osteryoung, 2004).

Incubators can help incubated companies through networking, whenever they lack some resource required by an incubated company, such as, for example, specialized technical knowledge (Scillitoe & Chakrabarti, 2010). Rubin et al. (2015) distinguish the different knowledge agents that are part of the incubator network between market knowledge carriers, technological knowledge carriers and financial resources carriers. Rothschild and Darr (2005) highlight the role of informal innovation networks, which involve informal contacts between the parties involved, but which can have strong and significant ties, in which both parties benefit.

Patton et al. (2009) found that one of the motivations for new companies to join the incubator is the possibility of meeting and interacting with like-minded individuals and organizations and that cooperation within this internal support network is a key factor for the success of the incubation. Bollingtoft (2012) states that the role of incubators is to facilitate these networking and cooperation activities, creating conditions that include physical proximity and the attraction of entrepreneurs with a positive behavior linked to knowledge sharing and cooperation. Tötterman and Sten (2005) highlight the importance of the incubator keeping in touch with its tenants after they leave, so that they remain part of the incubator community.

One of the functions of business incubators is to help managers of incubated companies to better prepare for the market; for this, they offer administrative, financial and structural support during the incubation process, in addition to enhancing entrepreneurial characteristics (Raupp & Beuren, 2011). Business incubators are incentive environments and managerial, technological and logistical support for new companies; therefore, they generally provide them with individual physical space temporarily housing them, physical space shared with other incubated companies, access to laboratories, specialized services to help carry out the activities of these companies and human resources available in the incubator (MCTI, 2013).

Lee and Osteryoung (2004) understand that physical and human resources include ease of access to incubator equipment and facilities, specialized organization, business support network and common access to incubator services and office equipment available.

The National Program for Business Incubators (PNI) of the MCT (2000) states that incubators must have a physical space that is built or adapted to temporarily house the incubated companies. In addition, these spaces must have the following facilities: individual space to be used by each company admitted to the incubation process; shared physical space for meetings, laboratories, administrative services, among others; human resources and specialized services

that support incubated companies in their activities; carrying out qualification, training and/or education of entrepreneurs in the main managerial aspects; and access to libraries and laboratories of educational institutions or that develop technological activities.

Knowledge sharing is defined by Bartol and Srivastava (2002) as the exchange of ideas, information, suggestions, as well as experiences that are relevant to the organization. The performance of an organization can be positively influenced by intellectual capital and undefined resources that can be generated through efficient knowledge practices (Nold, 2012). For Erickson, Rothberg and Carr (2003) and Rahab (2011), efficient knowledge management of organizational assets generates a greater chance of boosting the organization's performance in the market.

Binsawad, Sohaib and Hawryszkiewicz (2019), in their study on the factors that impact the performance of technology business incubators, analyzed knowledge sharing from the perspective of donating and collecting knowledge. Knowledge donation is understood as the process in which the individual communicates his personal intellectual capital to other people, while knowledge gathering is defined as the process of consulting other individuals in order to encourage them to share their knowledge (Van den Hooff & Leeuw van Weenen, 2004; Lin, 2007).

Creativity in general is defined as the creation of problem solving or new and useful ideas (Binsawad, Sohaib & Hawryszkiewicz, 2019), and may refer to the process of generating ideas or problem solving, as well as referring to the idea itself or solution itself (Amabile, 1997). Some studies highlight that the higher the level of individual creativity factors, such as intrinsic motivation for tasks, expertise and creative thinking ability (Amabile, 1997), the higher the level of creativity within organizations will also be, thus creating superior performance (Grewal, Levy & Kumar, 2009). For some researchers, creativity has a vital impact on organizational performance (George & Zhou, 2002; Oldham & Cummings, 1996).

Binsawad, Sohaib and Hawryszkiewicz (2019) suggest that individual creativity is positively related to the performance of the technology company incubator. For incubators, creativity is a desired result both in terms of creating more innovative and creative companies, and as part of the process, as creativity develops new ideas and helps determine how these ideas will be best applied (Patton, 2014). Therefore, creativity is related to the implementation of new creative ideas within the context of incubators (Binsawad, Sohaib & Hawryszkiewicz, 2019).

Innovation within organizations can contribute to the generation of wealth, increased productivity and a high level of competition (Carlson & Wilmot, 2006). For organizations, innovation can serve as a means to achieve and maintain competitive advantages and business

results (Binsawad, Sohaib & Hawryszkiewicz, 2019). For Zhu (2014), the innovation diffusion complexity factor can be a potential obstacle to diffusion, since more complex innovations are consequently more difficult to disseminate, which makes them less attractive.

However, if the innovations are compatible with the existing paradigms or preferences in the organization, this makes them significantly easier to spread (Zhu & Zhang, 2015). Innovations can be adopted more easily when their complexity involves aspects present in the organization, such as user skills, technological requirements and technical skill conditions (Rogers, 2003; Othman, Hawryszkiewicz & Kang, 2014).

New technology-oriented companies, in general, face difficulties in accessing financing (Colombo & Delmastro, 2002). This tends to happen because banks normally do not have the necessary technical knowledge to assess the quality of a new company in the high-technology field. In addition, new ventures do not have a history that serves as a tool for banks to base their decision-making on loans or financing (Zhang & Sonobe, 2011).

With this reluctance to grant investments or financing on the part of banks, it is expected that financial support to new companies offered by incubators will be an important input in the incubation process, which in general are carried out in the form of low interest loans, since the resources used by incubators for this purpose have the government as their main source (Zhang & Sonobe, 2011).

Lee and Osteryoung (2004) place the incubator as an important actor in the network of relationships that influence the incubated companies to obtain financial support and consultancies that can enable access to funding sources. Another point that deserves attention was found by Carmo and Rangel (2020), who, when carrying out their research, realized the financial dependence of the incubator on the part of the incubated companies to keep their activities running. Among the factors that were identified is funding via public notices; therefore, it is evident the importance for incubators to act together with development institutions.

Hackett and Dilts (2004) emphasize that because they are shared spaces that provide new companies with technological and organizational resources, incubators provide these companies with support from the government, private investors and local communities in order to overcome initial difficulties and facilitate the success of these new ventures. Zapata-Guerrero et al. (2020), in turn, found relevant but contradictory results when it comes to funding for the creation of new businesses, since it is not the number of financial institutions linked to the incubator that makes the difference, but the administration and availability access to resources, or even through funding for entrepreneurs who start a new business.

Organizational sustainability can be divided into three pillars: environmental, economic and social (Munasingle & Cutler, 2007; Moçatode-Oliveira & Sola, 2013). Such pillars originate from the Triple Bottom Line theory, which was proposed by Elkington (1999) and aimed to relate these three perspectives, being one of the most accepted theories in the organizational environment today when it comes to sustainability.

In Brazil, there is still a great dependence on the part of incubators on their management entities in order to cover operational costs, and self-sufficiency can promote its elimination (Lobosco, 2014). In order to achieve self-sustainability, incubators have sought to develop various actions related to a closer relationship with companies that have graduated, creation of business associations, menu of services and creation of a catalog of volunteer consultants (Lahorgue, 2008).

Business incubators are responsible for providing subsidies for the survival of incubated companies, and the self-sustainability of these ventures can also contribute to achieving this goal, since dependence on other institutions can limit the performance of their essential activities (Lobosco, 2014). It is worth mentioning that self-sustainability aims at total financial independence, in relation to third-party resources, in the shortest possible time, both for the incubator and for its incubated (Lobosco, 2014).

The great challenge presented to business incubators is in the strategic management process, which must adopt strategic indicators that have the capacity to help, in a first moment, the formation of bases, in order to guarantee their organizational sustainability (Bezerra, 2007). Generally, the actions that aim to strengthen the incubators that are identified as priorities include activities that focus on the qualification of the teams and on the provision of management tools, whether in strategic planning, management by indicators or marketing, which are considered the priority variables for the improvement of the performance of incubators, in order to achieve means to obtain their sustainability (Ortigara et al., 2011).

Strategic planning can be seen by incubated companies as a platform that helps them understand the strategies and implementation of the business (Lai & Lin, 2015), as it can be used to help resolve the difficulties faced by these companies and be perceived as an important part of its progress as a new company (Eshun, 2009). Among the strategies adopted, some are strictly necessary, such as a business model in order to generate revenue streams with clear target markets, which also shows that new companies need to ensure efficient planning and implementation (Picken, 2017), that can be done through organizational learning and business experimentation (Spender et al., 2017). These aspects indicate the perception of companies

regarding the effectiveness of the incubator on their ventures, in addition to being an important variable to measure the performance of incubators (Games et al., 2021).

2.4.2 Graduation success evaluation criteria

Below are the criteria for evaluating the success of the graduation that guided the conduction of this research. Eight variables were selected based on research in the literature, which are: graduation rate, survival of new companies, growth in job creation, financial sustainability of new companies, growth of new companies, occupancy rate / number of incubators, creation of companies by the incubator and growth and sustainability of the incubation program.

The first evaluation criterion selected in the literature was the graduation rate. The graduation of companies or exit from the incubator usually takes place about two years after the start of incubation, with the aim of offering support for new companies to be able to establish themselves outside the incubator structure (Dornelas, 2002).

When talking about incubator performance, the main indicator of success is graduation; however, when it comes to companies that have graduated, only high survival rates are not guaranteed as indicators of success, and it is important to define the contributions of incubator-specific support indicators for both the survival and growth of graduated companies (Iacono & Nagano, 2017).

There is no exact time indicated for the length of stay of companies in the incubator; thus, a point that should be observed is that a longer incubation time can make the incubated company dependent on the support received from the incubator, which can lead to these companies failing to invest in their own resources (Schwartz, 2009).

Another point to be observed for graduation are the conditions of the sector in which the incubated company is inserted, which may require different times for companies to reach a sustainable level of development (Grimaldi & Grandi, 2005). Therefore, it can be said that the specificities of the companies make it necessary to develop more flexible graduation policies, defining an average time, since this time will depend on the different business models employed by the companies. According to Rothaermel and Thursby (2005), graduation criteria need to be defined on a case-by-case basis and the maximum incubation time also needs to be established individually for each company.

Little is known about the survival dynamics of companies after leaving incubation and what are the specific support mechanisms that really determine the causes and the probability of success, survival and failure of companies after graduation (Schwartz, 2009). Despite all the support and assistance offered by the incubator, success after the company leaves graduation is not guaranteed (Mas-Verdú et al., 2015). According to Lasrado et al. (2016) some incubated companies may not obtain significant benefits from the relation with the incubator, and may even be more vulnerable to failure after leaving the incubation.

Schwartz (2009) and Rothaermel and Thursby (2005) argue that successful graduation does not guarantee the long-term survival and success of companies after leaving incubation. Research on incubated companies should go beyond their exit from the incubation and not just be restricted to their period of stay in the incubator (Studdard, 2006). For Rothaermel and Thursby (2005), the company's graduation from the incubation process is an important milestone in its development, but this does not offer any guarantee of success after graduation. Bruderl et al. (1992) point out three groups of factors that can explain the chances of survival of new companies: characteristics of the individual; structural characteristics, attributes and strategies of the new venture; and conditions that characterize the environment of the new company.

According to Iacono and Nagano (2017), establishing support mechanisms during the incubation process and carrying out supervision in the postgraduate period can improve the success rate, including not only the survival of companies, but also growth and profitability of companies, which are somewhat low after graduation.

Economic development takes place through the creation and support of small businesses, and, according to Campbell, Kendrick and Samuelson (1989), economic development strategies need to convert entrepreneurs' ideas into new businesses, resulting in a production force that provides job creation as well as economic growth.

Business incubators predominantly have the role of promoting local and regional development, operating as actors that promote transformations, facilitate the birth of competitive micro and small companies, disseminate knowledge and promote improvements in the quality of life in the region in which they operate, through job creation and consequent income distribution (Dornelas, 2004). However, it is necessary to observe some criteria in the creation of business incubators, because in some cases, in particular, political factors, among which is the strong pressure to create jobs (Dornelas, 2002) can lead them to fail in a short time. time (Morais, 1997), so the creation of jobs should be the consequence of the emergence of incubators and new companies, and not its primary objective.

The growth and financial performance of the incubated companies at the time of their graduation can serve as an evaluation criterion for the performance of the incubator incubation process (Hackett & Dilts, 2004).

For the authors, operationally, there are five different scenarios of the incubated companies at the conclusion of the incubation process, which have results that are reciprocally exclusive, namely: the incubated company survives and grows profitably; the incubated company survives and grows towards profitability; the incubated company survives, but does not grow and does not make a profit or has a marginal profit; the incubated company had its operation suspended while still in the incubator and losses were minimized; and finally, the incubated company had its operation suspended while still in the incubator and its losses were significant. According to the literature, the first three scenarios are indicative of the success of the incubation process, while the last two indicate failure (Hackett & Dilts, 2004).

The business incubator is a flexible and motivating environment, which has facilities both for the emergence of new ventures and for the growth of new companies (Dornelas, 2002). Grimaldi and Grandi (2005) corroborate the author and reaffirm that the incubation process seeks an effective way to unite knowledge, capital and technology, with the aim of boosting entrepreneurial talent, increasing the exploration of technologies and accelerating development of new companies.

According to Mian (1996, 1997), sales growth and job growth in new companies are indicative of the survival and growth of incubated companies, being results of the performance of the business incubator.

The occupancy rate is used to measure the relevance of the incubator within its ecosystem, especially in view of what it offers to the incubated companies and their results; therefore, companies that are looking for an incubator tend to look first for the most important incubators, which also generates high occupancy rates (Aerts, et al., 2007).

In his study, Dornelas (2002), regarding the evaluation of business incubators, based on a biblioGraph survey, identified several short-term variables that are related to the efficiency and impact coefficients, in agreement with the objectives of measuring the impact of the business plan on the incubator's management. Among the selected variables is the number of incubated companies and the incubator occupancy rate (places filled in relation to those offered).

For the National Association of Entities Promoting Investments in Advanced Technologies – ANPROTEC, business incubators are flexible environments that should encourage, through a set of facilities, the emergence and growth of new companies. Lalkaka

(2003) corroborates this by stating that the incubator is a space that aims to support the transformation of potential entrepreneurs into profitable and growing companies. Still, Fonseca and Kruglianskas (2000) state that incubators are associated with the purpose of encouraging the birth of enterprises that result from technology projects developed inside or outside universities.

The creation of companies and the generation of income in the 1990s in different parts of the world are linked to the role that incubators played in this period (Castells, 2000). For Hannon (2003), the growth of new incubators in the world has drawn a new contour in the business scenario, which can be seen in the increase in the number of emerging companies that compete in the international market.

For Baêta, Borges and Tremblay (2006), the creation of small and medium-sized companies is highlighted by the support mechanisms offered in the performance of business incubators, in particular by training entrepreneurs in management and encouraging the development of companies of this size, in addition to that it is believed that companies installed in incubators have greater chances of survival in the market when compared to companies that were not incubated.

When business incubators are located within Local Productive Arrangements (APLs), their contribution to encouraging the creation of companies must be focused on meeting the demands of the APLs, whether economic, cultural, environmental or social, offering support mechanisms that lead to the sustainability of the economic sector in accordance with the needs and links of the productive chain in the APL, reducing the creation of companies similar to those already installed in that region and facilitating access to information and conditions to undertake a business for a greater number of people.

The degree of importance of business incubators is directly related to the sustainable development resulting from their actions, on account of transforming science products into new and innovative technologies, especially combining business and academic skills (Silva et al., 2013). Still according to the author, a careful vision for the management of the incubator is essential, so that the objectives proposed by it become possible, since it is an environment that provides innovative companies.

When the incubator is linked to a university, it represents an investment and needs the incubation program to be maintained and expanded as needed, the sustainability and growth factor is an important part of understanding success, since no matter how successful whether the companies are incubated, it is difficult for an unsustainable incubation program to be considered a success (Patton, 2014).

For Mian (1996, 1997), growth in budget, space, facilities, employees, services and tenants are indicative of the growth and sustainability of the incubation program and are results of the performance of the business incubator.

2.5 SIMILAR EXPERIENCES IN BRAZIL AND IN THE WORLD

Gozali et al. (2020) investigated the relation between the performance and success factors of business incubators and found that factors such as information technology, government support and protection, entry criteria, mentoring networks, funding and university regulations contribute to the performance of business incubators. As for Lose et al. (2016), the authors indicate that the main factors that impede the growth of incubators are lack of financing, lack of credit line, lack of market access, competition, lack of business skills and lack of product selection and design; therefore, resources invested in business incubation programs are needed to find sustainable solutions aimed at win-win for all stakeholders.

Carmo and Rangel (2020) also described, through a case study, the critical success factors, but turned their research to the business incubation network in Federal Institutes and listed financial and government support, technical support and technological, institutional support from the Institute studied, management of the incubation process, in addition to monitoring the incubated companies. The researchers concluded that in order to promote the management of innovative environments, it is necessary to reconcile new management tools with the application of critical factors. Bose, Kiran and Goyal (2018) listed seven critical success factors for incubating agribusiness companies with organizational performance and highlighted that there is a significant variation in performance with facilities, networks and services. The clear and unequivocal mission also stood out as a significant factor influencing performance, as managerial skills mediate the evaluation and performance of the incubator and, finally, that the entry and exit policy, despite having a lower coefficient, it is also significant for the performance of the incubated.

Business incubators act as support systems and deal with failure, which is a common phenomenon in new venture creation. According to Nair and Blomquist (2019), employing a value creation perspective helps in understanding failure during the construction of a business, and it is based on this vision that they developed a dynamic process model aimed at understanding and preventing failures in the process. business incubation process, in which they present predictive and non-predictive practices and strategies seeking to avoid and manage

failures in various stages from the beginning to the graduation of companies, which is continuously managed. Such practices could help mitigate and prevent personal, organizational and social failures, and channel the effects of failure to social benefit, creating value for startups and their stakeholders.

For van Weele et al. (2018), business incubators only provide symptomatic solutions and create an environment that protects incubators from unfavorable institutional situations, thus presenting limited potential to strengthen business ecosystems. The five challenges faced by startups during the incubation process, identified by the authors, are: the lack of market orientation, the lack of entrepreneurial culture, the small domestic market, the lack of initial capital and the fact that universities do not are focused on entrepreneurship. These challenges are configured as a problem for these enterprises to scale their activities and transform themselves into high-impact businesses, as they have institutional roots, which makes them more difficult to overcome entirely.

Iacono and Nagano (2017) evaluated the effect of actions and the support system of incubators on the growth pattern of graduated companies that underwent incubation processes. They were analyzed from the pre-incubation periods, emphasizing the technical and managerial characteristics of the founders, the incubation period, when the incubator's performance in promoting companies was evaluated, to the post-incubation period, when performance was considered, potential, impact of the incubator and main barriers that hinder growth. As a result, they observed that the support system and the incubation process had little impact or effect on the different growth patterns identified in the companies.

Seeking to increase market understanding, competitiveness, success factors and to define a better sustainable value proposition, the authors Štefko and Steffek (2017) explored the main facilitation services for startups from incubation that are sought after by the creative industry. The results found in the research provide an in-depth understanding of the service business incubation environment. The basis for the success of a new-to-market company that demands incubation are facilitation services at the levels of physical infrastructure, office support, access to capital, process and network support, along with constant adaptation to the emerging future condition.

Incubators seek to increase the success rate of small companies in their initial phase by presenting a series of tools that intend to achieve the long-term success of these organizations. In this way, Lose and Tengeh (2016) evaluated the effectiveness of incubation programs from a user satisfaction approach and concluded that they do not regret participating in the incubation and that limited funding was the biggest challenge that incubates faced before of joining the

incubators and what most attracted the incubated to the programs was the need for multiple skills. The authors conclude that although there is room for improvement, when assessing user satisfaction, incubation programs are doing what they were created to do.

Theodorakopoulos, Kakabadse and McGowan (2014) provide, based on a review, a critical assessment of the literature on the effectiveness of incubation, offering a theoretical perspective on how incubation can foster the development of incubated companies, given the importance of the characteristics intangibles and the role of business incubation to be recommended, for understanding how the environment meets the needs of those incubated, in a theoretical perspective of situated learning.

Andrade Junior (2012) evaluated the Brazilian experience in overcoming the difficulties of technology-based incubators and identified their difficulties in four types of restrictions: financing, management, production and commercialization, seeking to contribute to the more realistic formulation of policies to support the system of incubation, in addition to proposing actions to be adopted in order to improve the performance of companies and incubators.

Assenova (2020) researched which factors influence the effectiveness of risk incubation in the initial stage in socially and educationally disadvantaged entrepreneurship, and through two studies, showed the disadvantage of these entrepreneurs when developing their businesses, which have as impediments limited rationality, knowledge and limited experience, limited resources to experiment, all of which contribute to low growth or business performance. In this context, incubators play an important role, as they can help these entrepreneurs to achieve profitability and scale their businesses, in addition to the possibility of developing knowledge and management capacity, transmitting lasting benefits.

In turn, Guillen and Veras (2018) adopted project management in order to understand how technology-based incubators develop their incubation process. The survey results corroborate that companies develop their incubation processes in accordance with the Cerne model guidelines, justifying that incubators use the adoption of this model, as it was created with the aim of making good management practices available. They also confirmed that incubators adopt project management in the areas of integration management, time, scope, quality, communication and human resources, but no evidence was found regarding risk and acquisition management.

Minello, Marinho and Bürger (2018) analyzed the incubation process as a stimulator of innovation in the incubated companies and, from the perspective of the incubated, the incubator provided opportunities for personal development and for their businesses by stimulating

innovative actions from a knowledge perspective, thus increasing economic and social development, in addition to preserving the autonomy and sustainability of organizations.

Șchiopu, Vasile and Țuclea (2015) addressed the best practices that contribute to achieving the objectives of business incubators, with a focus on tourism. In the study, the authors emphasize the role of emotions that entrepreneurs need to face and understand that emotions and logical thinking are intertwined and interact in decision-making, problem solving and other aspects of business development, since those incubated do not they only share resources, technologies and strategies, but they also benefit from the emotional support of the incubator in the face of challenges.

Tsaplin and Pozdeeva (2017) compared incubation strategies using performance criteria of incubators in the US, Germany and Russia and concluded that there are more differences than similarities in the incubation process of these countries. Aspects related to the involvement of power structures, interaction between incubators and academic institutes, the legal status of business incubators, performance measures of business incubators, among others, can help and impact business practice, clarifying the most significant characteristics for the incubation process.

The study carried out by Ortigara et al. (2011) proposes a cluster analysis of incubator performance factors, which are particularly relevant to their survival and development, from the perspective of the incubator's existence. As a result, they observed that in new organizations, infrastructure and marketing are identified as the main factors for their growth; for organizations with more maturity, the quality of personnel and management are the factors identified as decisive for success.

2.6 CONSIDERATIONS ON THE SECTION AND CONSTRUCTION OF RESEARCH HYPOTHESES

This section made it possible to bring together the concepts of innovation, systems, ecosystems and innovation habitats, in addition to dealing with business incubators and the process of incubation and graduation of companies. It was also possible to observe that there are several support mechanisms offered by the incubators to the incubated companies and several criteria used to evaluate the success of the graduation of these companies and the success of the incubator itself. These mechanisms and criteria serve as a reference for the creation of sustainability analysis categories for incubated companies. In addition, it broadly

addressed the existing studies on the factors that influence the incubation of family businesses and their aspects.

These support mechanisms, which can be treated in the literature as factors, best practices, critical success factors, among others, need to be considered when evaluating the graduation success of companies that went through the incubation process, as they are recognized as elements fundamental to the success or failure of incubated companies. Knowing these mechanisms that are present or necessary in a business incubator enables the design of a research model that investigates its relation with the criteria for the successful graduation of incubated companies. Although there is no established consensus on the measurement instruments, the support mechanisms show the ways to evaluate the success of the graduation.

Figure 1 presents the research model elaborated from the support mechanisms offered by the incubators and the graduation success criteria, which is based on the literature.

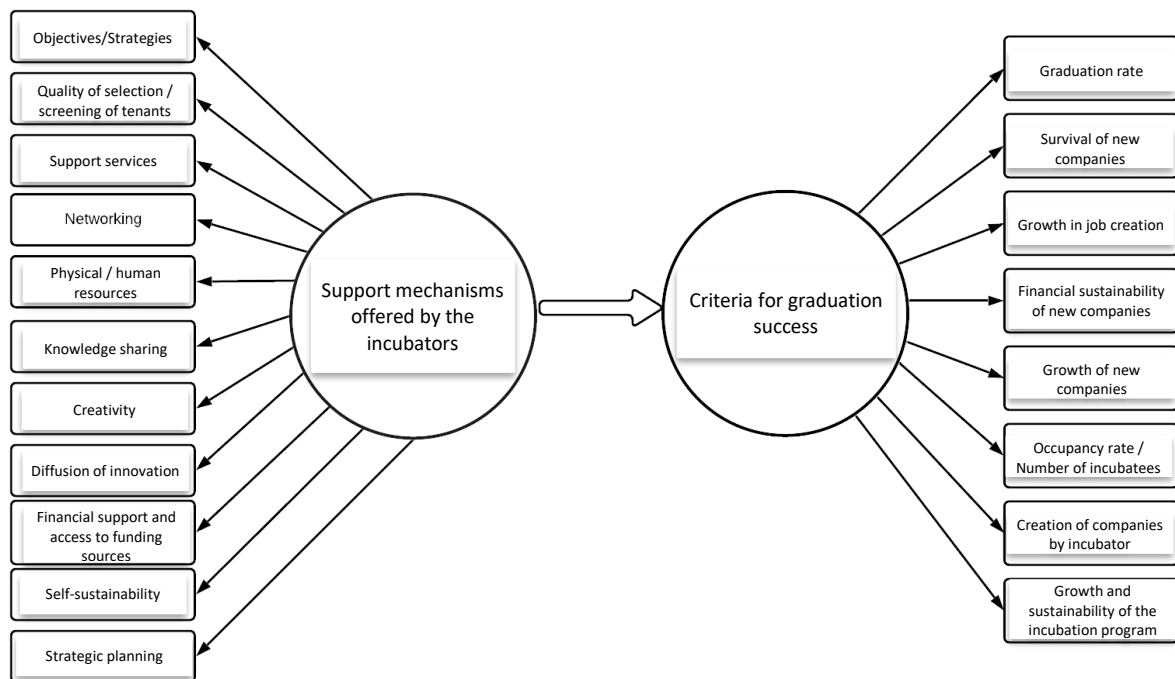


Figure 1. Research model
Source: Designed by the author.

Thus, based on the definition of the support mechanisms offered by the incubators (Chart 2), the criteria for evaluation of the graduation success (Chart 3) and the research model (Figure 1), eight hypotheses were formulated.

In view of what was exposed in the theoretical framework presented above, it is assumed that the graduation rate is one of the factors that can be decisive for the success of graduation. Based on this argument, hypothesis 1 was originated.

H1: The graduation rate of incubators has a significant relation with the support mechanisms adopted by the incubator.

From the literature survey, it can also be assumed that the survival of new companies is one of the factors that can be decisive for the successful graduation of incubated companies. Based on this argument, hypothesis 2 was originated.

H2: The survival of new companies from incubators has a significant relation with the support mechanisms adopted by the incubator.

According to the criteria for assessing success that were raised, it is assumed that the growth in job creation by graduated companies is one of the factors that can be decisive for successful graduation. Based on this argument, hypothesis 3 was originated.

H3: The growth in job creation by companies from incubators has a significant relation with the support mechanisms adopted by the incubator.

Given what was presented in the theoretical review, it is assumed that the financial sustainability of new companies is one of the evaluation criteria that can be decisive for the success of graduation. Based on this argument, hypothesis 4 was originated.

H4: The financial sustainability of new companies has a significant relation with the support mechanisms adopted by the incubator.

From what was presented in the previous section, it is assumed that the growth of new companies is one of the evaluation criteria that can be decisive for the success of the graduation. Based on this argument, hypothesis 5 was originated.

H5: The growth of new companies has a significant relation with the support mechanisms adopted by the incubator.

Given the above, it is assumed that the occupancy rate is one of the evaluation criteria that can be decisive for the success of the graduation. Based on this argument, hypothesis 6 was originated.

H6: The occupancy rate (number of incubated) has a significant relation with the support mechanisms adopted by the incubator.

Still, according to the success evaluation criteria that were raised, it is assumed that the creation of new companies is one of the factors that can be decisive for the graduation success. Based on this argument, hypothesis 7 was originated.

H7: The creation of new companies has a significant relation with the support mechanisms adopted by the incubator.

Finally, it is assumed that the growth and sustainability of the incubation program are factors that can be decisive for successful graduation. Based on this argument, hypothesis 8 was originated.

H8: The growth and sustainability of the incubation program have a significant relation with the support mechanisms adopted by the incubator.

In the analysis of the data, each of the support mechanisms was related to each of the criteria for evaluating the success of the graduation, in order to discover which variable is related or is influenced by the success of the incubated companies.

3 TECHNICAL PRODUCTION RESEARCH METHOD AND TECHNIQUES

This section addresses the methodological procedures that supported the development of this research, including the research design, the data collection procedure, the data analysis procedure and the limitations of the research methods and techniques. As it is the research question that suggests the methodology to be used (Becker, 1997; Gondin & Lima, 2002; Quivy & Compenhoudt, 2008; Strauss & Corbin, 2008; Silverman, 2009), this section begins by exposing again the research problem: What are the support mechanisms offered by the incubators and their relation with the success criteria for the graduation of the incubated companies?

3.1 RESEARCH OUTLINE

The present study is classified as descriptive research, as it highlights characteristics of a given population or phenomenon, thus being able to demonstrate correlations between variables and also define their nature (Creswell & Creswell, 2017; Vergara, 2016). Descriptive research needs information about what you want to research, allowing you to observe, analyze and describe phenomena and facts, in addition to classifying and interpreting them (Cooper & Schindler, 2008; Triviños, 1987; Rampazzo, 2005).

Therefore, the descriptive nature of this research is considered, which, through an empirical investigation, sought to analyze which support mechanisms are offered by incubators of companies associated with ANPROTEC that are related to the success criteria for the graduation of the incubated companies.

As for its approach, it is classified as quantitative (Hair et al., 2009), seeking to provide a general perspective of a given fact through the formulation of research hypotheses (Gil, 1999). Quantitative research aims to quantify the data, employing statistical analysis, measuring the relations between certain variables, and evaluating the results obtained, paying attention to the behavior of the facts (Raupp & Beuren, 2009b; Malhotra, 2001; Roesch et al., 1999).

In the quantitative approach, standardized data are used that allow the researcher to establish analyzes regarding the research problem, using, for this, statistical tools that allow reaching the understanding of the research object (Roesch et al., 1999). Quantitative research uses mathematical language to describe the causes of a given phenomenon and the relations between variables (Teixeira, 2005).

This research is also classified as a survey, which is characterized by direct consultation with people about whose behavior one wants to know, consisting of asking a significant group of individuals about the problem studied, in which it is possible to obtain conclusions corresponding to the data collected through quantitative analysis (Hair et al., 2009).

3.2 DATA COLLECTION PROCEDURE

In order to carry out the data collection, graduated companies linked to the Business Incubators associated with the National Association of Entities Promoting Innovative Enterprises (ANPROTEC) and, as research subjects, the managers of these companies were chosen as the research object. The managers were chosen because they are active agents in the business incubation process within their respective companies and have access to data and information, in addition to having relevant perceptions for achieving the objectives of this study.

To achieve the study's objectives, all research subjects were contacted, thus working with a census attempt. The method used in the study was the survey or online survey, carried out with managers of companies graduated in incubators of Brazilian companies. It is a research instrument committed to testing hypotheses, through the selection of a representative sample of the target population, in which data and information about their actions, characteristics or opinions are obtained, in addition to the elaboration and application of the questionnaire, followed by analysis of the results (Fonseca, 2002; Paranhos et al., 2013).

The research population was composed only of companies graduated in incubators associated with ANPROTEC - National Association of Entities Promoting Enterprises of Advanced Technologies. In order to obtain the contacts of the incubated companies, a search was carried out on the ANPROTEC website in the list of members and on the website of each incubator individually, with the intention of finding contact information via email, in addition to forwarding an email and making telephone contact with the incubators requesting that the questionnaire be passed on to the graduated companies. Currently, ANPROTEC informs on its website that there are 245 associated incubators in Brazil, but there is no published number of graduated companies. Some incubators disclose this information and others do not, so it is not possible to establish an exact number.

For data collection, a questionnaire was used. Bibliographical research is the first step to be carried out in any scientific research (Marconi & Lakatos, 1992) and, in addition to

supporting the theoretical framework, it was also fundamental for the construction of the questionnaire and for data analysis, enabling the realization of comparisons between the results found in this research with other studies with similar themes.

Data collection was carried out through the application of a questionnaire, which consists of an investigation technique formed by a set of questions that are asked to people in order to obtain information (Gil, 2008). This collection instrument is characterized by having defined variables, by being structured, by being answered in writing and by allowing the generalization of responses, presenting the perception of the survey respondents on the researched topic and providing conditions for the researchers to carry out the analyzes (Beuren, 2006b; Gil, 2002; Marconi & Lakatos, 2003; Martins, 2010; Vergara, 2010).

The questionnaire was chosen because it is understood that it is the technique capable of translating the objectives of this study into questions whose answers have the capacity to generate data that allow indicating what are the support mechanisms that affect the sustainable performance of the incubated companies. The questionnaire with closed questions was divided into two sections: the first part seeks to identify the profile of the incubated companies, and the second section asked for an assessment of the perceptions of the support mechanisms offered by the incubator and the adopted criteria for evaluating the success of the graduation by the incubator, which was structured in the Likert scale response format, in which the responses are parameterized from 1 to 5 (1 - Totally Disagree; 2 - Disagree; 3 - Indifferent; 4 - Agree; 5 - Totally Agree). After formulating the questionnaire, it was made available to the managers of the incubators in digital format (Google Forms), by electronic address (e-mail), obtained through the website of ANPROTEC and the incubators.

The questionnaire was prepared by the author considering the support mechanisms offered by the incubator and the evaluation criteria for graduation success, which were raised in the literature and presented in Charts 02 and 03. After preparing the questionnaire, it was forwarded by e -email to 14 people (including professors and technicians who work in incubators and/or research on the subject) for correction and validation of the research instrument. Four responses were received with small suggestions regarding grammar and some questions were formulated in such a way as to understand that they were directed more towards incubator managers rather than graduated companies, and also because the questionnaire was too long. The observations were accepted, and corrections were made before sending them to the companies for data collection. Data collection took place from November 2022 to March 2023, yielding a total of 79 responses.

3.3 DATA ANALYSIS PROCEDURE

Bearing in mind the adoption of a quantitative approach in carrying out this research, the analysis of the data collected through the questionnaires was handled by statistical analysis, in which the characteristics and relations between the variables were identified. The Partial Least Squares Structural Equation (PLS-SEM) (Hair et al., 2011) modeling was used to carry out the tests, which was considered adequate for this study. The PLS model is considered more appropriate when you have a sample size smaller than 200 observations (Chin, Marcolin & Newsted, 2003). Hair et al. (2014) corroborate this, stating that the PLS-SEM is a recognized method of analysis in business research because it does not require a large sample size, in addition to not requiring normality and working without distributive assumptions and with ordinal, nominal and interval variables.

The PLS-SEM model allows two elements to be evaluated simultaneously. First, there is a structural model, which can also be called an internal model, in which the relations or paths between the constructs are highlighted. The second element consists of a measurement model, also called an external model, in which the relations between indicators and constructs are demonstrated (Hair Jr. et al., 2011). PLS-SEM modeling is also adequate when there are a large number of variables, since it does not have estimation problems or improper results (Henseler et al., 2009).

Microsoft Excel and SmartPLS software were used for data processing. Cronbach's alpha test was also performed to assess the validity of the questionnaire employed.

3.4 LIMITATIONS OF RESEARCH METHODS AND TECHNIQUES

The limitations of a scientific research can occur in three ways: referring to the chosen method, the way the data are collected and the way the data are analyzed (Creswell, 2003).

As for the chosen method, as it is a quantitative study in which statistical data are analyzed in order to prove the research objectives, the researcher may not understand the complexity and details of the theme.

Regarding data collection, in the case of applied questionnaires, distortions of perceptions and interpretations of the questions carried out may occur. As much as an effort is made to make the instrument as simple and appropriate as possible, there is no way to guarantee that all respondents have the same understanding of the questioned items.

4 RESULTS

4.1 CHARACTERIZATION OF PARTICIPANTS

The first seven questions of the data collection instrument were intended to characterize the respondents. In the first question, respondents were asked to which incubator they were linked. In total, there were 79 companies linked to 22 incubators. Regarding the location of the graduated companies, the results are shown in Table 01. Due to the large number of cities, only the states were considered, emphasizing that the vast majority of companies are located in the state of Rio Grande do Sul.

Table 1
Respondents by state of the federation

State	Respondents
Rio Grande do Sul	25
Rio de Janeiro	13
Minas Gerais	11
Paraná	9
São Paulo	8
Mato Grosso do Sul	4
Amazonas	3
Santa Catarina	3
Mato Grosso	2
Goiás	1

Note. Source: Results from the research (2023)

With regard to the company's field of activity, 65.82% classify their company in the field of services, 18.99% of respondents state that their companies operate in the industry and 15.19% in commerce. With regard to the size of the company, 62.03% of the companies are classified as micro companies, 26.58% as small companies, 8.86% as large companies and only two responses (2.53% of the total) are classified as medium companies. The next question asked the total number of employees in the company, as shown in Table 02. It can be seen that there is a predominance of companies with up to 10 employees, a total of 68.35% of respondents, and only 2.53% of companies graduates have 21 to 30 people in their staff chart.

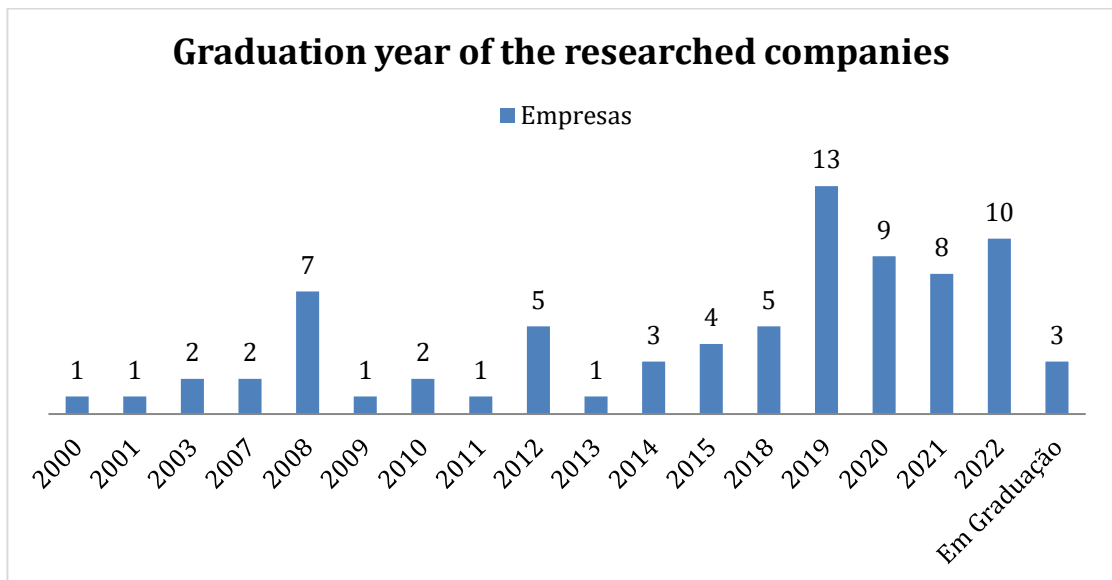
Table 2
Number of employees per graduated company

Number of employees	Respondents
01 to 10 people	68.35%
11 to 20 people	7.59%
21 to 30 people	2.53%
31 to 50 people	10.13%
50 to 100 people	3.80%
Above 100 people	7.59%

Note. Source: Results from the research (2023)

Regarding the time of existence of the company, it can be observed that the youngest responding companies have only 01 year of existence, while the most experienced has 40 years in the market. Among the companies that answered the questionnaire, the average time of existence was 11.69 years.

Regarding the incubation time in the incubator, 37.97% of the companies stayed in the incubator for more than 24 months. Of the respondents, 25.32% remained incubated from 19 to 24 months, 16.46% participated in the incubation process over a period of 13 to 18 months, 15.19% of the companies were incubated from 06 to 12 months and only 5.06% stayed in the incubator for a period of less than 06 months. The next question asked in which year the company graduated, and the results are shown in Graph 01.



Graph 1. Graduation year of the researched companies
 Source: Results from the research (2023)

4.2 MODEL ANALYSIS

The analysis was performed by applying the estimation method of the PLS-SEM model, which verifies the non-apparent relation related to the observed variables. The analysis related the constructs of the support mechanisms offered by the incubators with each of the constructs of the evaluation criteria of the graduation success adopted by the incubators.

In the first analysis structure generated by the software, which included all the variables (questions), it was verified whether the factor loadings of the observable variables had values greater than 0.6. Factor loadings greater than 0.6 indicate that the analyzed variables converge satisfactorily, forming their respective construct (Hair et al., 2014). Thus, it was decided to exclude the variables whose values were lower than this limit.

After carrying out the test of the total analysis model, the results of the Cronbach's Alpha (ALFA), Composite Reliability (ρ_a), Composite Reliability (ρ_c) and Average Variance Extracted (AVE) tests are presented, in order to observe the convergent validity of the constructs, analyzed through the internal consistency of the constructs. According to Hair et al. (2014), Cronbach's alpha can vary from 0 to 1, in which a value above 0.6 has an internal consistency reliability that can be considered satisfactory. The same happens with the Composite Reliability, which must have values above 0.6 to be considered satisfactory. The AVE must have a value equal to or greater than 0.50, indicating that the potential variable explains more than half of the variance of its indicators (Hair et al., 2009).

In the analysis of the relation between the support mechanisms and the graduation rate, in the Physical and Human Resources construct, the variable (question) Q23 – Does the incubator to which it is connected provide physical resources (rooms, auditoriums, laboratories, equipment, among others)) that help in the performance of the company. The variable Q48 – A fixed period of time is determined for companies to stay in the incubator, referring to the dependent construct, the Graduation Rate, generating the final analysis structure (Figure 2).

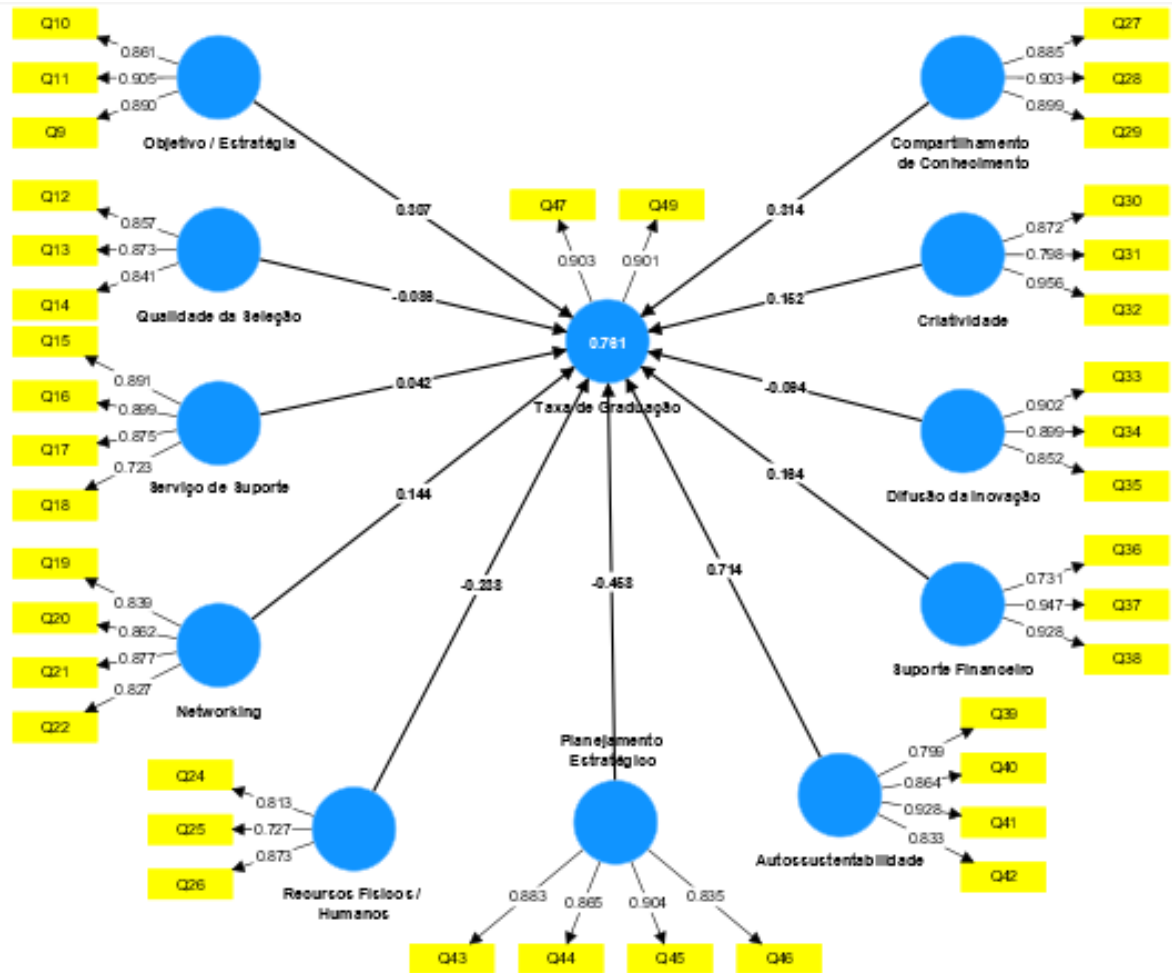


Figure 2. Final analysis model – Graduation Rate

Source: Results from the research (2023)

After testing the analysis model, the results of the Reliability and validity tests were checked in SmartPLS. Table 3 presents the result for the ratio of support mechanisms in relation to the graduation rate, and it is possible to observe that all constructs reached values greater than 0.50; Therefore, there is convergent validity.

Table 3
Reliability and validity tests – Graduation Rate

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.879	0.917	0.735
Compartilhamento_de Conhecimento	0.877	0.879	0.924	0.803
Criatividade	0.849	0.874	0.909	0.770
Difusão da Inovação	0.862	0.882	0.915	0.782
Networking	0.874	0.880	0.913	0.724
Objetivo / Estratégia	0.862	0.862	0.916	0.784
Planejamento _Estratégico	0.895	0.907	0.927	0.761
Qualidade da Seleção	0.820	0.821	0.893	0.735
Recursos Físicos / _Humanos	0.777	0.923	0.848	0.651
Serviço de Suporte	0.870	0.893	0.912	0.723
Suporte Financeiro	0.839	0.856	0.906	0.764
Taxa de Graduação	0.770	0.770	0.897	0.813

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Creativity, Diffusion of innovation, Networking,

Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support, Graduation rate.

In the analysis of the relation between support mechanisms and the survival of new companies, only the variable Q51 – The discontinuity of support that occurs after graduation affects the survival of the company, referring to the dependent construct, the Survival of new companies, generating the final analysis framework (Figure 3).

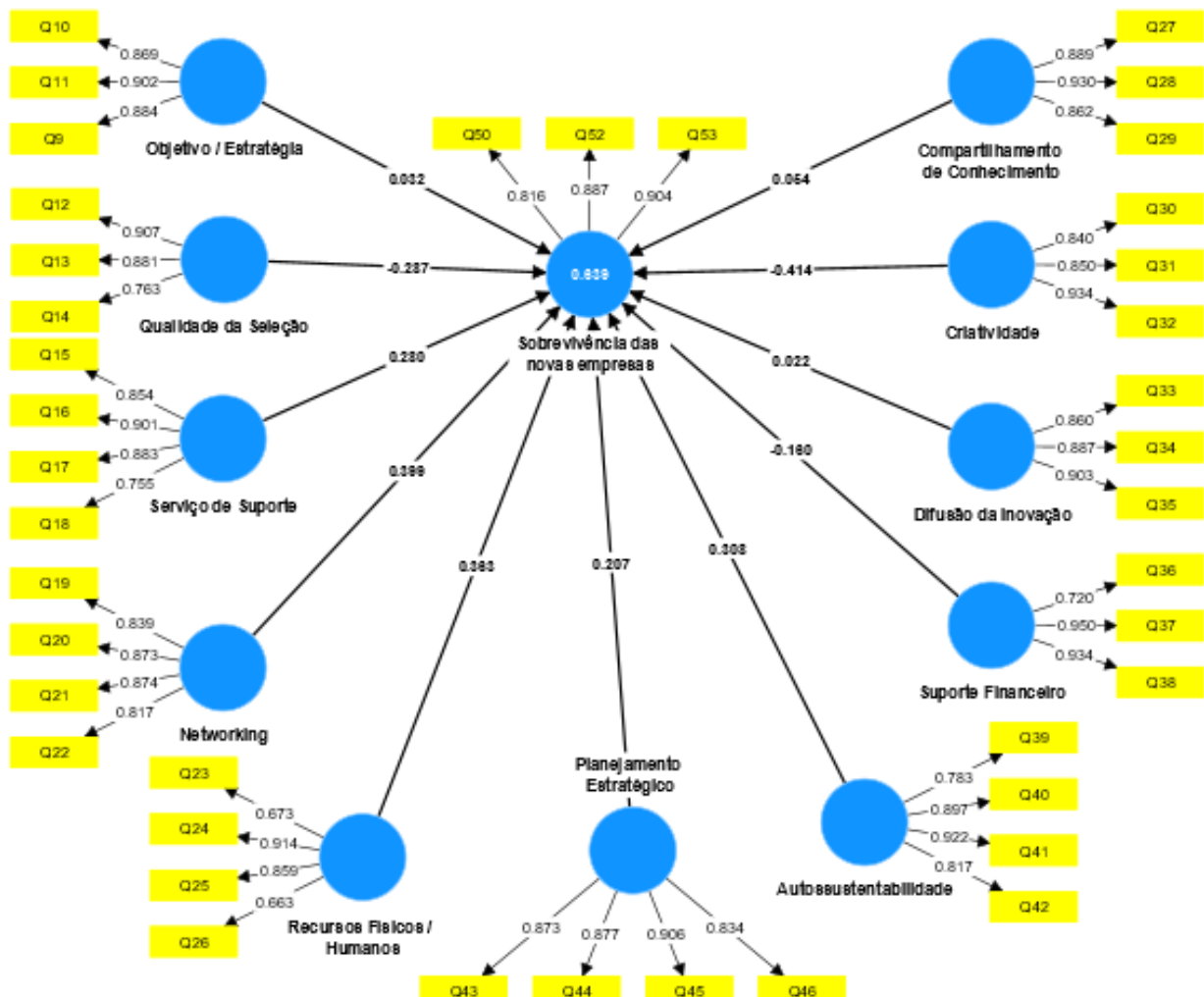


Figure 3. Final analysis model – Survival of new companies

Note. Source: Results from the research (2023)

The results of the Reliability and validity tests for the relation between support mechanisms and the survival of new companies, presented in Table 4, show that all constructs reached values greater than 0.50; Therefore, there is convergent validity.

Table 4
Reliability and validity tests – Survival of new companies

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.914	0.916	0.733
Compartilhamento_de Conhecimento	0.877	0.929	0.923	0.799
Criatividade	0.849	0.860	0.908	0.767
Difusão da Inovação	0.862	0.902	0.914	0.780
Networking	0.874	0.884	0.913	0.724
Objetivo / Estratégia	0.862	0.863	0.916	0.784
Planejamento_Estratégico	0.895	0.896	0.927	0.762
Qualidade da Seleção	0.820	0.903	0.888	0.727
Recursos Físicos / Humanos	0.785	0.806	0.863	0.617
Serviço de Suporte	0.870	0.883	0.912	0.722
Sobrevivência das_novas empresas	0.838	0.838	0.903	0.756
Suporte Financeiro	0.839	0.865	0.906	0.764

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Creativity, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Survival of new companies, Financial support

In the analysis of the relation between support mechanisms and growth in job creation, no variable was excluded (Figure 4).

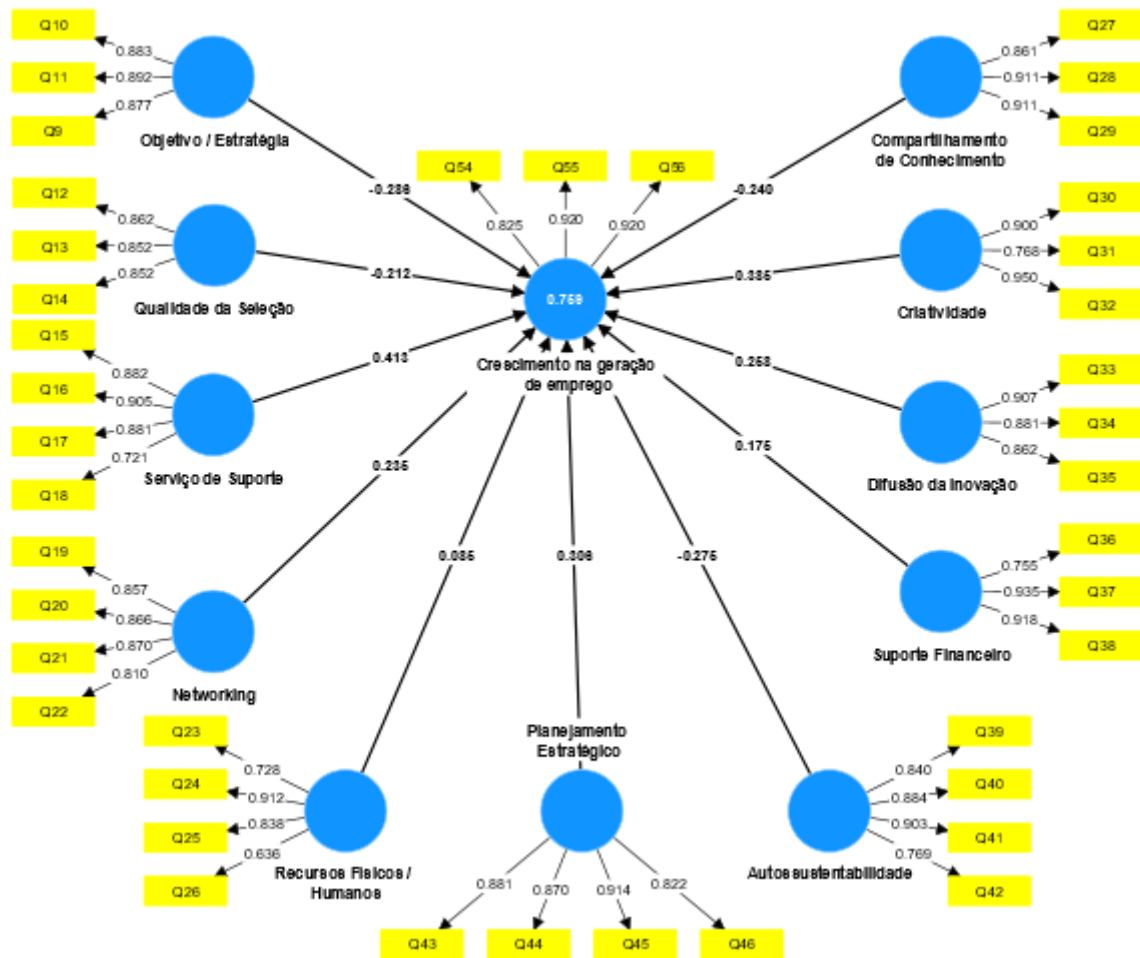


Figure 4. Final analysis model – Growth in job creation
Source: Results from the research (2023)

For the relation between support mechanisms and growth in job creation, the results of the Reliability and validity tests are presented in Table 5 and show that all constructs reached values greater than 0.50; Therefore, there is also convergent validity.

Table 5

Reliability and validity tests – Growth in job creation

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.925	0.913	0.724
Compartilhamento_de Conhecimento	0.877	0.902	0.923	0.801
Crescimento na geração_de emprego	0.866	0.870	0.919	0.791
Criatividade	0.849	0.895	0.907	0.767
Difusão da Inovação	0.862	0.901	0.914	0.781
Networking	0.874	0.881	0.913	0.725
Objetivo / Estratégia	0.862	0.875	0.915	0.782
Planejamento_Estratégico	0.895	0.909	0.927	0.761
Qualidade da Seleção	0.820	0.836	0.891	0.732
Recursos Físicos / Humanos	0.785	0.802	0.864	0.617
Serviço de Suporte	0.870	0.890	0.912	0.723
Suporte Financeiro	0.839	0.841	0.905	0.763

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Growth in job creation, Creativity, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support

In the analysis of the relation between support mechanisms and the financial sustainability of new companies, only the variable Q59 – Does the company already have a regular monthly income, referring to the dependent construct, Financial Sustainability, generating the final analysis structure (Figure 5) was excluded.

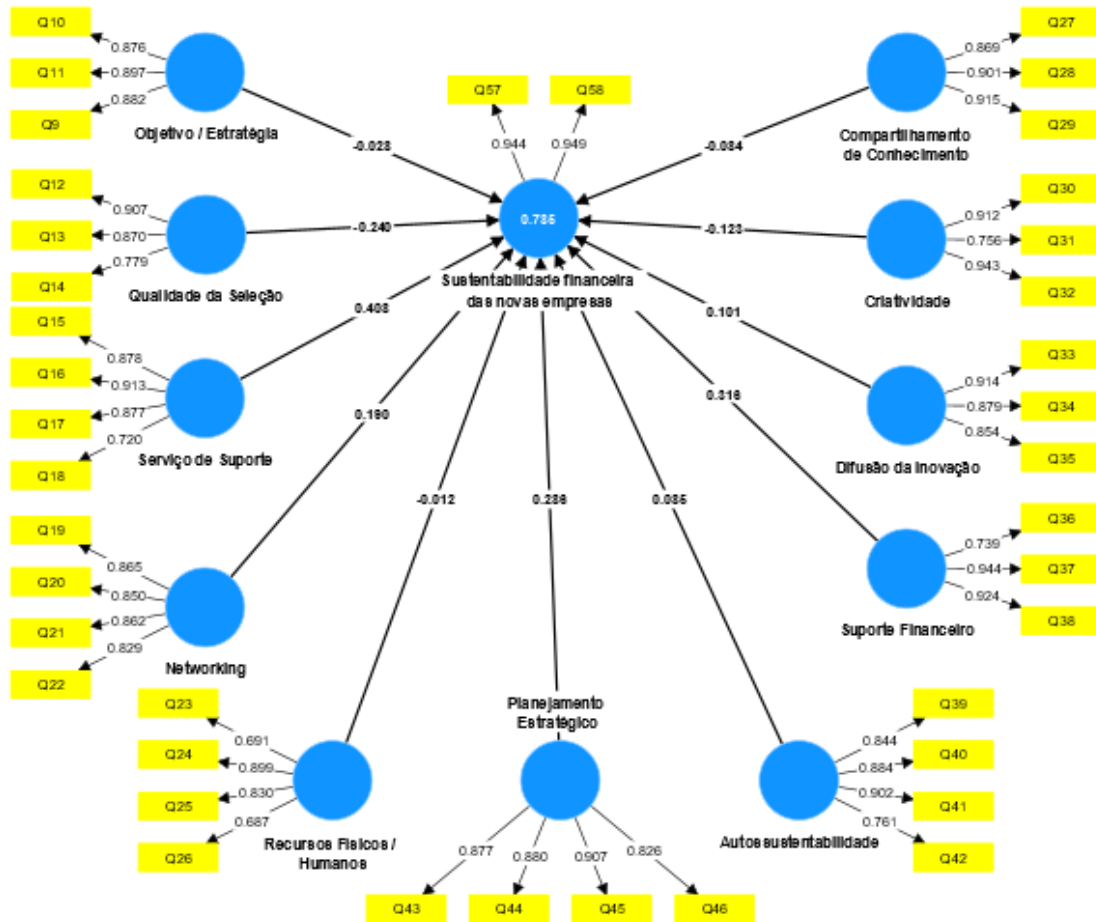


Figure 5. Final analysis model – financial sustainability
Source: Results from the research (2023)

For the ratio of support mechanisms in relation to the financial sustainability of new companies, the results of the Reliability and validity tests shown in Table 6 show that all constructs reached values greater than 0.50; Therefore, there is convergent validity.

Table 6
Reliability and validity tests – Financial sustainability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.928	0.912	0.722
Compartilhamento _de Conhecimento	0.877	0.904	0.923	0.801
Criatividade	0.849	0.935	0.906	0.764
Difusão da Inovação	0.862	0.924	0.914	0.779
Networking	0.874	0.876	0.913	0.725
Objetivo / Estratégia	0.862	0.867	0.915	0.783
Planejamento _Estratégico	0.895	0.898	0.927	0.762
Qualidade da Seleção	0.820	0.903	0.889	0.729
Recursos Físicos / _Humanos	0.785	0.790	0.862	0.612
Serviço de Suporte	0.870	0.900	0.912	0.723
Suporte Financeiro	0.839	0.849	0.906	0.764
Sustentabilidade financeira _das novas empresas	0.884	0.885	0.945	0.896

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Creativity, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support, Financial sustainability of new companies

In the analysis of the relation between support mechanisms and the growth of new companies, no variable was excluded (Figure 6).

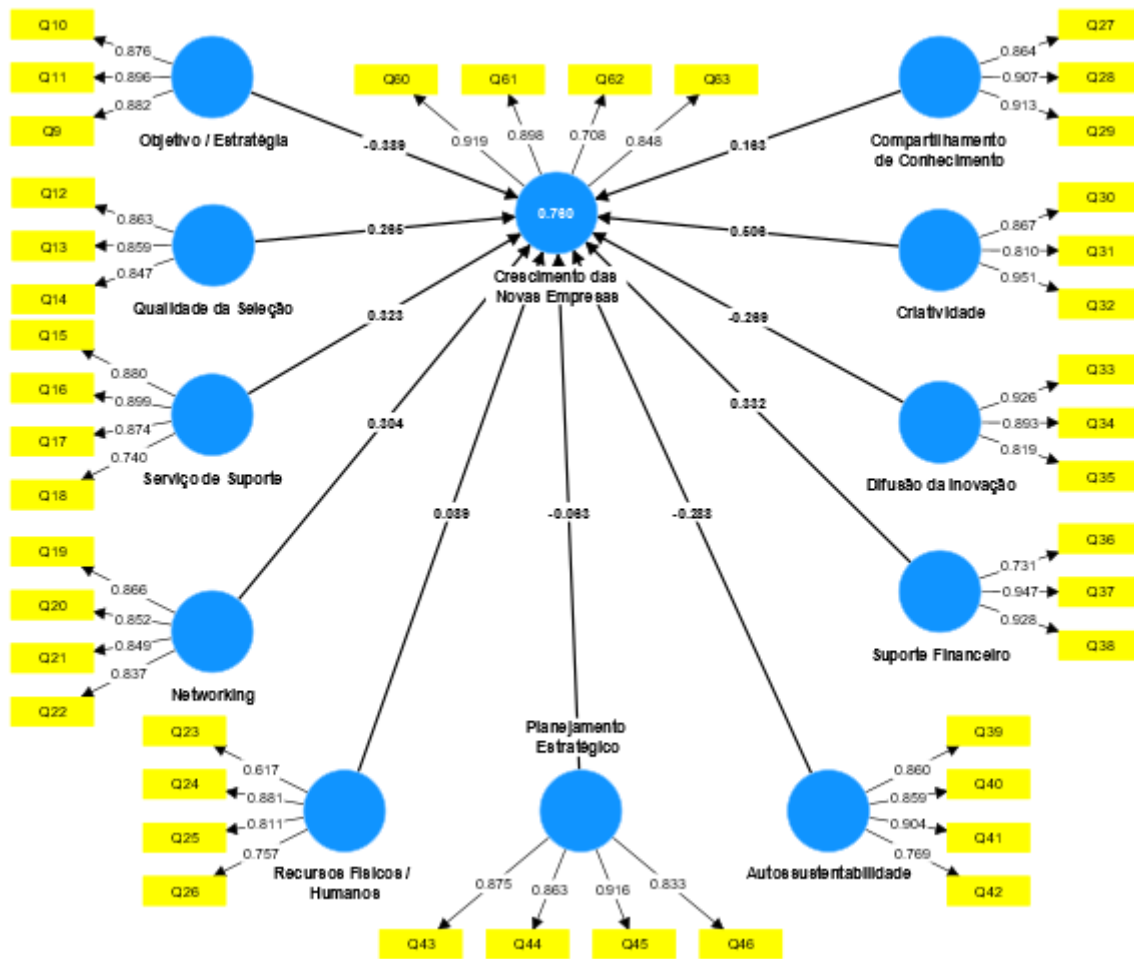


Figure 6. Final analysis model – Growth of new companies

Source: Results from the research (2023)

In the relation between support mechanisms and the growth of new companies, the results of the Reliability and validity tests show that all constructs reached values greater than 0.50; therefore, there is convergent validity (Table 7).

Table 7

Reliability and validity tests – Growth of new companies

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autosustentabilidade	0.879	0.957	0.912	0.721
Compartilhamento_de Conhecimento	0.877	0.902	0.923	0.801
Crescimento das _Novas Empresas	0.866	0.887	0.910	0.718
Criatividade	0.849	0.856	0.909	0.771
Difusão da Inovação	0.862	0.972	0.912	0.776
Networking	0.874	0.877	0.913	0.725
Objetivo / Estratégia	0.862	0.867	0.915	0.783
Planejamento _Estratégico	0.895	0.909	0.927	0.761
Qualidade da Seleção	0.820	0.830	0.892	0.733
Recursos Físicos / _Humanos	0.785	0.835	0.854	0.597
Serviço de Suporte	0.870	0.879	0.912	0.723
Suporte Financeiro	0.839	0.855	0.906	0.764

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Growth of new companies, Creativity, Diffusion of

innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support

In the analysis of the relation between the support mechanisms and the occupancy rate / Number of incubated individuals, in the Physical and Human Resources construct, the variable (question) Q23 – Does the incubator to which it is connected provide physical resources (rooms, auditoriums, laboratories, etc.) equipment, among others) that help the company's performance, generating the final analysis structure (Figure 7).

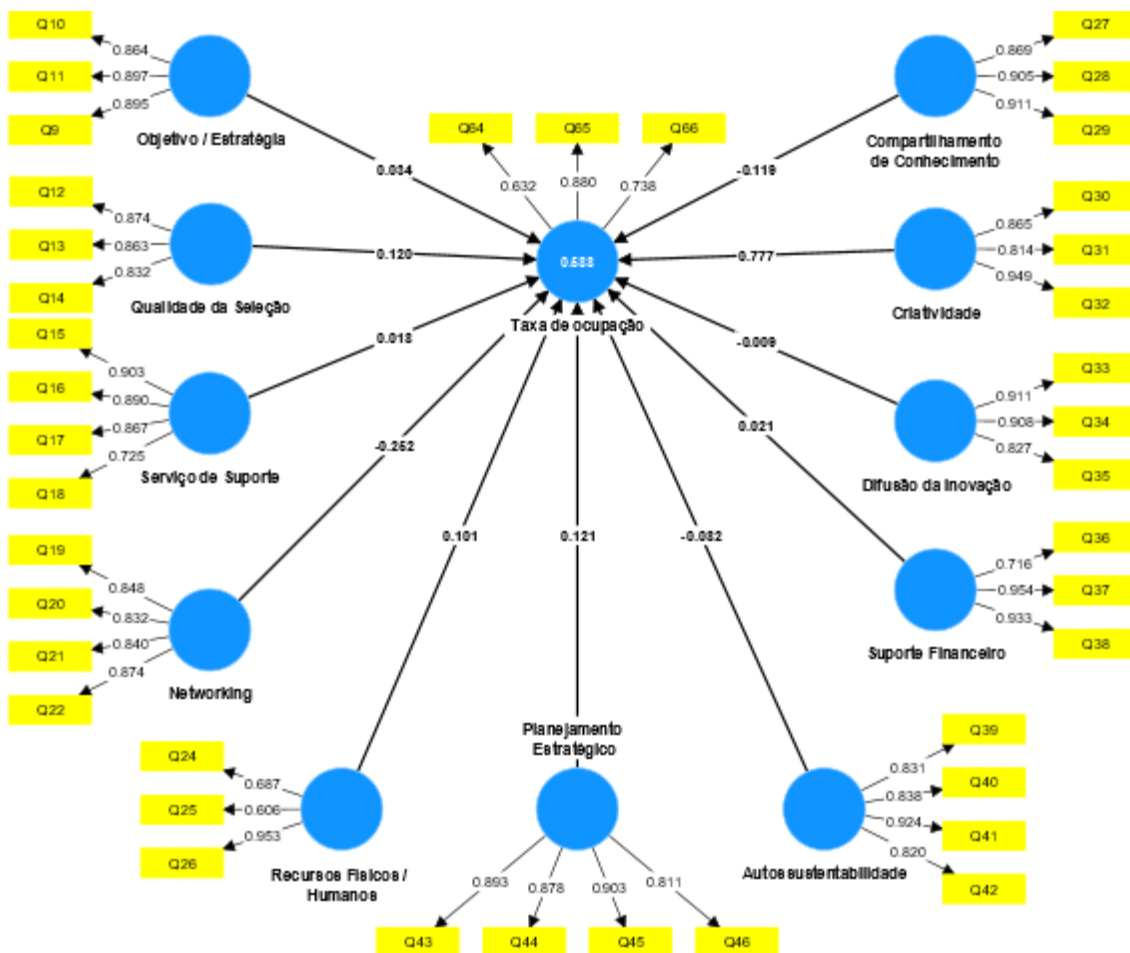


Figure 7. Final analysis model – Occupancy rate / Number of incubatees
Source: Results from the research (2023)

After testing the analysis model, the results of the Reliability and validity tests were checked in SmartPLS. Table 8 presents the result for the relation between support mechanisms and the occupancy rate / number of incubators, and it is possible to observe that all constructs reached values greater than 0.50; therefore, there is convergent validity. Although Cronbach's Alpha and Composite Reliability (ρ_a) are shown in red for the occupancy rate, indicating that they are not satisfactory, Cronbach's Alpha still presents a value above 0.6, indicating that

it has a coherence reliability considered satisfactory. The same situation is observed in relation to the Composite Reliability, which presents a value above 0.6, thus being considered satisfactory.

Table 8

Reliability and validity tests – Occupancy rate / Number of incubatees

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.911	0.915	0.730
Compartilhamento_de Conhecimento	0.877	0.896	0.924	0.801
Criatividade	0.849	0.852	0.909	0.771
Difusão da Inovação	0.862	0.912	0.914	0.779
Networking	0.874	0.926	0.911	0.720
Objetivo / Estratégia	0.862	0.864	0.916	0.784
Planejamento_Estratégico	0.895	0.917	0.927	0.760
Qualidade da Seleção	0.820	0.832	0.892	0.734
Recursos Físicos / _Humanos	0.777	1.669	0.801	0.582
Serviço de Suporte	0.870	0.919	0.911	0.721
Suporte Financeiro	0.839	0.876	0.906	0.764
Taxa de ocupação	0.619	0.658	0.798	0.573

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Creativity, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support, Occupancy rate / Number of incubatees

In the analysis of the relation between the support mechanisms and the creation of companies by the incubator, in the construct Physical and Human Resources, the variable Q23 – Does the incubator to which it is connected provide physical resources (rooms, auditoriums, laboratories, equipment, among others) was excluded that help the company's performance, generating the final analysis structure (Figure 8).

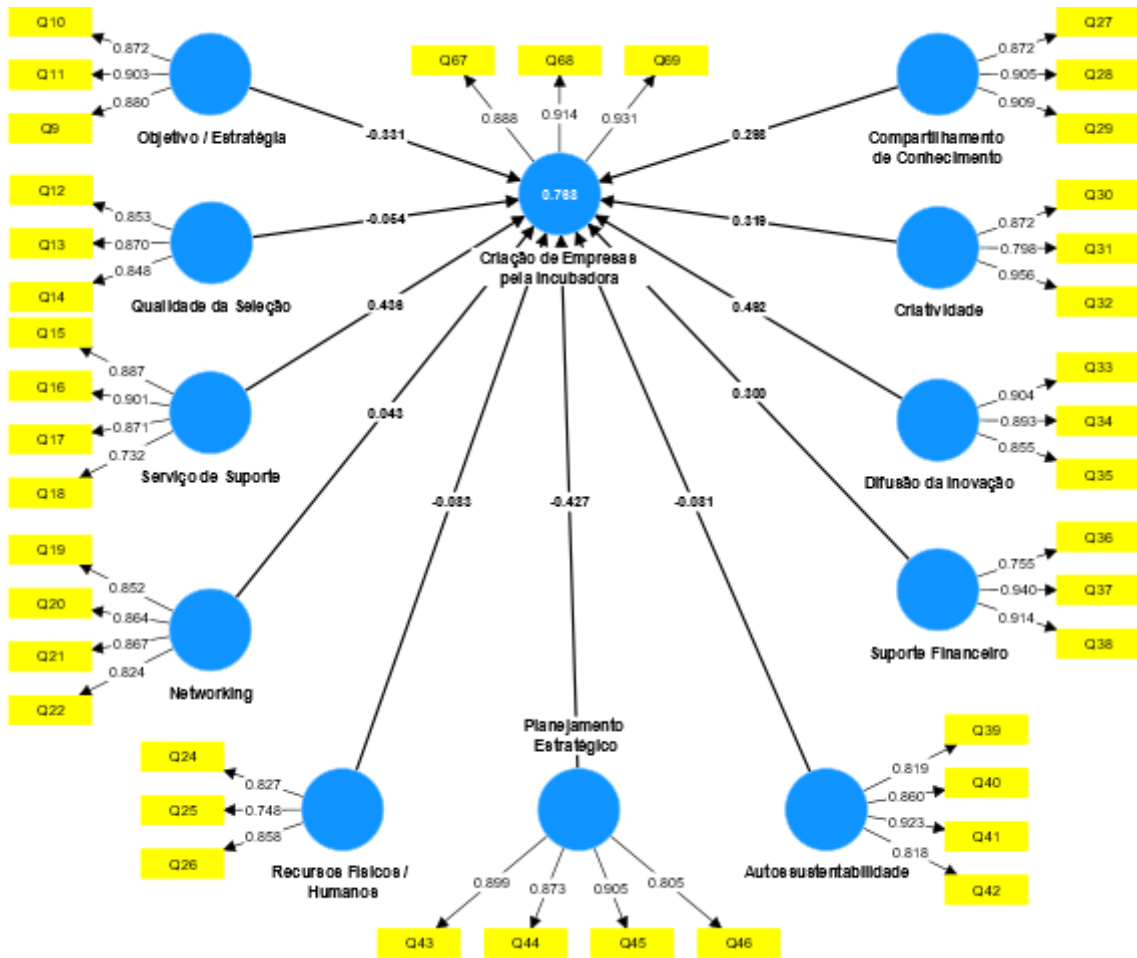


Figure 8. Final analysis model – Creation of companies by the incubator
 Source: Results from the research (2023)

In the relation between support mechanisms and the creation of companies by the incubator, the results of the Reliability and validity tests show that all constructs reached values greater than 0.50; therefore, there is convergent validity (Table 9).

Table 9
Reliability and validity tests – Creation of companies by the incubator

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.890	0.916	0.733
Compartilhamento _de Conhecimento	0.877	0.891	0.924	0.802
Criatividade	0.849	0.875	0.909	0.770
Criação de Empresas _pela Incubadora	0.897	0.899	0.936	0.830
Difusão da Inovação	0.862	0.888	0.915	0.782
Networking	0.874	0.876	0.913	0.725
Objetivo / Estratégia	0.862	0.865	0.916	0.783
Planejamento _Estratégico	0.895	0.934	0.926	0.759
Qualidade da Seleção	0.820	0.823	0.892	0.734
Recursos Físicos / _Humanos	0.777	0.888	0.853	0.660
Serviço de Suporte	0.870	0.887	0.912	0.723
Suporte Financeiro	0.839	0.848	0.905	0.763

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Creativity, Creation of companies by incubator, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support

The last analysis carried out relates the support mechanisms with the growth and sustainability of the incubation program. The variable Q23 – The incubator to which it is connected provides physical resources (rooms, auditoriums, laboratories, equipment, among others) that help the company's performance, in the construct Physical and Human Resources, generating the final analysis structure (Figure 9) was excluded.

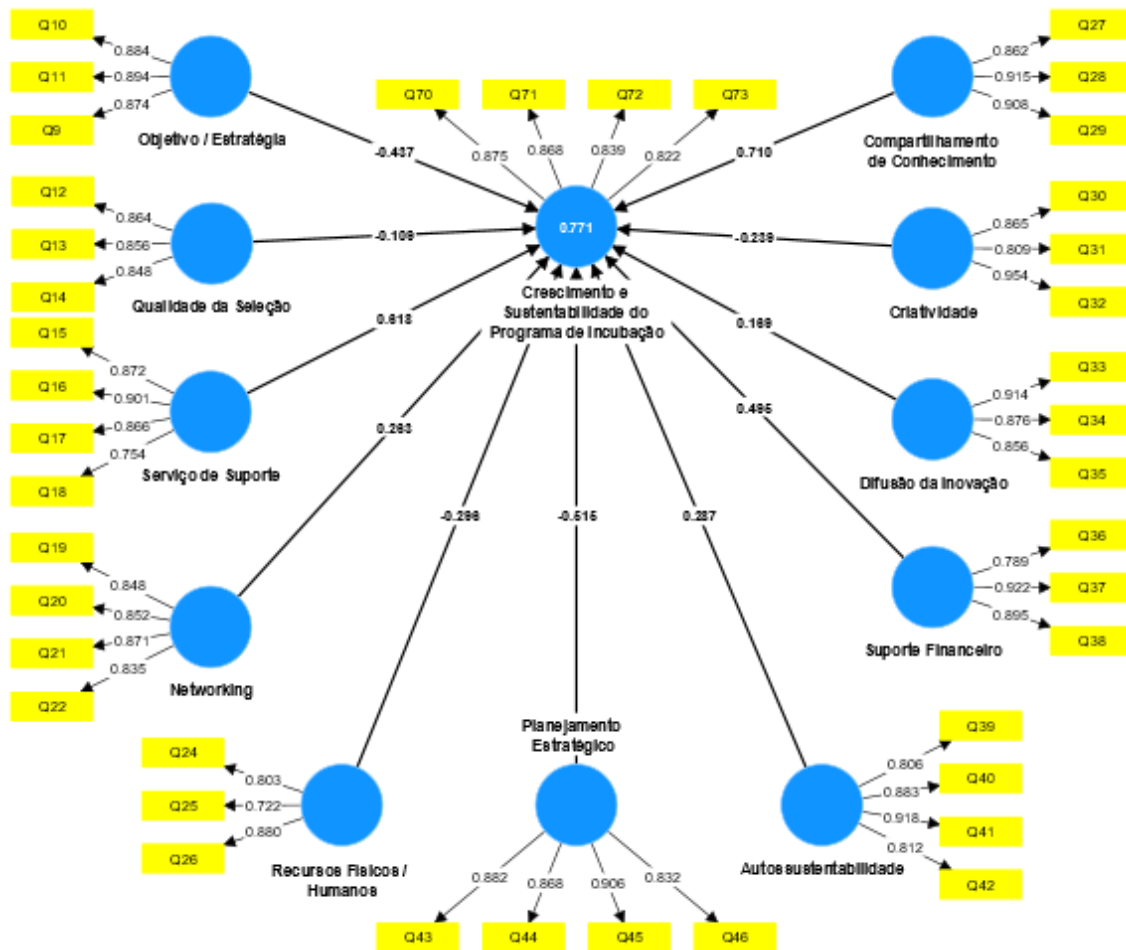


Figure 9. Final analysis model – Growth and sustainability of the incubation program
Source: Results from the research (2023)

Finally, regarding the relation between support mechanisms and the growth and sustainability of the incubation program, the results of the Reliability and validity tests also show that all constructs reached values greater than 0.50; therefore, there is convergent validity (Table 10).

Table 10
Reliability and validity tests – Growth and sustainability of the incubation program

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Autossustentabilidade	0.879	0.891	0.918	0.733
Compartilhamento_de Conhecimento	0.877	0.898	0.924	0.801
Crescimento e _Sustentabilidade do _Programa de Incubação	0.874	0.878	0.913	0.725
Criatividade	0.849	0.884	0.908	0.771
Difusão da Inovação	0.882	0.929	0.913	0.779
Networking	0.874	0.878	0.913	0.725
Objetivo / Estratégia	0.882	0.878	0.915	0.782
Planejamento _Estratégico	0.895	0.904	0.927	0.781
Qualidade da Seleção	0.820	0.832	0.892	0.733
Recursos Físicos / _Humanos	0.777	0.959	0.845	0.847
Serviço de Suporte	0.870	0.878	0.912	0.723
Suporte Financeiro	0.839	0.840	0.903	0.758

Note. Source: Results from the research (2023)

From top to bottom: Self-sustainability, Knowledge sharing, Growth and sustainability of the incubation program, Creativity, Diffusion of innovation, Networking, Objective / Strategy, Strategic planning, Quality of selection / screening of tenants, Physical / human resources, Support services, Financial support

5 DISCUSSION OF THE RESULTS

In this section, the results obtained after data analysis are discussed. A relevant fact observed from the results is that the incubators of Brazilian companies predominantly have in their incubation processes companies that operate in the field of service, demonstrated by 65.82% of the companies surveyed. It can also be seen that 62.03% of graduated companies are classified as micro-enterprises, with a small number of employees: for 68.35% this number is up to 10 employees.

These facts can be explained, according to Fonseca (2015), as business incubators stimulate the growth of small companies through their incubation process, in order to provide them with opportunities that they would not have if they were not incubated. Campbell, Kendrick and Samuelson (1989) corroborate this information when they state that economic development strategies should transform entrepreneurs' ideas into new businesses in order to provide job creation and also economic growth. For Dornelas (2004), business incubators have the main role of promoting local and regional development, facilitating the birth of competitive micro and small companies, job creation and consequent income distribution.

It is also noteworthy that the incubation time in the incubator tends to be longer than two years or very close to this time, since 37.97% of the companies stayed in the incubator for more than 24 months and 25.32% remained incubated from 19 to 24 months.

Although there is no exact time indicated for the permanence of companies in the incubator, it was observed that a longer incubation time can make the incubated company dependent on the support received from the incubator (Schwartz, 2009). On the other hand, it is necessary to observe, for graduation, what are the conditions of the sector in which the incubated company is inserted, which may require different times for them to reach a sustainable level of development (Grimaldi & Grandi, 2005). Therefore, the graduation criteria need to be defined on a case-by-case basis and the maximum incubation time also has to be determined individually for each company (Rothaermel & Thursby, 2005).

As presented in the results section, it was possible to confirm hypothesis H1 – The graduation rate of incubators has a significant relation with the support mechanisms adopted by the incubator, not showing a strong relation only with the variable presented in Q23, which dealt with the availability of physical resources (rooms, auditoriums, laboratories, equipment, among others) made available by the incubator and with the variable Q48, which dealt with the determination of a fixed period of time for companies to stay in the incubator. This finding also reinforces the variations in time for graduation among the respondent graduated companies,

despite Dornelas (2002) stating that graduation generally occurs about two years after the start of incubation, the finding in this research is corroborated by Rothaermel and Thursby (2005), who state that each company needs criteria and incubation time established individually. Iacono and Navaro (2017) assume that both the survival and growth of companies that have graduated depend on defining the contributions of specific support indicators of the incubator and not necessarily on the success of graduation.

Hypothesis H2 – The survival of new companies from incubators has a significant relation with the support mechanisms adopted by the incubator, was also confirmed. However, it did not show a very strong relation between the support mechanisms only and the variable Q51, which dealt with the discontinuity of support that occurs after graduation and its impact on the company's survival. The survival of companies after graduation is a controversial topic in the literature, where some authors, such as Lasrado et al. (2016), state that some incubated companies may not benefit significantly from their relation with the incubator, and may even be more vulnerable to failure after graduation. In contrast, Iacono and Nagano (2017) say that establishing support mechanisms during the incubation process and supervising the company in the postgraduate period can improve the success rate, including beyond the survival of companies, the growth and profitability of companies, which are somewhat low after graduation.

It was also possible to confirm hypothesis H3 – The growth in job creation by companies from incubators has a significant relation with the support mechanisms adopted by the incubator. This may be a result of the fact that job creation is a consequence of the emergence of incubators and new companies, which, as advocated by Dornelas (2004), the incubator has a predominant role in promoting local and regional development, promoting transformation, facilitating the birth of new companies, spreading knowledge and promoting the improvement of the quality of life in the region, through the creation of jobs and consequently the distribution of income. Despite this, it should be noted that the strong pressure to create jobs (Dornelas, 2002) can lead newly formed companies to fail in a short period of time (Morais, 1997). Therefore, Campbell, Kendrick and Samuelson (1989) state that strategies for economic development need to convert initial ideas into new businesses that provide both job creation and economic growth.

Hypothesis H4 – The financial sustainability of new companies has a significant relation with the support mechanisms adopted by the incubator – was also confirmed, with exception for variable Q59, which analyzed whether the company already had a regular monthly income. This can be interpreted in accordance with what was found by Carmo and Rangel (2020), who

noticed the financial dependence on the part of the incubated companies to keep their activities running, and also identified that one of the possible factors that contribute to this is financing via promotion notices. That is why, during the incubation period, the importance of the incubator in fostering business relations between companies and other external and internal agents is highlighted (Weinberg et al., 1991, Hausberg & Korreck, 2020, Lee & Osteryoung, 2004).

Hypothesis H5 was confirmed – The growth of new companies has a significant relation with the support mechanisms adopted by the incubator. The growth and financial performance of companies at the time of their graduation is pointed out by Hackett and Dilts (2004) as one of the performance evaluation criteria of the graduation process in incubators. The result found in the research can confirm that the business incubator is an environment that has facilities, both for the emergence of new ventures and for the growth of new companies (Dornelas, 2002), since it is through of the support mechanisms that incubators supply the deficiency of fundamental resources in the initial stage of new companies, in order to guarantee stability, long-term survival and sustainable economic growth in these new companies (Bergek & Norrman, 2008). Incubators stimulate the growth of small companies through the incubation process, creating opportunities for these companies to achieve greater performance compared to companies that have not gone through the same process (Fonseca, 2015).

Despite being confirmed, hypothesis H6 – The occupancy rate (number of incubators) has a significant relation with the support mechanisms adopted by the incubator – did not have a strong relation with the variable Q23 (the incubator to which it is connected provides resources that help the company's performance), in addition to having an unsatisfactory result in relation to its validity. This can be interpreted as the occupancy rate is used to measure the relevance of the incubator within its ecosystem, observing what is offered to the incubated companies and their results; thus, companies that are looking for an incubator end up looking first for the most important incubators, also generating high occupancy rates (Aerts, et al., 2007).

It was also possible to confirm hypothesis H7 – The creation of new companies has a significant relation with the support mechanisms adopted by the incubator – which presented an unsatisfactory relation only with the variable Q23, which related the availability of physical resources by the incubator in helping performance from the company. This result is in line with that found by Baêta, Borges and Tremblay (2006), who claim that the creation of small and medium-sized companies is highlighted by the support mechanisms offered in the performance of business incubators, especially when training entrepreneurs in management and encourage

the development of companies of this size. The incubator is a space that aims to support the transformation of potential entrepreneurs into profitable and growing companies (Lalkaka, 2003). Business incubators are directly associated with encouraging the creation of new ventures (Fonseca & Kruglianskas, 2000); thus, the growth of incubators results in a new business scenario, which is perceived by the increase in the number of new companies (Hannon, 2003).

Finally, hypothesis H8 – The growth and sustainability of the incubation program have a significant relation with the support mechanisms adopted by the incubator – was also confirmed. It also showed a weaker relation with the variable Q23 – The incubator to which it is connected provides physical resources (rooms, auditoriums, laboratories, equipment, among others) that help the company's performance. This result may indicate that one of the mechanisms that should be improved by incubators is the infrastructure, which is one of the elements that help the growth and sustainability of the incubation program. This is in line with what Mian (1996, 1997) says, when he states that the growth of the budget, space, facilities, employees, services and tenants are indicative of the growth and sustainability of the incubation program are results business incubator performance.

With the confirmation of all the hypotheses raised in the study, it is possible to highlight the importance of adopting efficient support mechanisms by the incubators, observing both the internal and external environment in which they operate. The support mechanisms will vary according to the particularities of each incubator and will be more or less efficient depending on the profile of each incubated company; therefore, it can be said that there is no more or less effective mechanism.

6 CONCLUSION

The objective of this study was to analyze which support mechanisms are offered by the incubators of companies associated with ANPROTEC that are related to the success criteria for the graduation of the incubated companies. In order for the objective to be achieved, each of the support mechanisms was related to each of the evaluation criteria of graduation success, according to what was found most relevant in the literature, seeking to discover which variable is related to or influences on the success of incubated companies.

The study showed that there is a strong relation between all the support mechanisms raised (Objective / Strategy; Quality of tenant selection / screening; Support services; Networking; Physical / human resources; Knowledge sharing; Creativity; Innovation diffusion; Financial Support and access to funding sources; Self-sustainability; Strategic planning) with all the criteria for evaluating the success of graduation (Graduation rate; Survival of new companies; Growth in job creation; Financial sustainability of new companies; Growth of new companies; Occupancy rate / Number of incubated; Creation of companies by the incubator; Growth and sustainability of the incubation program), in addition to identifying that the physical and human resources offered by the incubators are the mechanisms that least influence the success of the companies that went through the process of incubation.

Based on this study, it can be stated that there is not only one support mechanism that influences the success of an incubation program, but rather the relation between different support mechanisms and the success evaluation criteria adopted by each of the incubators, which help incubated companies and incubators to visualize which mechanisms have the most impact on improving the incubation process.

Considering the theoretical contributions, the results of this dissertation helped to enrich the literature on the subject, since there is a shortage of publications that analyze the vision of managers of graduated companies. In this study, a series of variables that are normally studied individually were gathered, making it possible to conclude that it is not just a single variable or support mechanism that will determine the success of the graduation process, but their set, and that these are conditioned to the environment in which the incubator operates, the size and sector of the incubated companies.

The research thus has the practical contribution of helping incubator managers to understand what are the support mechanisms that can be adopted that can contribute more efficiently and effectively to the success of the incubator and the companies that go through the incubation process.

One of the biggest limitations to be considered is in relation to the size of the companies that were different and that, therefore, can better or worse assimilate the post-incubation period. It is to be expected that larger companies can adapt better and spend less effort, depending on the quality of management or even the degree of innovation.

Another limitation of the research emerged during data collection, as it was a period after social isolation due to the COVID-19 pandemic, and because few business incubators make data available in relation to the incubated and graduated companies (name of companies and contact), making it necessary for the incubators to act as a bridge to pass on the questionnaire, thus requiring a greater effort to get the contacts and convince the managers of the graduated companies to answer the questions electronically.

As a suggestion for carrying out future work, more in-depth research could be carried out on how the support mechanisms influence each of the evaluation criteria for graduation success, which could serve as a guide for incubators to adopt clearer evaluation criteria, in order to measure the maturity of incubated companies and be more assertive in what company managers really look for in the graduation process.

Another suggestion is to carry out the study with the managers of the incubators so that the two main agents of the incubation process visualize what they consider most important in order to achieve success.

REFERENCES

- Abetti, P. (2004). Government-Supported Incubators in the Helsinki Region, Finland: Infrastructure, Results, and Best Practices. *The Journal of Technology Transfer*, 29. 19-40. doi:10.1023/B:JOTT.0000011179.47666.55.
- Adner, R. (2006). Match Your Innovation Strategy to Your Innovation Ecosystem. *Harvard Business Review*, 84, 98-107.
- Aernoudt, R. (2004). Incubators: tool for entrepreneurship?. *Small Business Economics*, 23, 127-135.
- Aerts, K., Matthyssens, P. & Vandenbempt, K. (2007). Critical role and screening practices of European business incubators. *Technovation*, 27(5), 254-267.
- Albadvi, A. & Saremi, H. Q. (2006). *Business incubation process framework: the case of Iranian high-tech innovations*. IEEE International Conference on Management of Innovation and Technology, Anais, 2, 1053-1058.
- Albert, P. & Gaynor, L. (2000). Incubators - growing up, moving out: a review of the literature. *ARPENT: Annual Review of Progress in Entrepreneurship*, 1, 158-216.
- Allen, D. N. & Rahman, S. (1985). Small business incubators: a positive environment for entrepreneurship. *Journal of Small Business Management*, 23(3), 12-22.
- Almeida, P. S. (2015). *Proposta de critérios para avaliação do ciclo de maturidade das empresas incubadas, a partir do modelo cerne: um estudo na incubadora tecnológica de Curitiba (INTEC)* (Master's thesis). Curso de Engenharia de Produção, Universidade Federal do Paraná, Curitiba.
- Al-Mubarak, H. M. & Schrödl, H. (2011). Measuring the effectiveness of business incubators: a four dimension approach from a Gulf cooperation council perspective. *Journal of Enterprising Culture*, 19(4), 435-452.
- Al-Mubarak, H.M. & Busler, M. (2013). Business incubation as an economic development strategy: a literature review. *International Journal of Management*, 30(1), 362-373.
- Amabile, T. M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10(1), 123-167.
- Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, 40(1), 39-58.
- Amabile, T. M., Barsade S. G., Mueller J. S. & Staw B. M. (2005). Affect and creativity at work. *Administrative Science Quarterly*, 50(3), 367-403.
- Andino, B. F. A., Fracasso, E. M., Silva, P. L. & Lobler, M. L. (2004). Avaliação do Processo de Incubação de Empresas em Incubadoras de Base Tecnológica. In: *Anais ENANPAD*.

- Andrade Junior, P. P. (2012). The Brazilian experience in overcoming difficulties of technology-based firms in incubator. *Journal of Technology Management and Innovation*, 7(3), 161-171. doi:10.4067/s0718-27242012000300014
- Anholon, R. & Silva, M. C. (2015). Features of management system developed by a references business incubator: the case of Celta Florianópolis. *Revista GEINTEC*, 5(1), 1864-1880. doi:10.7198/S2237-0722201500010021.
- ANPROTEC (2012). *Estudo, Análise e Proposições sobre as Incubadoras de Empresas no Brasil – relatório técnico*. Brasília. Recuperado de <http://anprotec.org.br/site/menu/publicacoes-2/estudos-e-pesquisas>
- ANPROTEC (2021). *Associação Nacional de Entidades Promotoras de Empreendimentos Inovadores (Anprotec) – Sobre*. Recuperado de <https://anprotec.org.br/site/sobre/>
- Arbix, G. (2010). Caminhos cruzados: rumo a uma estratégia de desenvolvimento baseada na inovação. *Novos Estudos-CEBRAP*, 87, 13-33.
- Armanios, D. E., Eesley, C. E., Li, J. & Eisenhardt, K. M. (2016). How entrepreneurs leverage institutional intermediaries in emerging economies to acquire public resources. *Strategic Management Journal*, 38(7), 1373-1390.
- Asheim, B., Grillitsch, M. & Trippel, M. (2015). *Regional Innovation Systems: Past - Presence - Future*. Papers in Innovation Studies 2015/36, Lund University, CIRCLE - Center for Innovation Research.
- Asheim, B., Smith, H. L. & Oughton, C. (2011). Regional Innovation Systems: Theory, Empirics and Policy. *Regional Studies*, 45(7), 875-891.
- Assenova, V. A. (2020). Early-Stage Venture Incubation and Mentoring Promote Learning, Scaling, and Profitability Among Disadvantaged Entrepreneurs. *Organization Science*, 31(6), 1560-1578. doi:10.1287/orsc.2020.1367
- Ayatse, F.A., Kwahar, N. & Iyortsuun, A. S. (2017). Processo de incubação de empresas e desempenho da empresa: uma revisão empírica. *Journal of Global Entrepreneurship Research*, 7(2), 1-17. doi:10.1186/s40497-016-0059-6
- Baêta, A. M. C., Borges, C. V. & Tremblay, D. (2006). Empreendedorismo nas incubadoras: reflexões sobre tendências atuais. *Comportamento Organizacional e Gestão*, 12(1), 7-18.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. Macmillan.
- Baregheh, A., Rowley, J. & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323-1339.
- Bartol, K. & Srivastava, A. (2002). Encouraging knowledge sharing: the role of organizational reward systems. *Journal of Leadership & Organizational Studies*, 9(1), 64-76.
- Becker, B. & Gassmann, O. (2006). Gaining leverage effects from knowledge modes within corporate incubators. *R&D Management*, 36(1), 1-16.

- Becker, H. S. (1997). *Métodos de pesquisa em ciências sociais* (3a ed.). São Paulo: Hucitec.
- Bergek, A. & Norrman, C. (2008). Incubator best practice: a framework. *Technovation*, 28(1-2), 20-28.
- Berger, M. & Diez, J. R. (2006). Technological capabilities and innovation in southeast Asia: results from innovation surveys in Singapore, Penang and Bangkok. *Science, Technology and Society*, 11(1), 109-148.
- Beuren, I. M. (2000). *Gerenciamento da informação: um recurso estratégico no processo de gestão empresarial*. São Paulo: Atlas.
- Beuren, I. M. (2006a). O suporte das incubadoras brasileiras para potencializar as características empreendedoras nas empresas incubadas. *Revista de Administração - RAUSP*, 41(4), p. 419-430. doi:10.1590/S0080-21072006000400006
- Beuren, I. M. (Org.) (2006b). *Como elaborar trabalhos monoGraphs em contabilidade: teoria e prática* (3a ed.). São Paulo: Atlas.
- Binsawad, M., Sohaib, O. & Hawryszkiewicz, I. (2019). Factors impacting technology business incubator performance. *International Journal of Innovation Management*, 23. 1950007. doi:10.1142/S1363919619500075.
- Bizzotto, C. E. N. (2003). *The Incubation Process*. Gene Institute – Fundação Univ. Regional de Blumenau, Santa Catarina. IDISC-InfoDev Incubator Support Center.
- Blok, V., Thijssen, S. & Pascucci, S. (2017). Understanding management practices in business incubators: empirical evidence of the factors impacting the incubation process. *International Journal of Innovation and Technology Management*, 14(4), 1750023. doi:10.1142/S0219877017500237
- Bogers, M., Sims, J. & West, J. (2019). *What Is an Ecosystem? Incorporating 25 Years of Ecosystem Research*. 2019 Meeting of the Academy of Management. August 9-13, 2019. Boston, Massachusetts, USA.
- Borges e Silva, G. A., Linares, I. M. P. & Passador, J. L. (2016). Orientação para o mercado em ambientes usuais de empreendimento versus ambientes de inovação por incubadoras. *RACEF, Revista de Administração, Contabilidade e Economia da Fundace*, 7(1), 1-13.
- Bollingtoft, A. & Ulhoi, J. P. (2005). The networked business incubator – leveraging entrepreneurial agency?. *Journal of Business Venturing*, 20(2), 265-290.
- Bose, S. C., Kiran, R. & Goyal, D. (2018). Critical success factors of agri-business incubators and their impact on business performance. *Custos e Agronegocio*, 14, 350-376.
- Brooks, O. J. (1986). Economic development through entrepreneurship: incubators and the incubation process. *Economic Development Review*, 4(2), 24-29.
- Brun, E. C. (2019). Understanding a Business Incubator as a Start-Up Factory: A Value Chain Model Perspective. *International Journal of Innovation and Technology Management*, 16(3), 1-28. doi:10.1142/S0219877019500251

- Bruneel, J., Ratinho, T., Clarysse, B. & Groen, E. (2012). The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation*, 32(2), 110-121. doi:10.1016/j.technovation.2011.11.003
- Buys, A. J. & Mbewana, P. N. (2007). Key success factors for business incubation in South Africa: the Godisa case study. *South African Journal of Science*, 103(9/10), 356-358. Recuperado de <http://www.scielo.org.za/pdf/sajs/v103n9-10/a0110310.pdf>
- Cagnazzo, L., Taticchi, P. & Botarelli, M. (2008). A literature review on innovation management tools. *Revista de Administração da Universidade Federal de Santa Maria*, 1(3), 316-330.
- Campbell, C. (1989). Change agents in the new economy: business incubators and economic development. *Economic Development Review*, 7(2), 56-59.
- Campbell, C. & Allen, D. N. (1987). The small business incubator industry: micro-level economic development. *Economic Development Quarterly*, 1(2), 178-191.
- Campbell, C., Kendrick, R. C. & Samuelson, D. S. (1985). Stalking the latent entrepreneur: business incubators and economic development. *Economic Development Review*, 3(2), 43-49.
- Carayannis, E. G. & Campbell, D. F. J. (2009). 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management*, 46(3), 201-234.
- Carmo, J. P. & Rangel, R. C. (2020). Fatores críticos de sucesso da rede de incubação de empreendimentos do IFES. *International Journal of Innovation - IJI*, 8(2), 150-175. doi:10.5585/iji.v8i2.17390
- Carlson, C. R. & Wilmot, W. W. (2006). *Innovation: The Five Disciplines for Creating What Customers Want*. New York: Crown Business.
- Cassiolo, J. E. & Lastres, H. M. M. (2000). Sistemas de Inovação: Políticas e Perspectivas. *Parcerias estratégicas*, 5(8), 237-255.
- Cefis, E. & Marsili, O. (2006). Survivor: The role of innovation in firms survival. *Research Policy*. 35, 626-641.
- Chan, K. & Lau T. (2005). Assessing technology incubator programs in the science park: The good, the bad and the ugly. *Technovation*, 25(10), 1215-1228.
- Chandra, A. & Chao, C. A. (2011). Growth and evolution of high-technology business incubation in China. *Human Systems Management*, 30(1), 55-69.
- Chen, J. (2017). Towards new and multiple perspectives on innovation. *International Journal of Innovation Studies*, 1(1), 1-4.
- Chen, J., Yin, X. & Mei, L. (2018). Holistic Innovation: An Emerging Innovation Paradigm. *International Journal of Innovation Studies*, 2, 1-13.

- Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, Massachusetts: Harvard Business School Press.
- Christensen, C. M. (1997). *The Innovator's Dilemma: When New Technologies Cause great Firms to Fail*. Boston: HBS Press.
- Christensen, C. M. (2006). The ongoing process of building a theory of disruption. *The Journal of Product Innovation Management*, 23(1), 39-55.
- Clarysse, B., Wright, M., Bruneel, J. & Mahajan, A. (2014). Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems. *Res. Policy*, 43, 1164-1176. doi:10.1016/j.respol.2014.04.014
- Coad, A., Grassano, N., Hall, B. H., Moncada-Paternò-Castello, P. & Vezzani, A. (2019). Innovation and industrial dynamics. *Structural Change and Economic Dynamics*, 50(C), 126- 131.
- Colombo, M. G. & Delmastro, M. (2002). How effective are technology incubators? Evidence from Italy. *Research Policy*, 31(7), 1103-1122.
- Comini, G. M., PIRES, S. O., BRANDAO, D. & HORA, A. (2020). *Um olhar para sustentabilidade de organizações de apoio a empreendimentos de impacto* [livro eletrônico]. São Paulo: Instituto de Cidadania Empresarial.
- Cooke, P. (1992). Regional innovation systems: competitive regulation in the new Europe. *Geoforum*, 23(3), 365-382.
- Cooper, C. E., Hamel, S. A. & Connaughton, S. L. (2012). Motivations and obstacles to networking in a university business incubator. *The Journal of Technology Transfer*, 37, 433-453. doi:10.1007/s10961-010-9189-0
- Cooper, D. R. & Schindler, P. S. (2008). *Métodos de pesquisa em administração* (7a ed.). Porto Alegre, Rio Grande do Sul: Ed. Bookman.
- Corrente, S., Garcia-Bernabeu, A., Greco, S. & Makkonen, T. (2021). Robust measurement of innovation performances in europe with a hierarchy of interacting composite indicators. *Economics of Innovation and New Technology*. doi:10.1080/10438599.2021.1910815
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W. & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage publications.
- David-West, O., Umukoro, I. O. & Onuoha, R.O. (2018). Platforms in Sub-Saharan Africa: startup models and the role of business incubation. *Journal of Capital Intellectual*, 19(3), 581-616. doi:10.1108/JIC-12-2016-0134
- Damanpour, F., Walker, R.M. & Avellaneda, C. N. (2009). Combative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies*, 46(4), 650-675. doi: 10.1111/j.1467-6486.2008.00814.x

- D'auria, A., Tregua, M., Spena, T. R. & Bifulco, F. (2016). Exploring innovation contexts: system, network and ecosystem innovation. *International Journal of Management and Enterprise Development*, 15(2-3), 127-146.
- Dolabela, F., Prado, A. & Neto, F. (1999). *Uma incubação sem incubadora: como induzir parcerias entre empresas de base tecnológica. O caso Squadra – Doctor Sys*, 3rd International Conference on Technology, innovation, and Policy- Global Knowledge Partnerships: creating Value for the 21st Century, August 30-September 2. Austin, Texas.
- Dornellas, J. C. A. (2003). *Empreendedorismo Corporativo*. São Paulo: Editora Campus.
- Dornelas, J. C. A. (2002) *Planejando Incubadoras de empresas: Como Desenvolver um Plano de negócios para Incubadoras*. Rio de Janeiro, RJ: Campus.
- Dornelas, J. C. A. (2012). *Planejando incubadoras de empresas: como desenvolver um plano de negócios para incubadoras* (2a ed.). Rio de Janeiro: Campus.
- Dornelas, J. C. A. (2004). *Plano de Negócios para incubadoras: a experiência da rede paulista de incubadoras de empresas*. Recuperado de <http://www.planodenegocios.com.br>
- Dosi, G. (1988). Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature*, 26(2), 1120-1171.
- Dosi, G. (1982). Technological paradigms and technological trajectories – a suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11(3), 147-162.
- Dosi, G. (1983). Technology gaps and cost-based adjustment: some explorations on the determinants of international competitiveness. *Metroeconomica*, 35(3), 197-222.
- Edquist, C. (2007). Systems of Innovation: perspectives and challenges. In: Fagerberg, J., Mowery, D. C. & Nelson, R.R. *The Oxford Handbook of Innovation* (pp. 181-208). New York: Oxford University Press.
- Edquist, C. & Lundvall, B. A. (1993) Comparing the Danish and Swedish systems of innovations. In: Nelson, R. *National innovation systems: a comparative analysis* (pp. 265-298). New York, Oxford: Oxford University.
- Elkington, J. (2012). *Sustentabilidade, canibais com garfo e faca*. São Paulo: M. Books.
- Erickson, G. S., Rothberg, H. & Carr, C. (2003). Knowledge-sharing in value-chain networks: Certifying collaborators for effective protection process. *Advances in Competitiveness Research*, 11(1), 152-164.
- Eriksson, P., Montonen, T., Vilhunen, J. & Voutilainen, K. (2016). Incubation manager roles in the co-innovation context. *International Journal of Entrepreneurship and Innovation Management*, 20(5-6), 285-299.
- Ernst, H. (2001). Patent applications and subsequent changes of performance: Evidence from time-series cross-section analyses on the firm level. *Research Policy*, 30(1), 143-157. doi:10.1016/S0048-7333(99)00098-0

- Faems, D., de Visser, M., Andries, P. & van Looy, B. (2010). Technology Alliance Portfolios and Financial Performance: Value-Enhancing and Cost-Increasing Effects of Open Innovation. *Journal of Product Innovation Management*, 27(6), 785-796.
- Ferreira, M. P., Abreu, A. F., Abreu, P. F., Trzeciak, D. S., Apolinário, L. G. & Cunha, A. A. (2008). Gestão por indicadores de desempenho: resultados na incubadora empresarial tecnológica. *Produção*, 18(2), 302-318. Recuperado de <https://www.redalyc.org/articulo.oa?id=396742033008>
- Fiates, G. G. S., Martins, C., Fiates, J. E. A., Martignago, G. & Santos, N. D. (2013). Análise do papel da incubadora na internacionalização de empresas de base tecnológica, incubadas e graduadas. *Revista Eletrônica de Estratégia & Negócios*, 6(1), 252-274.
- Fiates, G. G. S., Martins, C., Piccinini, A. C. G. & Coral, E. (2017). Sistema de Inovação Brasileiro, Desafios, Estratégias, Atores: Um Benchmarking a Partir de Sistemas Internacionais de Inovação. *Revista de Administração, Contabilidade e Economia da FUNDACE*, 8(3), 16-33. doi: <http://dx.doi.org/10.13059/racef.v8i3.187>
- Fiore, A., Grisorio, M. J. & Prota, F. (2011). Regional innovation systems: which role for public policies and innovation agencies? Some insights from the experience of an Italian region. *European Planning Studies*, 19(8), 1399-1422.
- Fiuza, P. R., Emmendoerfer, M. L. & Vasconcelos, M. C. R. L. (2010). (In) *Certezas de Micro e Pequenos Empresários na Grande Belo Horizonte (GBH) Sobre as Competências Gerenciais e a sua Relação com a Mortalidade Empresarial*. Em: XXV Simpósio de Gestão da Inovação Tecnológica - ANPAD.
- Fonseca, J. J. S. (2002). *Metodologia da pesquisa científica* [Apostila do Curso de especialização em comunidades virtuais de aprendizagem – informática educativa]. Ceará: UECE. Recuperado de http://leg.ufpi.br/subsiteFiles/lapnex/arquivos/files/Apostila_-_METODOLOGIA_DA_PESQUISA%281%29.pdf
- Fonseca, S. A. (2015). Incubadoras como vetores para a promoção de tecnologias limpas em empreendimentos de pequeno porte: possibilidades e limites. *Revista de Administração Mackenzie – RAM*, 16(1), 188-212.
- Fonseca, S. A. & Kruglianskas, I. (2000, pp. 3-4) apud Beuren, I. M. & Raupp, F. M. (2003). Compartilhamento do Conhecimento em Incubadoras de Empresas: um Estudo Multicasos das Incubadoras de Santa Catarina Associadas à ANPROTEC. *Anais XXVII ENANPAD*.
- Freeman, C. (2004). Technological infrastructure and international competitiveness. *Industrial and Corporate Change*, 13(3), 541-569.
- Freeman, C. (1987). *Technology Policy and Economic Performance: Lessons from Japan*. London, Pinter.
- Freeman, C. (1989). *Technology policy and economic performance*. London, Pinter.
- Freeman, C. (1982). *The Economics of Industrial Innovation*. London/New York: Pinter.

- Freeman, C. (1995). *The National System of Innovation in historical perspective*. Cambridge *Journal of Economics*, 19, 5-24.
- Freeman, C. & Soete, L. (2008). *A economia da inovação industrial*. Campinas: Editora da Unicamp.
- Freeman, C. & Soete, L. (1997). *The economics of industrial innovation*. London: Pinter.
- Gadrey, J., Gallouj, F. & Weinstein, O. (1995). New modes of innovation: how services benefit industry. *International Journal of Service Industry Management*, 6(3), 4-16. doi:10.1108/09564239510091321
- Gallouj, F. & Weinstein, O. (1997). Innovation in services. *Research Policy*, 26 (4-5), 537-556.
- Games, D., Kartika, R., Sari, D. K. & Assariy, A. (2021). Eficácia da incubadora de empresas e estratégia de comercialização: uma análise temática. *Journal of Science and Technology Policy Management*, 12(2), 176-192. doi:10.1108/JSTPM-03-2020-0067
- Gassmann, O., Enkel, E. & Chesbrough, H. (2010). The future of open innovation. *R&D Management*, 40, 213-221.
- Gava, R. & Vidal, W. J. R. (2009). Sistema de inovação em nível de firma: evidências de uma iniciativa no mercado brasileiro de telecomunicações. *RAC-Eletrônica*, 3(1), 180-201.
- George, J. M. & Zhou, J. (2002). Understanding when bad moods foster creativity and good ones don't: The role of context and clarity of feelings. *Journal of Applied Psychology*, 87(4), 687-697.
- Gerlach, S. & Brem, A. (2015). What determines a successful business incubator? Introduction to an incubator guide. *Int. J. Entrepreneurial Venturing*, 7(3), 286-307.
- Gil, A. C. (2002). *Como elaborar projetos de pesquisa* (4a ed.). São Paulo: Atlas.
- Gil, A. C. (1999). *Métodos e técnicas de pesquisa social*. São Paulo: Atlas.
- Gil, A. C. (2008). *Métodos e técnicas de pesquisa social* (6a ed.). São Paulo: Atlas.
- Gillotti, T. & Ziegelbauer, R. (2006). Seven components of a successful business incubator. University of Wisconsin Extension. *Let's Talk Business*, 119.
- Giordano Martínez, K. R., Fernández-Laviada, A. & Herrero Crespo, Á. (2018). Influence of business incubators performance on entrepreneurial intentions and its antecedents during the pre-incubation stage. *Entrepreneurship Research Journal*, 8(2), 74-91.
- Gist, M. E. & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review*, 17(2), 183-211. <https://doi.org/10.2307/258770>
- Giuri, P., Mariani, M., Brusoni, S., Crespi, G., Francoz, D., Gambardella, A. Garcia-Fontes, W., Geuna, A., Gonzales, R., Harhoff, D., Hoisl, K., Le Bas, C., Luzzi, A., Magazzini, L., Nesta, L., Nomaler, O., Palomeras, N., Patel, P., Romanelli, M. & Verspagen, B.

- (2007). Inventors and invention processes in Europe: Results from the PatVal-EU survey. *Research Policy*, 36, 1107-1127. doi:10.1016/j.respol.2007.07.008
- Gomes, L. A. V., Facin, A. L. F., Salerno, M. S. & Ikenami, R. K. (2018). Unpacking the innovation ecosystem construct: Evolution, gaps and trends. *Technological Forecasting and Social Change*, 136, 30-48.
- Gondin, L. M. P. & Lima, J. C. (2002). *A Pesquisa como Artesanato Intelectual: considerações sobre método e bom senso*. João Pessoa: Manufatura.
- Gonthier, J. & Chirita, G. M. (2019). The role of corporate incubators as invigorators of innovation capabilities in parent companies. *Journal of Innovation and Entrepreneurship*, 8(1), 1-21. doi:10.1186/s13731-019-0104-0
- Gorączkowska, J. (2020). Enterprise innovation in technology incubators and university business incubators in the context of polish industry. *Oeconomia Copernicana*, 11(4), 799-817. doi:10.24136/OC.2020.032
- Gozali, L., Masrom, M., Zagloel, T. Y. M. & Haron, H. N. (2016). A framework of successful business incubators for indonesian public universities. *International Journal of Technology*, 7(6), 1086-1096. doi:10.14716/ijtech.v7i6.3351.
- Gozali, L., Masrom, M., Zagloel, T. Y. M., Haron, H. N., Dahlan, D., Daywin, F. J., Saryatmo, M. A., Saraswati, D., Syamas, A. F. & Susanto, E. H. (2018). Critical Success and Moderating Factors Effect in Indonesian Public Universities Business Incubators. *International Journal of Technology*, 9(5), 1049-1060. doi:10.14716/ijtech.v9i5.1363
- Gozali, L., Masrom, M., Zagloel, T. Y. M., Haron, H. N., Garza-Reyes, J. A., Tjahjono, B. & Marie, I. A. (2020). Performance factors for successful business incubators in Indonesian public universities. *International Journal of Technology*, 11(1), 155-166. doi:10.14716/ijtech.v11i1.2464
- Granados, M. S. S. (2019). Characterization and analysis of business incubation systems in Costa Rica: The case of public universities. *Innovar*, 29(74), 57-70. doi:10.15446/innovar.v29n74.82061
- Granstrand, O. & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, 90–91.
- Grewal, D., Levy, M. & Kumar, V. (2009). Customer experience management in retailing: an organizing framework. *Journal of Retailing*, 85(1), 1–14.
- Grimaldi, R. & Grandi, A. (2005). Business incubators and new venture creation: an assessment of incubating models. *Technovation*, 25(2), 111-121.
- Guillen, R. & Veras, M. (2018). Processo de Incubação de Empresas de Base Tecnológica à Luz da Gestão de Projetos: Um Estudo de Casos Múltiplos. *Revista de Gestão e Secretariado*, 9(2), 126-157. doi:10.7769/gesec.v9i2.760
- Hackett, S. M. & Dilts, D. M. (2004a). A real options-driven theory of business incubation. *The Journal of Technology Transfer*, 29(1), 41-54.

- Hackett, S. M. & Dilts, D. M. (2004b). A systematic review of business incubation research. *The Journal of Technology Transfer*, 29(1), 55-82.
- Hackett, S. M. & Dilts D. M. (2008). Inside the black box of business incubation: Study B scale assessment, model refinement, and incubation outcomes. *The Journal of Technology Transfer*, 33(5), 439-471.
- Hagedoorn, J. & Cloudt, M. (2003). Measuring innovative performance: is there an advantage in using multiple indicators?. *Research Policy*, 32(8), 1365-1379. doi:10.1016/S0048-7333(02)00137-3
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. & Tatham, R. L. (2009). *Análise multivariada de dados*. Porto Alegre: Bookman.
- Hannon, P. D. (2003). A conceptual development framework for management and leadership learning in the UK incubator sector. *Education + Training*, 45(8/9), 449-460.
- Hannon, P. D. (2005). Incubation policy and practice: building practitioner and professional capability. *Journal of Small Business and Enterprise Development*, 12(1), 57-75.
- Hausberg, J. P. & Korreck, S. (2018). Business incubators and accelerators: a co-citation analysis-based, systematic literature review. *Journal of Technology Transfer*, 23, 1-26.
- Hausberg, J. P. & Korreck, S. (2020). Business incubators and accelerators: A co-citation analysis-based, systematic literature review. *Journal of Technology Transfer*, 45(1), 151-176. doi:10.1007/s10961-018-9651-y
- Henderson, R. & Clark, K. (1990). Architectural Innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35, 9-31.
- Hewitt, L. M. M. & van Rensburg, L. J. J. (2020). The role of business incubators in creating sustainable small and medium enterprises. *Southern African Journal of Entrepreneurship and Small Business Management*, 12(1). doi:10.4102/SAJESBM.V12I1.295
- Hisrich, R. D. (1988). New business formation through the Enterprise Development Center: a model for new venture creation. *IEEE Transactions on Engineering Management*, 35(4), 221-231.
- Huizingh, E. K. R. E. (2011). Open Innovation: State of The Art and Future Perspectives. *Technovation*, 31(1), 2-9.
- Iacono, A. & Nagano, M. S. (2014). Gestão da inovação em empresas nascentes de base tecnológica: evidências em uma incubadora de empresas no Brasil. *Interciencia*, 39(5), 296-306.
- Iacono, A. & Nagano, M. S. (2017). Post-incubation of technology-based firms: A case study on the effects of business incubators on growth patterns. *Gestão e Produção*, 24(3), 570-581. doi:10.1590/0104-530X1357-16

- Ishikawa, V. R. (2013). *Habitats de inovação tecnológica: um estudo sobre a importância das Agências de Inovação em Curitiba no desenvolvimento regional*. In: Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas, 23, 2013, Recife, PE. Anais... Recife, PE: Anprotec.
- Jabbour, C. J. C., Dias, P. R. & Fonseca, S. A. (2005). As incubadoras de empresas como redes empresariais pró-inovação. *Revista gestão da produção operações e sistemas*, 1, 100. doi:10.15675/gepros.v0i1.22
- Jackson, D. J. (2011). *What is an Innovation Ecosystem?*. National Science Foundation, Arlington, VA.
- Jacobides, M., Cennamo, C. & Gawer, A. (2018). Towards a Theory of Ecosystems. *Strategic Management Journal*, 39(8). doi:10.1002/smj.2904.
- Jishnu, V., Gilhotra, R. M. & Mishra, D. N. (2011). Pharmacy education in India: Strategies for a better future. *Journal of Young Pharmacists*, 3(4), 334-342.
- Kilcrease, K. M. (2011). Faculty perceptions of business advisory boards: The challenge for effective communication. *Journal of Education for Business*, 86, 78-83. doi:10.1080/08832323.2010.480989
- Klofsten, M. (2005). New venture ideas: an analysis of their origin and early development. *Technology Analysis and Strategic Management*, 17(1), 105-119.
- Kuratko, D. F. & LaFollette, W. R. (1987). Small business incubators for local economic development. *Economic Development Review*, 5(2), 49-55.
- Lalkaka, R. (2003). Business Incubator in developing countries: characteristics and performance. *International Journal of Entrepreneurship and Innovation Management*, 3(1/2), 31-55.
- Lalkaka, R. (1996). Technology business incubators: Critical determinants of success. *Annals of the New York Academy of Sciences*, 798, 270-290.
- Laranja, M., Uyerra, E. & Flanagan, K. (2008). Policies for science, technology and innovation: Translating rationales into regional policies in a multi-level setting. *Research Policy*, 37(5), 823-835.
- Lasrado, V., Sivo, S., Ford, C., O'Neal, T. & Garibay, I. (2016). Do graduated university incubator firms benefit from their relation with university incubators?. *Journal of Technology Transfer*, 41(2), 205-219.
- Lee, S. S. & Osteryoung, J. S. (2004). A comparison of critical success factors for effective operations of university business incubators in the United States and Korea. *Journal of Small Business Management*, 42(4), 418-426.
- Lemos, P. A. B. (2011). *As universidades de pesquisa e a gestão estratégica do empreendedorismo: uma proposta de metodologia de análise de ecossistemas*. 2011. (Doctoral dissertation). Política Científica e Tecnológica, UNICAMP, Campinas.

- Lian, C. L. (2020). Viveros de empresa: mecanismos dinamizadores de la capacidad de innovación empresarial. Análisis de los viveros de empresas de la Comunidad de Madrid. *Esic Market Economics and Business Journal*, 51(1), 105-134.
- Lobosco, A. (2014). Study of business incubators Brazilian and Portuguese companies with a focus on self sustainability incubators of technology-based companies. (Doctoral dissertation). Programa de Pós-Graduação de Mestrado e Doutorado em Engenharia de Produção, Universidade Nove de Julho, São Paulo.
- Löfsten, H. & Lindelöf, P. (2002). Science parks and the growth of new technology-based firms – academic-industry links, innovation and markets. *Research Policy*, 31(6), 859-876.
- Lopes, W. S. & Sassi, R. J. (2019). Development of technology-based firms of the vale do paraíba paulista region: Survey with incubators managers and incubated companies. *Gestão e Produção*, 26(4) doi:10.1590/0104-530X1302-19
- Lose, T. & Tengeh, R. K. (2016). An evaluation of the effectiveness of business incubation programs: A user satisfaction approach. *Investment Management and Financial Innovations*, 13(2), 370-378. doi:10.21511/imfi.13(2-2).2016.12
- Lose, T., Tengeh, R. K., Maziriri, E. T. & Madinga, N. W. (2016). Exploring the critical factors that hinder the growth of incubatees in south africa. *Problems and Perspectives in Management*, 14(3), 698-704. doi:10.21511/ppm.14(3-3).2016.13
- Lumpkin, J. R. & Ireland, R. D. (1988). Screening practices of new business incubators: the evaluation or critical success factors. *American Journal of Small Business*, 12(4), 59-81.
- Lundqvist, M. A. (2014). The importance of surrogate entrepreneurship for incubated Swedish technology ventures. *Technovation*, 34, 93-100.
- Lundvall, B-A. (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter.
- Lundvall, B. Å. (1992). *Towards a Theory of Innovation and Interactive Learning*. Londres e Nova Iorque: Pinter.
- Lundvall, B. (2011). *Notes on innovation systems and economic development*. Denmark: Routledge.
- Lynn, G. S., Morone, J. G. & Paulson, A. S. (1996). Marketing and discontinuous innovation: the probe and learn process. *California Management Review*, 38(3), 8-37.
- Malerba, F. (2003). Sectoral systems and innovation and technology policy. *Revista Brasileira de Inovação*, 2(2), 329-375.
- Maletz, E. A. & Siedenberg, D. R. (2007). *A Gestão dos Fatores Críticos de Sucesso nas Incubadoras de Empresas da Região do Ruhr – Alemanha*. Anais do EnANPAD, Rio de Janeiro, RJ, Brasil.
- Malhotra, N. (2001). *Pesquisa de marketing* (3a ed.) Porto Alegre: Bookman.

- Manjama, M. P., Ramos, E. S., Crisostimo, C. & Rodrigues, P. R. P. (2019). A Evolução de Incubadoras no Estado do Paraná – Uma Vertente ao Empreendedorismo Inovador. *Sodebrás*, 15, 85-90.
- Marconi, M. A. & Lakatos, E. M. (1992). *Metodologia do trabalho científico: procedimentos básicos, pesquisa bibliográfica, projeto e relatório, publicações e trabalhos científicos* (4a ed.). São Paulo: Atlas.
- Marconi, M. A. & Lakatos, E. M. (2003). *Fundamentos de metodologia científica* (5a ed.). São Paulo: Atlas.
- Martins, R. A. (2010). Abordagens quantitativa e qualitativa. In: Miguel, P. A. C. (Org.). *Metodologia de pesquisa em engenharia de produção e gestão de operações* (pp. 45-61). Rio de Janeiro: Elsevier.
- Mas-Verdú, F., Ribeiro-Soriano, D. & Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, 68(4), 793-796. doi:10.1016/j.jbusres.2014.11.030
- Mcadam, M. & Marlow, S. (2007). Building futures or stealing secrets? entrepreneurial cooperation and conflict within business incubators. *International Small Business Journal*, 25(4), 361-382.
- Mercan, B. & Göktaş, D. (2011). Components of innovation ecosystems: A cross-country study. *International Research Journal of Finance and Economics*, 76, 102-112.
- Merrifield, D. B. (1987). New business incubators. *Journal of Business Venturing*, 2(3), 277-284.
- Mian, S. A. (1994). US university-sponsored technology incubators: an overview of management, policies and performance. *Technovation*, 14(8), 515-528.
- Mian, S. A. (1996). Assessing value-added contributions of university technology business incubators to tenant firms. *Research Policy*, 25(3), 325-335.
- Mian, S. A. (1997). Assessing and managing the university technology business incubator: an integrative framework. *Journal of Business Venturing*, 12(4), 251-285.
- Minello, I., Marinho, E. & Bürger, R. (2018). Processo de incubação como estimulador de inovação: um estudo com empresas incubadas de base tecnológica. *Revista Eletrônica de Estratégia & Negócios*, 10(3), 3-26. doi:10.19177/reen.v10e320173-26
- Moore, J. F. (1993). Predators and prey: a new ecology of competition. *Harvard Business Review*, 71(3), 75-86.
- Morais, E. F. C. (1997). A incubadora de empresas como fator de inovação tecnológica em pequenos empreendimentos. (Master's thesis). Programa de Pós-Graduação em sociologia. Universidade de Brasília.
- Nair, S. & Blomquist, T. (2019). Failure prevention and management in business incubation: Practices towards a scalable business model. *Technology Analysis and Strategic Management*, 31(3), 266-278. doi:10.1080/09537325.2018.1495325

- Naqshbandi, M. M. & Singh, S. K. G. (2015). Theories in Innovation. In: Idris, A., Moghavvemi, S., Musa, G. (Ed.). *Selected Theories in Social Science Research* (pp. 41-51). Um Press.
- NBIA (2021). *National Business Incubation Association (NBIA)*. Recuperado de <https://www.inc.com/encyclopedia/national-business-incubation-association-nbia.html>
- Nelson, R. (1993). *National Innovation Systems: A Comparative Analysis*. Oxford, Oxford University Press.
- Nelson, R. & Rosenberg, N. (1993). Technical innovation and national systems. In: Nelson, R. (Ed.). *National innovation systems: a comparative analysis* (pp. 3-21). New York: Oxford University.
- Niosi, J., Saviotti, P., Bellon, B. & Crow, M. (1993). National systems of innovation: in search of a workable concept. *Technology in society*, 15(2), 207-227.
- Nold, H. A. (2012). Linking knowledge processes with firm performance: Organizational culture. *Journal of Intellectual Capital*, 13(1), 16-38.
- OCDE. (2005). *Manual de Oslo: diretrizes para coleta e interpretação de dados sobre inovação* (3a ed.). Paris: OCDE.
- OCDE (2010). *Manual de Oslo: Diretrizes para a Coleta e Interpretação de Dados sobre Inovação* (3a ed.). Rio de Janeiro: FINEP.
- Olawale, F. & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African Journal of Business Management*, 4, 729-738.
- Oldham, G. R. & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39(3), 607-634.
- Oliveira, O. V. de, Zaba, E. F. & Forte, S. H. A. C. (2017). Razão da não utilização de incentivos fiscais à inovação tecnológica da Lei do Bem por empresas Brasileiras. *Revista Contemporânea de Contabilidade*, 14(31), 67-88. doi:10.5007/2175-8069.2017v14n31p67
- Oliveira, P. H. & Terence, A. C. F. (2018). Innovation practices in small technology-based companies during incubation and post-incubation periods. *INMR - Innovation & Management Review*, 15(2), 174-188. Recuperado de <https://www.revistas.usp.br/rai/article/view/151130>
- Onea, I. A. (2020). Innovation indicators and the innovation process-evidence from the european innovation scoreboard. *Management and Marketing*, 15(4), 605-620. doi:10.2478/mmcks-2020-0035
- Ortigara, A. A., Grapeggia, M., Juliatto, D. L., Lezana, Álvaro, G. R. & Bastos, R. C. (2011). Análise por agrupamento de fatores de desempenho das incubadoras de empresas. *INMR - Innovation & Management Review*, 8(1), 64-91.

- Othman, F., Hawryszkiewicz, I. & Kang, K. (2014). *The influence of socio-technical factors on knowledge-based innovation in Saudi Arabia firms*. ACIS. <http://hdl.handle.net/10292/8123>
- Özdemir, Ö. Ç. & Şehitoğlu, Y. (2013). Assessing the Impacts of Technology Business Incubators: A framework for Technology Development Centers in Turkey. *Procedia - Social and Behavioral Sciences*, 75. 282-291. doi:10.1016/j.sbspro.2013.04.032.
- Padgett, R. C. & Moura-Leite, R. C. (2012). Innovation with High Social Benefits and Corporate Financial Performance. *Journal of Technology Management & Innovation*, 7(4), 59-69, 2012.
- Paranhos, R., Figueiredo, D. B., Rocha, E. C. & Silva, J. A. (2013). Corra que o Survey vem aí: noções básicas para cientistas sociais. *Revista Latino americana de Metodología de la Investigación Social*, 6(3), 07-24.
- Paranhos, R. P. R. & Palma, M. A. M. (2010). Um novo olhar para o futuro da política brasileira de Ciência, Tecnologia e Inovação. *Soldagem & Inspeção*, 15(2), 165-168.
- Patton, D. (2014). Realising potential: The impact of business incubation on the absorptive capacity of new technology-based firms. *International Small Business Journal*, 32(8), 897-917.
- Patton, D., Warren, L. & Bream, D. (2009). Elements that underpin high-tech business incubation processes. *The Journal of Technology Transfer*, 34(6), 621-636.
- Peña, I. (2004). Business incubation centers and new firm growth in the Basque country. *Small Business Economics*, 22(3/4), 223-236.
- Pereira, J. M. & Kruglianskas, I. (2006). Lei de inovação tecnológica: instrumento efetivo de incentivo a inovação e a pesquisa no Brasil? *Revista Gestão Industrial*, 2(2), 76-88.
- Peters, L., Rice, M. & Sundararajan, M. (2004). The role of incubators in the entrepreneurial process. *Journal of Technology Transfer*, 29(1), 83-91.
- Phan, P. H., Siegel, D. S. & Wright, M. (2005). Science parks and incubators: Observations, synthesis and future research. *Journal of Business Venturing*, 20(2), 165-182.
- Petrovski, E. F., Ishikawa, G., Carvalho, H. A., Lima, I. A & Rasoto, V. I. (2004). Habitats de inovação tecnológica. *Universidade Tecnológica Federal do Paraná*, 1(13), 1-13.
- Petrovski, E. F., Ishikawa, G., Carvalho, H. A., Lima, I. A. & Rasoto, V. I. (2010). *Habitats de inovação tecnológica*. In: Congresso de Pesquisa e Inovação da Rede Norte Nordeste de Educação Tecnológica. 5. 2010. Maceió. Anais... Maceió. Recuperado de <http://connepi.ifal.edu.br/ocs/anais/>
- Quivy, R. & Campenhoudt, L. V. (2008). *Manual de Investigação em Ciências Sociais* (5a ed.). Portugal: Gradativa.
- Rahab, S. (2011). Sudjono, the development of innovation capability of small medium enterprises through knowledge sharing process: An empirical study of Indonesian creative industry. *International Journal of Business and Social Science*, 2, 21.

- Rampazzo, L. (2005). *Metodologia científica: para alunos do curso de graduação e pós-graduação* (3a ed.). São Paulo, São Paulo: Ed. Loyola.
- Ramukumba, T. (2014). Overcoming SMEs challenges through critical success factors: A case of SMEs in the Western Cape province. *South Africa. Economic and Business Review*, 16, 19-38.
- Ratinho, T. & Henriques, E. (2010). The role of science parks and business incubators in converging countries: Evidence from Portugal. *Technovation*, 30, 278-290. doi:10.1016/j.technovation.2009.09.002.
- Raupp, F. M. & Beuren, I. M. (2007). Compartilhamento do conhecimento em incubadoras brasileiras associadas à Anprotec. *Revista de Administração Mackenzie*, 8(2), 38-58.
- Raupp, F. M. & Beuren, I. M. (2009a). Programas oferecidos pelas incubadoras brasileiras às empresas incubadas. *RAI - Revista de Administração e Inovação*, 6(1), 83-107.
- Raupp, F. M. & Beuren, I. M. (2009b). Metodologia da pesquisa aplicável às ciências sociais. In: Beuren, I. M. (Org.). *Como elaborar trabalhos monoGraphs em contabilidade: teoria e prática* (3a ed., pp. 76-97). São Paulo: Atlas.
- Raupp, F. M. & Beuren, I. M. (2011). Perfil do suporte oferecido pelas incubadoras brasileiras às empresas incubadas. *REAd. Revista Eletrônica de Administração*, 17(2), 330-359.
- Rebelato, M. G., Rodrigues, A. M., Pereira, K.T.A. & Rodrigues, E.C. (2006). Modelos de indicadores de desempenho em incubadoras de empresas: um ensaio analítico. In: XIII *Simpósio de Engenharia de Produção*, 2006, Bauru. Anais do XIII Simpósio de Engenharia de Produção.
- Reis, D. R. (2008). *Gestão da Inovação Tecnológica*. Barueri: Manole.
- Rice, M. P. (2002). Co-production of business assistance in business incubators: an exploratory study. *Journal of Business Venturing*, 17(2), 163-187.
- Ritala, P. & Almpantopoulou, A. (2017). In defense of 'eco' in innovation ecosystem. *Technovation*, 60-61, 39-42.
- Roesch, S. M. A., Becker, G. V. & Mello, M. I. (1999). *Projetos de estágio e de pesquisa em administração: guia para estágios, trabalhos de conclusão, dissertações e estudos de caso* (2a ed.). São Paulo: Atlas.
- Rogers, E. M. (1962). *Diffusion of Innovations*. New York: Free Press.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.) New York: Free Press.
- Rothaermel, F. T. & Thursby, M. (2005). University-incubator firm knowledge flows: assessing their impact on incubator firm performance. *Research Policy*, 34(3), 305-320.
- Russell, M. G., Still, K., Huhtamäki, J., Yu, C. & Rubens, N. (2011). *Transforming innovation ecosystems through shared vision and network orchestration*. In: Triple Helix IX International Conference. Stanford, CA, USA. 2011.

- Sahin, I. (2006). Detailed Review of Rogers Diffusion of Innovations Theory and Educational Technology-Related Studies Based on Rogers Theory. *The Turkish Online Journal of Educational Technology*, 5, 14-23.
- Șchiopu, A. F., Vasile, D. C. & Țuclea, C. E. (2015). Principles and Best Practices in Successful Tourism Business Incubators. *Amfiteatru Economic*, 17(38), 474-487.
- Schmookler, J. (1966). *Invention and Economic Growth*. Cambridge: Harvard University Press.
- Schumpeter, J. A. (1942). *Capitalismo, socialismo e democracia*. Rio de Janeiro: Zahar Editores, 1984.
- Schwartz, M. (2009). Beyond incubation: an analysis of firm survival and exit dynamics in the post-graduation period. *The Journal of Technology Transfer*, 34(4), 403-421.
- Schwartz, M. (2013). A control group study of incubators impact to promote firm survival. *The Journal of Technology Transfer*, 38, 302-331. doi:10.1007/s10961-012-9254-y
- Seoane, F.J. F. (2016). Análisis de los viveros de empresas en Galicia según su orientación tecnológica o generalista. *Cuadernos de Gestión*, 16(2), 49-76. doi: 10.5295/cdg.130451ff
- Serra, B., Serra, F. R., Ferreira, M. P. & Fiates, G. G. (2011). Fatores fundamentais para o desempenho de incubadoras de base tecnológica. *Revista de Administração e Inovação*. 8(1), 221-248.
- Siddiqui, K. A., Al-Shaikh, M. E., Bajwa, I. A. & Al-Subaie, A. (2021). Identifying critical success factors for university business incubators in Saudi Arabia. *Entrepreneurship and Sustainability Issues*, 8(3), 267-279. doi:10.9770/jesi.2021.8.3(15)
- Silva, A. & Da Cunha, J. (2018). Are technology business incubators fulfilling their objectives? a study of the TBI's performance located in Brazil. *International Journal of Innovation*, 6(3), 298-313. doi:10.5585/iji.v6i3.313
- Silva, R., Silveira, M., D'Amore, T. & Araújo, A. (2013). Incubadora e gestão: uma percepção das empresas incubadas. *Holos*, 3, 27-37. doi:10.15628/holos.2013.1353
- Silverman, D. (2009). *Interpretação de dados qualitativos: métodos para análise de entrevistas, textos e interações*. Porto Alegre: Artmed.
- Smilor, R. W. (1987). Managing the incubator system: critical success factors to accelerate new company development. *IEEE Transactions on Engineering Management*, EM-34(3), 146-155.
- Smilor, R. W. & Gill, M. D. (1986). *The New business Incubator: linking talent, technology, capital, and knowhow*. United States of America: The University of Texas at Austin.
- Smith, K. (2005). Measuring Innovation. In: Fagerberg, J., Mowery, D. & Nelson, R. *The Oxford Handbook of Innovation*. New York: Oxford.

- Smith, M., Busi, M., Ball, P. & Van der Meer, R. (2008). Factors influencing an organisations ability to manage innovation: A structured literature review and conceptual model. *International Journal of Innovation Management*, 12(4), 655-676.
- Smorodinskaya, N., Russell, M., Katukov, D. & Still, K. (2017). *Innovation ecosystems vs. innovation systems in terms of collaboration and co-creation of value*. In: Proceedings of the 50th Hawaii international conference on system sciences.
- Soetanto, D. P. (2004). *Research of the Role of the Incubation Policy in Helping the Growth of New Technology Based Firms*. Lisbon: Globelics Academy.
- Soetanto, D. & Jack, S. L. (2018). Slack resources, exploratory and exploitative innovation and the performance of small technology-based firms at incubators. *The Journal of Technology Transfer*, 43(5), 1213-1231.
- Souza, L., Dantas, P., Aouar, W. & Barreto, L. (2015). Modelo de gestão em incubadoras e mapas de desempenho. *Revista Ciências Administrativas*, 21(1). 112-130. doi:10.5020/2318-0722.2015.v21n1p112.
- Ssekiziyivu, B. & Banyenzaki, Y. (2021) Business incubation practices and sustainability of incubatee start-up firms in Uganda. *Cogent Business & Management*, 8(1). doi:10.1080/23311975.2021.1963168
- Štefko, R. & Steffek, V. (2017). A study of creative industry entrepreneurial incubation. [Badanie inkubacji przedsiębiorczości przemysłu kreatywnego]. *Polish Journal of Management Studies*, 15(2), 250-261. doi:10.17512/pjms.2017.15.2.23
- Stokan, E., Thompson, L. & Mahu, R. J. (2015). Testing the differential effect of business incubators on firm growth. *Economic Development Quarterly*, 29(4), 317-327. doi:10.1177/0891242415597065.
- Strauss, A. & Corbin, J. (2008). *Pesquisa qualitativa: técnicas e procedimentos para o desenvolvimento de teoria fundamentada* (2a ed.). Porto Alegre: Artmed
- Sun, H., Ni, W. & Leung, J. (2007). Critical Success Factors for Technological Incubation: Case Study of Hong Kong Science and Technology Parks. *International Journal of Management*, 24(2), 346-363.
- Surie, G. (2017). Creating the innovation ecosystem for renewable energy via social entrepreneurship: Insights from India. *Technological Forecasting and Social Change*, 121, 184-195.
- Tang, M., Baskaran, A., Yan, H. & Muchie, M. (2015). Strengthening regional integration/cooperation with the Neighbourhood System of Innovation conceptual framework: the case of China and ASEAN. *Asian Journal of Technology Innovation*, 23(2), 205-229.
- Taques, F. H., López, M. G., Basso, L. F. & Areal, N. (2021). Indicators used to measure service innovation and manufacturing innovation. *Journal of Innovation and Knowledge*, 6(1), 11-26. doi:10.1016/j.jik.2019.12.001

- Teixeira, C. S. Almeida, C. G. & Ferreira, M. C. Z. (Org.). (2016). *Habitats de inovação: alinhamento conceitual* (e-book). São Paulo: Perse. Recuperado de <http://via.ufsc.br/download-habitats-de-inovacao>
- Teixeira, E. (2005). *As Três metodologias: acadêmica, da ciência e da pesquisa*. Petrópolis, RJ: Vozes.
- Teza, P., Miguez, V. B., Fernandes, R. F., Dandolini, G. A. & Souza, J. A. D. (2016). Ideias para a inovação: um mapeamento sistemático da literatura. *Gestão & Produção*, 23(1), 60-83.
- 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*, 21(4), 602-622.
- Thomas, L. D. W. & Autio, E. (2020). *Innovation Ecosystems in Management: An Organizing Typology*. Oxford Res. Encycl. Bus. Manag. doi:10.1093/acrefore/9780190224851.013.203
- Tidd, J., Bessant, J. & Pavitt, K. (2008). *Gestão da Inovação* (3a ed.). Porto Alegre: Bookman.
- Triviños, A. N. S. (1987). *Introdução à pesquisa em Ciências Sociais: a pesquisa qualitativa em educação*. São Paulo, São Paulo: Atlas.
- Tsaplin, E. & Pozdeeva, Y. (2017). International strategies of business incubation: the USA, Germany and Russia. *International Journal of Innovation*, 5(1), 32-45. doi:10.5585/iji.v5i1.130
- Van de Vrande, V., Jong, J. P. J. D., Vanhaverbeke, W. & Rochemont, M. D. (2009). Open Innovation in SMEs: Trends, Motives and Management Challenges. *Technovation*, 29(6-7), 423-437.
- Van den Hooff, B. & Leeuw van Weenen, F. (2004). Committed to share: Commitment and CMC use as antecedents of knowledge sharing. *Knowledge And Process Management*, 11(1), 13-24.
- Van Weele, M., van Rijnsoever, F. J., Eveleens, C. P., Steinz, H., van Stijn, N. & Groen, M. (2018). Start-EU-up! lessons from international incubation practices to address the challenges faced by western european start-ups. *Journal of Technology Transfer*, 43(5), 1161-1189. doi:10.1007/s10961-016-9538-8
- Vedovello, C. (2000). *Science parks and the university-industry links: a case study of the Surrey Research Park*. SPRU, University of Sussex.
- Vergara, S. C. (2010). *Projetos e relatórios de pesquisa em administração* (12a ed.). São Paulo: Atlas.
- Vergara, S. C. (2016). *Projetos e relatórios de pesquisa em administração* (16a ed.). São Paulo, São Paulo: Atlas.

- Voisey, P., Gornall, L., Jones, P. & Thomas, B. (2006). The measurement of success in a business incubation Project. *Journal of Small Business and Enterprise Development*, 13(3), 454-468.
- Voisey, P., Jones, P. & Thomas, B. (2013). The pre-incubator: a longitudinal study of 10 years of university pre-incubation in Wales. *Industry and Higher Education*, 27(5), 349-363.
- Xiao, L. & North, D. (2017). O desempenho da graduação de incubadoras de empresas de tecnologia nas três cidades da China: o papel do financiamento da incubadora, suporte técnico e orientação empresarial. *The Journal of Technology Transfer*, 42, 615-634. doi:10.1007/s10961-016-9493-4
- Wagner, M. B., Motta, V. T. & Dornelles, C. C. (2004). *SPSS passo a passo: Statistical Package for the Social Sciences*. Caxias do Sul, RS: EDUCS.
- Wagner, S. & Cockburn, I. (2010). Patents and the survival of Internet-related IPOs. *Research Policy*, 39, 214-228.
- Wiggins, J. & Gibson, D. V. (2003). Overview of US incubators and the case of the Austin technology incubator. *International Journal of Entrepreneurship and Innovation Management*, 3(1/2), 56-66.
- Woodman, R. W., Sawyer, J. E. & Griffin, R. W. (1993). Toward a theory of organizational creativity. *The Academy of Management Review*, 18(2), 293-321.
- Wynarczyk, P. & Raine, A. (2005). The performance of business incubators and their potential development in the North East region of England. *Local Economy*, 20(2), 205-220.
- Zapata-Guerrero, F. T., Ayup, J., Mayer-Granados, E.L. & Charles-Coll, J. (2020). Incubator efficiency vs survival of start-ups. *RAUSP Management Journal*, 55(4), 511-530. doi:10.1108/RAUSP-04-2019-0063
- Zen, A. C. & Hauser, G. (2005). *A articulação e o desenvolvimento dos parques tecnológicos: o caso do Programa Porto Alegre Tecnópolis – Brasil*. In: Seminário Latino-Iberoamericano de Gestão Tecnológica, 11, 2005, Salvador, BA. Anais... Salvador: Altec.
- Zhang, H. & Sonobe, T. (2011). Business Incubators in China: An Inquiry into the Variables Associated with Incubatee Success. *Economics: The Open-Access, Open-Assessment E-Journal*, 5(1), 20110007. doi:10.5018/economics-ejournal.ja.2011-7
- Zhang, J. & Yin, Q. (2010a). Study on the performance of enterprise incubator in the region of yangtze river Delta. *Studies in Science of Science*, 1, 86-94.
- Zhang, J. & Yin, Q. (2010b). Differences study on the operational efficiency of business incubators in China- based on data envelopment analysis and cluster analysis. *Science of Science and Management of S&T*, 31, 171-177.
- Zhu, X. (2014). Mandate versus championship: Vertical government intervention and diffusion of innovation in public services in authoritarian China. *Public Management Review*, 16(1), 117-139.

Zhu, X. & Zhang, Y. (2015). Political mobility and dynamic diffusion of innovation: The spread of municipal pro-business administrative reform in China. *Journal of Public Administration Research and Theory*, 26(3), 535–551.

ANNEX A – APPLIED RESEARCH QUESTIONNAIRE

RESPONDENTS' PROFILE	
1- Which incubator is the company linked to?	
2- City and State where the business is located:	
3- Field of activity:	<input type="checkbox"/> Industry <input type="checkbox"/> Commerce <input type="checkbox"/> Services
4- Indicate the size of the company, according to your billing (SEBRAE):	<input type="checkbox"/> Micro business (lower or equal to R\$ 360K) <input type="checkbox"/> Small Business (higher than R\$ 360K and lower or equal to R\$ 4,8 million) <input type="checkbox"/> Medium Business (higher than R\$ 4,8 million and lower or equal to R\$ 300 million) <input type="checkbox"/> Large Business (higher than R\$ 300 million)
5- Total number of company employees:	<input type="checkbox"/> 01 to 10 people <input type="checkbox"/> 11 to 20 people <input type="checkbox"/> 21 to 30 people <input type="checkbox"/> 31 to 50 people <input type="checkbox"/> 50 to 100 people <input type="checkbox"/> Above 100 people
6- Time of existence of the company:	
7- Incubation time in the incubator:	<input type="checkbox"/> Less than 6 months <input type="checkbox"/> From 6 to 12 months <input type="checkbox"/> From 13 to 18 months <input type="checkbox"/> From 19 to 24 months <input type="checkbox"/> More than 24 months
8- Year in which the company was graduated:	

SUPPORT MECHANISMS OFFERED BY THE INCUBATORS

Regarding the support mechanisms offered by the incubators (questions 08 to 45), indicate the scale in which you agree or disagree with the statements according to the caption (1- Totally disagree; 2- Disagree; 3- Indifferent; 4- Agree; 5- Totally agree).

CONSTRUCT	QUESTIONS	SCALE
Objective / Strategy	9- The incubator to which you are linked has well-defined objectives and strategies, which serve as a basis for planning and managing the incubated companies.	1-2-3-4-5
	10- The incubator assists in defining the objective of the incubated company.	1-2-3-4-5
	11- Tools are presented for the implementation and execution of a strategy for the incubated company.	1-2-3-4-5
Quality of selection / screening of tenants	12- The incubator has a selection system for new companies that values the quality of the selection.	1-2-3-4-5
	13- There is clarity of the desired requirements when screening new tenants.	1-2-3-4-5
	14 – The selection criteria adopted by the incubator can influence the development of the incubated company.	1-2-3-4-5
Support services	15- The incubator offers incubated companies a good management and commercial support service.	1-2-3-4-5
	16- The incubator offers consultancy and advisory services to the incubated companies.	1-2-3-4-5
	17- The support services offered by the incubator meet the needs of the incubated company.	1-2-3-4-5
	18- I believe that the support services offered by the incubator can improve the	1-2-3-4-5

	results of the incubated company.	
Networking	19- The incubator makes an effort to work on networking (relation network facilitating contacts).	1-2-3-4-5
	20- The incubator promotes a relevant number of contacts between the companies incubated in the incubator or in other incubators.	1-2-3-4-5
	21- The incubator promotes contact between the incubated companies and other companies in the region.	1-2-3-4-5
	22- The incubator encourages the relation between the incubated companies and universities and/or research institutes.	1-2-3-4-5
Physical / human resources	23- The incubator to which you are connected provides physical resources (rooms, auditoriums, laboratories, equipment, among others) that help the company's performance.	1-2-3-4-5
	24- The physical resources offered by the incubator meet the needs of the incubated company.	1-2-3-4-5
	25- The incubator offers specialized services (cleaning, surveillance, secretarial services, internet, telephony, among others) that are relevant to the company's performance.	1-2-3-4-5
	26- The human resources offered by the incubator meet the needs of the incubated company.	1-2-3-4-5
knowledge sharing	27- The sharing of knowledge (information, ideas, suggestions, and organizational experiences) is verifiable at all levels of the company.	1-2-3-4-5

	28- Knowledge sharing exists in the relation with the incubator, reciprocally.	1-2-3-4-5
	29- The sharing of knowledge between the incubated and the incubator can improve the results of the incubated company.	1-2-3-4-5
Creativity	30- The incubator stimulates the creativity of the team and the incubated companies, for new ideas or problem solving.	1-2-3-4-5
	31- There is diversity in the composition of team members (members from different areas, functions, educational backgrounds, professional experiences).	1-2-3-4-5
	32- Leadership establishes group structure that favors creativity	1-2-3-4-5
Diffusion of innovation	33- There are incentives and support tools offered by the incubator that enable the dissemination of innovation.	1-2-3-4-5
	34- There is a formal innovation process.	1-2-3-4-5
	35- There is a monitoring of results by innovation indicators.	1-2-3-4-5
Financial support and access to funding sources	36- The incubator offers incubated companies some kind of financial support and/or access to funding sources.	1-2-3-4-5
	37- There is greater ease of access to external financial resources from public bodies or development / development agencies, from being in an incubator.	1-2-3-4-5
	38- There is greater ease of access to external financial resources from private institutions, for being in an incubator.	1-2-3-4-5
Self-sustainability	39- The incubator creates	1-2-3-4-5

	mechanisms that encourage the development or improvement of organizational practices aiming to organizational self-sustainability of the incubated company.	
	40- The company analyzes your administrative and financial risks and opportunities.	1-2-3-4-5
	41- The company analyzes your growth balance.	1-2-3-4-5
	42- There is a contingency plan to avoid moments of difficulty	1-2-3-4-5
Strategic planning	43- The incubator assists the incubated company in creating or improving its strategic planning, through a systemic process.	1-2-3-4-5
	44- Actions and goals are established to achieve the objectives.	1-2-3-4-5
	45- Indicators are defined for analysis and control, with a view to defining the use of resources and decision-making aimed at the success of the company.	1-2-3-4-5
	46- The planning of the incubated company considers the short, medium and long terms.	1-2-3-4-5

Regarding the evaluation criteria for graduation success adopted by the incubators (questions 46 to 73), indicate the scale to which you agree or disagree with the statements according to the caption (1- Totally disagree; 2- Disagree; 3- Indifferent; 4- I agree; 5- I totally agree).

CONSTRUCT	QUESTIONS	SCALE
Graduation rate	47- The support mechanisms offered by the incubator help the incubated companies to graduate on time.	1-2-3-4-5
	48- A fixed period of time is determined for companies to stay in the incubator.	1-2-3-4-5

	49- There is an assessment of the maturity of companies before their graduation.	1-2-3-4-5
Survival of new companies	50- The survival of new companies from incubators can be influenced by the support mechanisms adopted by the incubator.	1-2-3-4-5
	51- The discontinuity of support that happens after graduation affects the survival of the company.	1-2-3-4-5
	52- The companies' results are monitored at the end of the incubation period.	1-2-3-4-5
	53- The incubator has a formal process to monitor graduated companies.	1-2-3-4-5
Growth in job creation	54- The incubator creates a favorable environment for growth in the generation of employment and income by the companies coming from the incubators.	1-2-3-4-5
	55- The incubator contributes to competitiveness and the creation of local jobs.	1-2-3-4-5
	56- Regarding job creation, the incubator contributed to the results achieved by the company.	1-2-3-4-5
Financial sustainability of new companies	56- Regarding job creation, the incubator contributed to the results achieved by the company.	1-2-3-4-5
	58- The incubator contributes to the development of new products and services.	1-2-3-4-5
	59- The company already has a regular monthly income.	1-2-3-4-5
Growth of new companies	60- The support received by the incubated companies during the incubation process contributes to the growth of new companies.	1-2-3-4-5
	61- The company has made or	1-2-3-4-5

	is making improvements in internal processes, influenced by the period in which it was incubated.	
	62- The companies linked to the incubator have an impact on local and regional development.	1-2-3-4-5
	63- The incubator contributes to the internationalization of business in the area.	1-2-3-4-5
Occupancy rate / Number of incubatees	64- The incubator offers a number of vacancies compatible with its structure and support.	1-2-3-4-5
	65- To what degree are these vacancies filled (occupancy rate).	1-2-3-4-5
	66- At the end of the incubation period, the company was prepared to compete in the market.	1-2-3-4-5
Creation of companies by incubator	67- The incubator encourages and supports the creation of new companies within its environment.	1-2-3-4-5
	68- The incubator helps to create new innovative and high quality businesses.	1-2-3-4-5
	69- With regard to attracting new business, actions are developed to raise awareness of the local and regional community.	1-2-3-4-5
Growth and sustainability of the incubation program	70- To what degree do you assess that the incubation program to which you are/were connected presents growth and is economically and socially sustainable.	1-2-3-4-5
	71- The incubator acts as a support mechanism of the triple helix – University, Business and Government	1-2-3-4-5
	72- The incubator maintains a regular training program for	1-2-3-4-5

	their staff.	
	73- The incubator monitors its business to assess its current development.	1-2-3-4-5