



PROCESSO DE INOVAÇÃO EM STARTUPS SERGIPANAS STARTUPS INNOVATION PROCESS FROM SERGIPE

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RESUMO

Nos últimos anos, as startups têm se tornado o centro das atenções no mundo dos negócios, não só pelas ideias e soluções produzidas, mas também pela forma como são gerenciadas, aceleradas e financiadas, despertando interesse e curiosidade em entender como isso ocorre o processo de inovação nessas empresas. Nesse contexto, o presente estudo teve como objetivo compreender o processo de inovação em startups sergipanas. Especificamente, buscou-se caracterizar a etapa de ideação, verificar a existência de um estudo de viabilidade e identificar ações de prototipagem, implantação e aprendizagem como elementos do processo inovador em startups sergipanas inseridas no movimento do Vale do Caju. Em termos metodológicos, a pesquisa é descritiva e quantitativa e utiliza como estratégia o levantamento a partir de um questionário para coleta de dados. Na análise dos dados, foi possível compreender as dificuldades enfrentadas pelos empresários sergipanos; as fontes de financiamento geralmente utilizadas por essas organizações e descrever cada uma das etapas adotadas no processo de inovação das startups inseridas no movimento do Vale do Caju.

Palavras Chaves: Processo de Inovação, Iniciantes, vale do Caju.

ABSTRACT

Over the past few years, startups have become the center of attention in the business world, not only for the ideas and solutions produced, but also for the way they are managed, accelerated, and financed, arousing interest and curiosity to understand how it occurs the innovation process in these companies. In this context, the present study aimed to understand the innovation process in Sergipe's startups. Specifically, we sought to characterize the ideation stage, to verify the existence of a feasibility study, and to identify prototyping, implementation, and learning actions as elements of the innovative process in Sergipe startups inserted in the Caju Valley movement. In methodological terms, the research is descriptive and quantitative and uses as a strategy the survey from a questionnaire for data collection. In the data analysis, it was possible to understand the difficulties faced by Sergipe entrepreneurs; the sources of financing generally used by these organizations, and describe each of the steps adopted in the innovation process of startups inserted in the Caju Valley movement.

Keywords: Innovation process. Startups. Caju Valley

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1. INTRODUCTION

Innovation gives adopting organizations the advantage of attracting, keeping, and retaining customers by offering new and improved products. In addition to the potential to attract and retain customers, organizations that practice innovation can also optimize internal processes, reduce costs of manufacturing and marketing goods, as well as entering new markets (Vargas, Gonçalo, Ribeirete, & Souza, 2017). Therefore, it is not difficult to imagine how important, regardless of size, sector, and location, the practice of innovation in modern organizations.

On the other hand, while innovation attributes differentiation, and competitive advantage to adopting organizations, the innovative practice offers competitiveness and business maintenance to the adopting companies (Rocha, 2018). Under this understanding, innovation works as an instrument for economic development and job creation (Ciriaci, Castello, & Voigt, 2013).

Highlighting the importance of innovation as an instrument for economic development and business growth, Gonthier and Chirita (2019) emphasize the role of startups as promoters of innovation, as, according to these authors, startups are businesses endowed with flexibility and agility capable of fostering creativity, innovation and, consequently, to acquire gains in competitive advantages. Furthermore, the startups stand out by the insertion of new or significantly improved products and services (Rocha, Olave, Ordonez, Luft, & Centty, 2020). In this perspective, startups are companies that have innovation at their core, are guided by information technology, and have great growth potential through the insertion of innovations in the market (Rocha, Olave, & Ordonez, 2020).

In this context of the importance and relevance of startups, it is also necessary to discuss how these companies carry out the innovation process, that is, what are the steps, procedures, and mechanisms performed in search of innovative solutions (Tohidi, & Jabbari, 2012).

The innovation process is initially composed of an environmental scan in which organizations carefully analyze their internal and external environment to recognize opportunities and minimize the effect of threats, to later make strategic decisions (Sanchez, & Machado, 2014). At the corporate level, the innovative process includes decisions on the definition of resources, as well as the learning practices necessary for the implementation, use, and commercialization of the proposed innovation, therefore, the mistaken execution of this can compromise organizational performance (Brophey, Baregheh, & Hemsworth, 2013).

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Given the information presented, this work addressed the following research question: How do startups execute the innovation process? To answer this problem, adopted the objective of discussing the stages of the innovation process in Sergipe startups. To achieve the proposed objective, a research model with stages of the innovation process was elaborated, which was used as a guide to the empirical stage of this study. Thus, this article, specifically, through a quantitative study, sought to: characterize the ideation stage, verify the existence of a feasibility study, and identify prototyping, implementation, and learning actions as elements of the innovative process in Sergipe startups inserted in the movement Caju Valley.

It should be noted that in the context of Sergipe, the Caju Valley movement is a support network for beginning entrepreneurs that promotes regular meetings to discuss proposals, financing mechanisms, and the feasibility of innovative ideas. Besides, the Caju Valley has as its basic perspective the strengthening of the local ecosystem to assist in the collective construction of an innovative entrepreneurial potential (Felizola, & Gomes, 2020).

In the global conjuncture of the innovation and startups market, Brazil has a relevant position at the international level (it is in the top 10 countries in the number of startups) with 11 unicorn startups and some promises with great growth potential. With this, it has attracted to Latin America, looks from investment funds and large international corporations (Cirilo, 2020). Though the existing studies that addressed the innovation process in startups (Silva, & Fleury, 2016; Choi, Sung, & Park, 2020) little attention has been directed to this issue in the shortest scenario state of Brazil, reasons that reinforce the justification for this study.

2. INNOVATION PROCESS IN STARTUPS

The innovation process is the path taken by the startup from the conception of the idea to the stage when the innovation is ready to be launched to the market. It is a sequence of steps that do not need to be followed faithfully and can be modified and adapted according to the reality of each business (Gollo, 2006).

In this perspective, Anthony (2012) states that the innovation process bypasses a set of activities designed to promote the development of ideas and projects with an impact on an organization's processes, products, and markets.

On this subject, Agostini et al., (2011) complement that there are many models of the innovation process, however, there is not a suitable pattern for all circumstances, organizations, and strategies, this is because the innovation process is not a formula, it is socially constructed

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by the actors involved or interested in its generation, for this reason, Table 1 presents the different stages of the innovation process, from the perspective of different researchers.

Table 1
Stages of the innovation process

Author	Proposed steps to the innovation process
Roberts (1998)	<ul style="list-style-type: none"> • Search: looking for opportunities with the potential to win customers. • Assessment: Examination of business opportunities and their respective potential for success. • Implementation: Development of the considered idea and study of conditions that will promote its success • Pursuit: Development and implementation of strategic plans.
Cardoza (2004)	<ul style="list-style-type: none"> • Explore opportunities and new market needs. • Examination of sources of information and knowledge. • Evaluation of opportunities and core competencies. • Project definition. • Product and process design. • Production and distribution routines. • Market exploration and interactions.
Tidd, Bessant, and Pavitt (2008)	<ul style="list-style-type: none"> • Search: Observation of internal and external scenarios to the organization. • Selection: Definition of opportunities with real economic potential. • Implementation: Development and commercialization. • Learning: Evaluation of acquired knowledge and development of innovations.
Desouza et al., (2009)	<ul style="list-style-type: none"> • Generation and mobilization of ideas: Use of internal communication toolboxes as an instrument to identify creative ideas among employees. • Awareness, defense, and selection: Selection of the best ideas. • Experimentation: Analysis of possibilities for implementing ideas. • Commercialization; Analysis of the profitability of the proposed innovation. • Diffusion and application: General analysis of the innovation process, considering the stages of generation, maintenance, and acceptance of the innovation.
D' alvano and Hidalgo (2012)	<ul style="list-style-type: none"> • Scan: Organizational search for opportunities and organizational technologies. • Focus: Generation of ideas and opportunities capable of improving the company's competitiveness in the market. • Resource: Development and selection of skills for innovation. • Implementation: Manufacturing of the new product/service. • Learning: Review of processes, analysis of objectives, results, and evaluation of acquired knowledge.

Source: Developed by Rocha (2018)

Despite the diversity of stages in the innovation process, Macedo, Cauchick Miguel, and Casarotto Filho (2015) present the design thinking methodology as recommended for the generation of innovations of various kinds (radical, semi- radical and incremental) and types (product, service, process, organizational and marketing). Also, design thinking is indicated for

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startups given their innovative results and differentiation possibilities in products and services (Signori, Martins, & Silva Junior, 2014), which is why, in this study, this methodology is adopted as a basis for the innovation process in startups.

In this perspective, design thinking is a model of thinking that helps in solving problems and implementing innovative projects from development to product delivery (Dunne, 2018). Different authors have dealt with the steps for applying this methodology, which is summarized in Table 2.

Table 2
Stages of the innovation process using the Design Thinking methodology

Authors	Phases
Brown (2010)	<ul style="list-style-type: none"> • Inspiration: preliminary analysis of the problem context, both from the company and the end-user • Ideation: information synthesis, which aims to refine opportunities and generate ideas for the project • Implementation: Construction of prototypes and tests of the product and/or service.
Terenzio (2012)	<ul style="list-style-type: none"> • Define: identify the problem to be solved. • Search: analyze as much information as possible • Generate ideas for solutions: use all the information collected to generate meaningful solutions • Test prototypes: visualize the idea and build the best solutions • Select: analyze which are the best solutions to reach the objective • Implement and deliver develop the business model and implement the solution together with the customer • Learn: evaluate the experience obtained and seek customer feedback.
Mueller-Roterberg (2018)	<ul style="list-style-type: none"> • Understanding the problem: identifying, clarifying, and understanding the problem • Observation: Observe and determine the conditions and objectives of the innovative structure • Point of view: define the target group and describe the customer's problem/needs • Idealize: Create, evaluate, and select ideas • Prototype: Selection of appropriate techniques for prototyping. • Test: a test of the idea, analysis, and reflection on the results.

Source: Developed by the authors (2020)

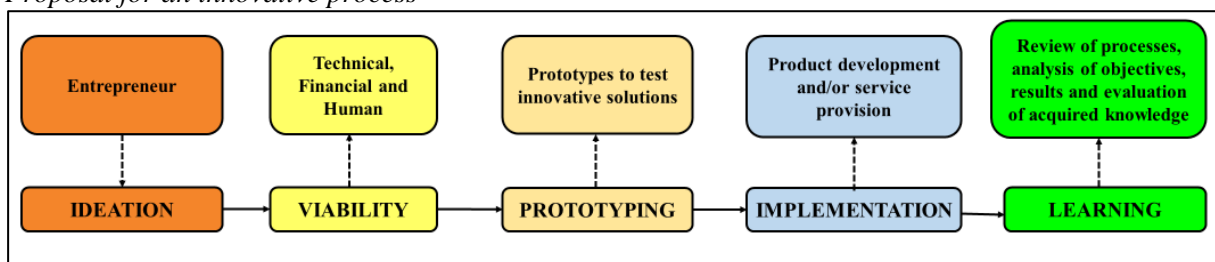
It is also important to present the innovation process proposed by Terenzio (2012), aimed especially at startups, which can be adapted to projects of different types and degrees of complexity. According to the author, when customized to startups, there is a greater probability of quality in the innovation process. The aforementioned methodology is composed of the stages of Idea generation - Initial phase of the project, when several sources are searched for insights; Viability - assessment of market potential, technical, human, and financial viability; Training - use of the knowledge of the agents involved, as well as investment in training; Launch of Startup - offering the conceived innovation to the market.

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Even though all these activities are defined in the innovative process, Imbuzeiro (2014) advocates that each business environment can adopt a different sequence of activities, in this sense the author clarifies that the innovation process and the transmission of ideas and practices can occur in different ways, a since environments are formed by different cognitive categories, conventions, rules, expectations and logics that condition the formation of the innovative process.

From the analysis of the concepts and stages of the innovation process, either in the traditional approach or by the design thinking methodology, it was noticed that these processes present similar steps and procedures, which is why such methodologies were synthesized for the construction of the model (Figure 1) the innovative process adopted by this study.

Figure 1
Proposal for an innovative process



Source: Prepared by the authors (2020)

The proposed model was summarized in four stages:

1. Ideation: preliminary analysis of the problem context, both from the startup and the end-user, as well as the search for opportunities with economic potential (Roberts, 1998; Cardoza, 2004; Tidd, Bessant, & Pavitt, 2008; Brown, 2010; Terenzzo, 2012; Mueller-Roterberg, 2018).

2. Feasibility analysis: In-depth examination of business opportunities and their respective potential for success, development of the idea considered and study of conditions that will promote their success (Roberts, 1998), development and selection of skills required for innovation projects (D'alvano, & Hidalgo, 2012) and assessment of market potential, technical, human, and financial viability (Terenzzo, 2012).

3. Prototyping: Design of the product, process and production and distribution routines (Cardoza, 2004), analysis of possibilities for implementing ideas (Desouza et al., 2009), visualization of the project to build the best solutions (Terenzzo, 2012), and selection of appropriate prototyping techniques (Mueller-Roterberg, 2018).

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4. Implementation: Development and implementation of strategic plans (Roberts, 1998), production and distribution routines (Cardoza, 2004), development and commercialization of innovation (Tidd, Bessant, & Pavitt, 2008) and development of the business model to implement the solution with the customer (Terenzzo, 2012).

5. Learning: Evaluation of acquired knowledge and development of innovations (Tidd, Bessant, & Pavitt, 2008); general analysis of the innovation process, considering the stages of generation, maintenance, and acceptance of innovation (Desouza et al., 2009); review of processes, analysis of objectives, results, and appreciation of acquired knowledge (D'alvano, & Hidalgo, 2012), assessing the experience obtained and seeking feedback from the customer and target audience (Terenzzo, 2012) and analysis and reflection on results (Mueller-Roterberg, 2018).

Thus, by the steps proposed for the innovative process in startups, it is summarized that the innovation process encompasses the employment and exploitation of opportunities in improved products, processes, or services based on market demand and taking advantage of existing and developed practices and techniques by organizations (Rocha, 2018), be they startups or consolidated companies.

3. METHODOLOGY

There is a wide variety of ways to classify academic research (Gray, 2009), however, this study adopted the classification proposed by Fontelles, Simões, Farias, and Fontelles (2009), being classified as to purpose or nature of the object; approach; objectives, and technical procedures or design.

In this perspective, as to the purpose, this study is basic and applied simultaneously. The basic aspect is highlighted by the increase in the existing literature on the innovation process and especially by the formulation of stages of the innovative process in startups, the applied character is revealed by the analysis and discussion of the innovation process in the context of Sergipe startups inserted in the Caju Valley movement. As for the approach, it is quantitative research, since this study was determined using quantification in the stages of data collection and statistical treatment of results (Richardson, 2017) on the general characteristics and innovation process.

Regarding the objectives, it is descriptive, since it sought to describe the characteristics and stages of the innovation process in Sergipe startups, thus seeking to describe the processes,

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mechanisms, and relationships existing in the reality of a given phenomenon of which they already exist accumulated knowledge (Neuman, 2013).

Concerning technical procedures, this research initially used bibliographic research, characterized by the use and analysis of academic material already published in books, journals, documents, manuscripts, and materials made available on the internet (Fontelles et al., 2009). A survey or technical procedure was also used, which aimed to obtain data, actions, or opinions (Freitas, Oliveira, Saccol, & Moscarola, 2000) from startup entrepreneurs. Also, the adoption of the survey procedure is justified, as explained by Saunders, Lewis, and Thornill (2012), as it allows us to collect and analyze data quantitatively using statistical techniques.

For data collection a questionnaire was used, elaborated from the literature review, with open, closed, and multiple-choice questions. It is explained that even the open questions underwent quantitative analysis since only the frequency of responses was observed. The questionnaire was applied in person to 14 entrepreneurs from Sergipe startups, in one of the meetings of Caju Valley, a movement for technological innovation in Sergipe (Felizola, & Gomes, 2020).

The questionnaire was divided into two blocks of questions, the first with questions about the entrepreneur's profile and identification of the startup's characteristics. In the second block, the questionnaire asked questions about the stages of the innovation process. The description of the variables and indicators applied in the questionnaire can be seen in Table 3.

Table 3
Research variables and indicators

Variables	Indicators
Startup	• Entrepreneur profile: Position, Age, and education level.
	• Characterization of the startup: operating area, operating time, number of partners, number of employees, startup stage.
Innovation process	• Ideation: Identifying problems, business opportunities, and generating ideas, motivation.
	• Feasibility: Technical, financial, and human.
	• Prototyping: Development of prototypes to test innovative solutions.
	• Implementation: Development, construction, and/or service provision
	• Learning: process, results, and points for improvement.

Source: Prepared by the authors (2020)

It is worth explaining that for the characterization of the innovation stages, information was collected from the entrepreneurs to identify the percentage of participating startups that undertake the stages of ideation, viability, prototyping, implementation, and learning. For the analysis of the results, descriptive statistics were applied, and the results were compared with other theoretical findings.

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4. EMPIRICAL FINDINGS AND ANALYSIS

The analysis of the results in this work is divided into two stages, initially, aspects related to the characterization of the researched companies are discussed, and later, with the representation of an analytical structure, the data obtained on the innovation process in Sergipe startups are presented and analyzed quantitatively.

4.1 CHARACTERIZATION OF THE RESEARCHED STARTUPS

Among the entrepreneurs participating in this research, 57.14% (n = 8) occupy the position of CEO at the startups in which they operate, the rest, 42.86% (n = 6) are partners, directors, and analysts, all with extensive knowledge on the formation of startups where they perform their duties. About the age group, it was found that most entrepreneurs, 35.7% (n = 5) are in the age group of 26 to 30 years old, the rest are between 31 and over 40 years old. These results corroborate the findings of the Entrepreneurship in Brazil Report (Brazilian Institute of Quality and Productivity, 2019), which identified that individuals between 25 and 44 years of age are more active in creating business in the country.

Regarding the level of education, 85.7% (n = 12) of the participants have completed higher education, and 14.3% (n = 2) incomplete higher education. This result differs from that exposed by GEM (2017), in which the most active group of entrepreneurs is composed of people with only elementary education. On the other hand, the higher level of education of these entrepreneurs has been reflected in the formalization of their businesses, confirming the findings of Sebrae (2019) that the level of formalization of Brazilian business owners grows with the level of education, since entrepreneurs with higher education have a level of formalization almost 20 times higher than those without education.

The operating areas of the startups participating in this research are diverse, since, except for the line tourism (n = 2), no other business segment was repeated. Thus, the businesses surveyed are distributed in the sectors of Autotech, e-commerce, CRM for aesthetic companies, health/fitness, lawtech (legal technology), reverse logistics of recyclable waste, marketplace/e-commerce, means of payment, reality increased, industrial recycling of solid waste, services, technology, and tourism. The diversity of the business segments of the consulted startups reinforces the role of these companies as key businesses for the promotion of novelties and the development of varied, high value-added ideas, products, and services (Galloway et al, 2017).

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Regarding the operating time of the startups, it was noticed that most of them, 35.7% (n = 5) have been in operation for 2 years, the same percentage for businesses in operation for 1 year, the other businesses oscillated between less than 1 year to more than 5 years. These results are like results found by Rocha et al. (2020), that when analyzing a northeastern sample identified startups similar percentage (32.4%) in operation time between 1 and 3 years.

Regarding the number of owners in each startup analyzed, the results showed that the majority, 42.9% (n = 6), have 2 partners and that 28.6% (n = 4) have 4 partners. It should be noted that only 1 startup was classified as an individual enterprise. The predominance of businesses with more than one owner is explained by Grando (2012), who argues that successful startups have two or more partners to share the responsibilities in managing the company, reaching the stage of growth and scalability in less time.

Regarding the number of employees, 50% (n = 7) of those surveyed stated that only the partners work at the startup, 35.7% (n = 5) have up to 5 employees and only 1 startup has a workforce with more than 20 employees, the other businesses have 6 to 10 employees. Although half of the analyzed businesses operate only with the work of the partners, Brattström (2019) warns that this reality must be changed, since startups with well-managed teams are more likely to survive and grow.

Regarding the phase in which the startups are in, the companies were classified in the ideation, operation, and traction stages (Cunha Filho, Reis, & Zilber, 2018; Sebrae, 2015). It was then found that 14.3% (n = 2) are in the ideation phase, in which startups have not yet been formalized and need to structure their business model, that is, these businesses are in the phase of seeking information, researching, and validating ideas with customers.

Most of the businesses consulted are classified in the operation stage, 57.1% (n = 8), characterized by the development of the business from the creation of the minimum viable product (MVP), the legitimization of the idea, and the prospecting of new customers, besides, at this stage the product's premises are tested and validated in search of initial growth (Oliveira, 2019). For authors like Salamzadeh and Hiroko (2015), this stage can also be called a seed stage, is characterized by the development of the prototype, market-entry, valuation of the enterprise, search for support mechanisms such as accelerators and incubators, and investments for the growth of a startup.

On the other hand, 28.6% (n = 4) of the evaluated businesses were classified in the traction stage, which allows us to infer that these startups already sell their products, have employees, and are looking for market consolidation (Sebrae, 2015). Moreover, startups that are in this process can expand, since they have revenue, active customers, and high leverage

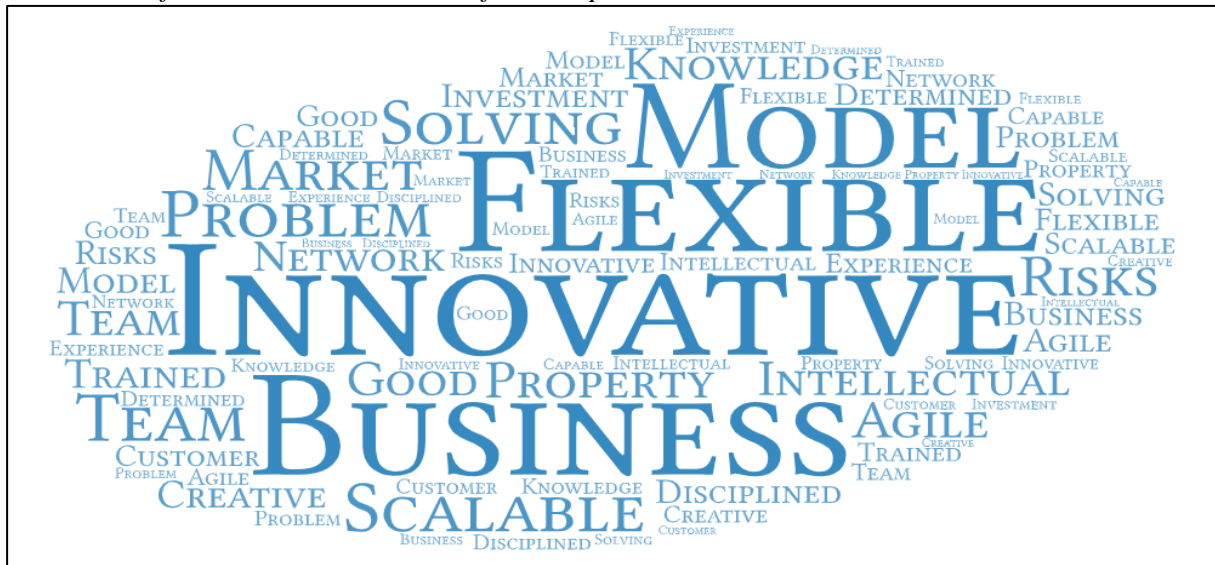
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potential (Salamzadeh, 2015). The rest startups at this stage undertake commercial strategies to grow faster, evaluate possibilities for greater investments, in addition to the search for internationalization and insertion of new partners (Cunha Filho, Reis, & Zilber, 2018).

In the perception of the surveyed entrepreneurs, the main characteristics of a startup were also investigated and, due to the variety of terms presented, the word cloud was created with the indicated terms, as shown in Figure 2.

Figure 2

Word cloud of the main characteristics of a startup



Source: Prepared by the authors (2020)

As seen in Figure 2, the most frequent terms were an innovative, flexible, and scalable business model, demonstrating that these attributes are the main characteristics of the analyzed startups. The indication of these terms reinforces the perception of Ries (2012) that startups are companies that have innovation at their core and intend to revolutionize the market through interaction with customers. The scalable aspect is also corroborated by Stoilov (2015), as startups are designed to grow quickly, aided by using information technology tools.

4.2 STARTUPS INNOVATION PROCESS FROM SERGIPE

About the innovation process, through the characterization of each of the variables and indicators adopted in this study, it was verified with the surveyed entrepreneurs which steps were taken in the innovative process of their respective enterprises. On this subject, 78.6% (n = 11) indicated to carry out the ideation stage, characterized by the identification of problems and commercial opportunities and the process of generating and conceiving ideas. Additionally,

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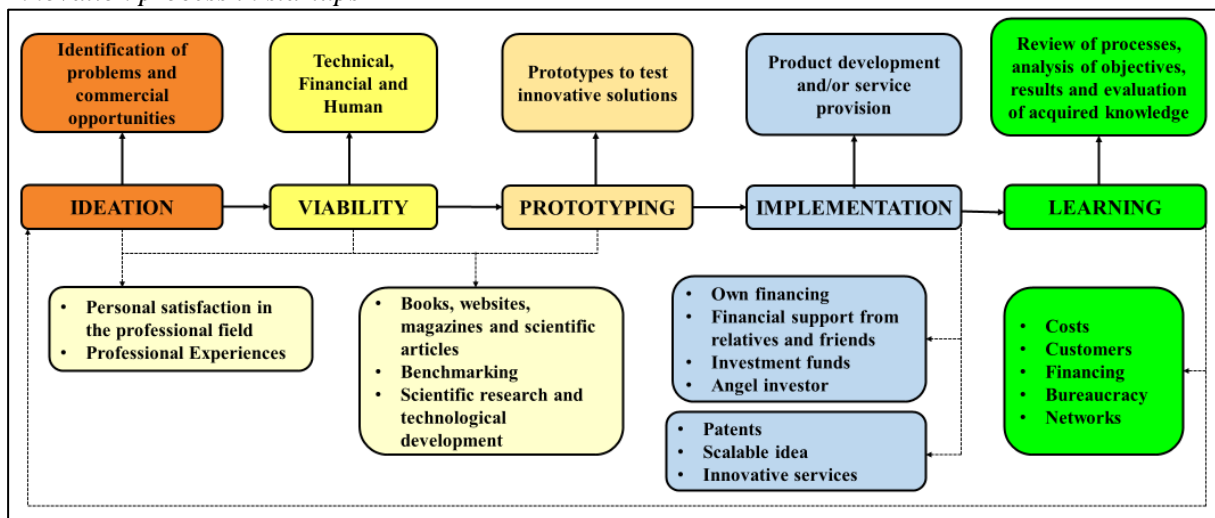
57.1% (n = 8) of the surveyed entrepreneurs indicated that they did the feasibility study (technical, financial, and human) of the innovation found.

Furthermore, 71.4% (n = 10) reported carrying out prototyping, carried out by developing prototypes, in generic form, to test innovative solutions. On this subject, it is worth noting that, previously and during the processes of idealization and prototyping, entrepreneurs act through planning, indicated by 85.7% (n = 12) of the surveyed entrepreneurs.

For the implementation stage, indicated by 57.1% (n = 8), development, construction, and/or service provision of the conceived innovation is carried out. Finally, 64.3% (n = 9) reported performing the learning stage, through which they evaluate the process, its results, and points for improvement.

Thus, it appears that Sergipe surveyed startups undertake the innovation process proposed in this study and portrayed in the stages: ideation, feasibility, prototyping, implementation, and learning, represented in Figure 3.

Figure 3
Innovation process in startups



Source: Prepared by the authors (2020)

On the motivation to start the innovation process and consequently the business, especially between the stages of idealization and prototyping, a question in which the participants could indicate more than one option, the entrepreneurs answered that the search for personal satisfaction in carrying out professional activities (71.4%, n = 10) and the use of previous experiences to explore opportunities (71.4%, n = 10) were the main reasons. Regarding the experiences, the results of this research expand the findings of Rider, Thompson,

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Kacperczyk, and Tag (2019) that one of the effects of professional experience is the opening of new companies by individuals.

It is important to mention that the innovation process in the consulted startups, especially from the prototyping and feasibility analysis stages, is based, as indicated by the entrepreneurs, on knowledge obtained from books, websites, magazines, and scientific articles (42.9%, n = 6), benchmarking with other startups (35.7%, n = 5) and scientific research and technological development (7.1%, n = 1). For the implementation and learning stages, in addition to the previous sources, the entrepreneurs apply knowledge resulting from previous experiences (78.6%, n = 11).

In this context, it is highlighted that the entrepreneurs themselves do the financing of the innovation process in these businesses, particularly from the implementation stage. About the sources of financing, the question in which entrepreneurs were able to indicate more than one alternative, it was found that most companies surveyed used their financing, 78.6% (n = 11), whereas 28, 6% (n = 4) received financial contributions from relatives and 7.1% (n = 1) contributions from friends. It is worth mentioning that only 3 startups individually indicated having used: The Investment Fund of the National Bank for Economic and Social Development - Criatec and the research funding by the National Council for Scientific and Technological Development (CNPq); financing by the Research Support Foundation of the State of Bahia (FAPESB); an angel investor assistance.

The results obtained are supported by Tariq (2013), who indicated that, at the beginning of business activities, startups have the principal source of financing in the owner's capital, followed by banks and angel investors. This same author reinforces that startups in operation are accessing new sources of financing, such as venture capitalists, commercial credit and leasing, financial transactions not mentioned by the participants of this study.

Still, regarding the implementation stage, it was noticed that the surveyed startups, 85.7% (n = 12) did not receive support from incubators or accelerators. In this perspective, Lunelli, Santos, and Cherobim (2019) explain that accelerators provide support for the survival of startups through mentoring programs, financial support, validation of prototypes, and construction of relationship networks.

Besides, it is recommended that in the stages of ideation (innovative process) and operation (startup phase) these companies seek the support of accelerators, as business accelerators play a decisive role in the development and consolidation of new companies with an entrepreneurial culture, since which directs and empowers startups, especially in the first stages of the business (Uhm, Sung, & Park, 2018).

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Still regarding the implementation stage, when asked about the fact that the startup had obtained assistance from an incubator, only 14.3% ($n = 2$) responded positively. This result requires attention and reassessment of the companies evaluated, as, according to the OECD (2019), companies that receive support in incubators tend to have higher survival rates, create more jobs, and generate more revenue. Besides, Sedita, Apa, and Grandinetti (2019) argue that the effect of incubation is especially important in shaping the innovative performance of new ventures, as it speeds up the sale of innovations, positively moderates the impact of internal technical capabilities, and enables selection and implementation of a portfolio of collaborations for innovation.

As for the implementation of the proposed innovations, usually, simultaneously with the more consolidated functioning of the startup, it was found that most entrepreneurs consider their businesses innovative, 85.71% ($n = 12$), as they have patent registrations (Signore, & Torfs, 2017), scalable idea (Blank, & Dorf, 2012) and innovatively provide services. It is worth mentioning that some entrepreneurs did not indicate their businesses as innovators, because, according to these entrepreneurs, a startup company that solves problems is not necessarily innovative, this finding is supported by Sopjani (2019), who explains that innovation is not necessarily about the introduction of new products and services, it is about proven and durable problem-solving.

Entrepreneurs also reported that difficulties were encountered throughout all stages of the innovation process, among which they mentioned: costs, contact with customers, identification, and attraction of people, understanding of the problem to be solved, sources of financing, in addition to factors such as bureaucracy, legislation, and government inefficiency. On this subject, Giardino and Paternoster (2016) state that startups are agile, creative, and flexible companies, reluctant to introduce bureaucratic processes or measures, which can result in ineffective practices.

Moreover, the entrepreneurs indicated difficulty in forming networks and the lack of structure in the Sergipe startups ecosystem. About the network, the businesses must build strategies to approach each other, since networks are of vital importance for entrepreneurs, as they help entrepreneurs to find new partners and reach new customers (Martinez, & Aldrich, 2011).

Because of the expressiveness of the difficulties faced by the entrepreneurs, there is a contradiction in the indication of the elaboration of planning and difficulties in cost control, identification of customers, and sources of financing, showing that the planning activity has been limited and inefficient in these businesses. On this subject, it appears that this finding

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requires greater attention from the companies analyzed since planning prevents organizations from being surprised by events and/or environmental contingencies capable of affecting their business (Cancellier, Blageski Junior, & Rossetto, 2014). Additionally, it should be noted that the main difficulties faced are the object of learning processes so that the startup does not face the same problems again and starts innovation processes.

6. CONCLUSIONS

This study sought, through the elaboration of a research model, to discuss the stages of the innovation process in Sergipe startups inserted in the Caju Valley movement. Among the results obtained, it was noticed that, unlike what happens with traditional companies, entrepreneurs of startups are individuals with a higher educational level.

Besides, in general, Sergipe startups are businesses with an average of up to 2 years of operation and due to the variety of sectors of the consulted startups, it was possible to infer that Sergipe is still not prominent in the development of startups businesses for specific branches, as occurs in others Northeastern states, such as Pernambuco. On the other hand, from the perspective of Sergipe entrepreneurs, startups are businesses characterized by innovative practice, the development of appropriate business models, endowed with flexibility, and scalability.

It is also noteworthy that most of the businesses surveyed are in the operating stage, seeking the initial development of the firm, as well as business growth and application of product improvements.

To validate the stages of the proposed model, the percentage of startups that perform the stages of ideation, feasibility, prototyping, implementation, and learning was verified. In this context, it was noticed that almost all enterprises carry out ideation activities, marked by the search for business opportunities and the generation of ideas. It is important to highlight that in the ideation stage, Sergipe startups are conditioned by the search for the personal satisfaction of their owners, as well as by the application of knowledge obtained in previous professional experiences.

Concerning the feasibility study, it was noticed that just over half of the consulted startups undertake technical, financial, and human evaluations on the potential of the proposed innovations. In contrast, a significant portion of the participants performs the prototyping stage (in a higher percentage than that perceived for the feasibility analysis), thus demonstrating that the startup's businesses are not directing greater efforts to a preliminary analysis of the

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feasibility and potential of growth of their businesses, since they anticipate the construction of prototypes.

In this perspective, it is worth mentioning that the feasibility and prototyping study are carried out primarily with the support of books, websites, magazines, scientific articles, and benchmarking with other startups, with scientific research and technological development being the elements least indicated by entrepreneurs, thus revealing, the need for closer ties between academic institutions and startups in the context of Sergipe.

It should be noted that, in general, for the implementation stage, equity is the main source of financing used by Sergipe startups. This finding may be a consequence of inexpressive activities in economic feasibility studies and revenue estimates, which have made it difficult for these businesses to access investment funds, angel investors, and other commercial finance operations.

Another aspect that draws attention is the low support of incubators and accelerators in the innovation implementation processes by Sergipe startups, a finding that deserves attention from the state government authorities and development institutions, for building strategies for attracting, supporting, and monitoring the performance of these businesses.

In general, when evaluating the entire innovation process of their businesses, entrepreneurs indicated difficulties in dealing with costs, attracting customers, sources of financing, bureaucracy, legislation, and forming networks, thus reinforcing the need to direct greater efforts to the ideation and feasibility study stages, as well as the need to participate in incubators and receive support from accelerators. As for the learning stage, it was noticed that entrepreneurs have been striving to start and consolidate their businesses based on innovative practices, however, the positive consequences of this learning depend on overcoming the difficulties and barriers faced.

The main limitation of this study was the number of participating startups, which prevented more structured statistical tests. In addition, the moderate practice of feasibility studies hindered the elaboration of further inferences about the role of this stage in the innovative process, satisfactory performance, and business continuity in startups.

Thus, due to the results presented, new studies can: analyze the obstacles to the participation of Sergipe startups in incubators; discuss the effects of accelerators in startups; identify the factors that prevent the elaboration of technical, economic, and human viability plans; to point out the difficulties in building networks among Sergipe startups, as well as to evaluate the effects of the support of academic, governmental and parastatal institutions on the performance and innovative process of startups.

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From a theoretical point of view, this study synthesized the stages of the innovation process, as well as elaborating on a model that involves traditional aspects and the design thinking methodology. Thus, given the data obtained and the analyzes carried out, it was found that the proposed model has adherence to startups in the Sergipe context and can be reevaluated in similar units of analysis in search of new findings.

About managerial implications, this study indicated the limitations of each stage of the innovation process, highlighting aspects that need to be overcome by entrepreneurs of startups in search of the consolidation of their businesses and recognition of the proposed innovations.

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