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INNOVATION STRATEGIES: AN ANALYSIS IN INFORMATION TECHNOLOGY STARTUPS

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Abstract

Objective: Analyze the main innovation strategies used by information technology startups.

Methodology: A qualitative exploratory study was developed, with the evidence interpreted from the content analysis technique. Data collection took place through a semi-structured interview script applied to four managers (founders) of information technology startups, domiciled in the states of Sergipe, Maranhão and Ceará.

Main results: The main practices for promoting open innovation identified were partnerships with customers and organizations; and the least found strategy was internationalization.

Theoretical/Methodological contributions: This study contributes to the literature on the subject, confirming, through empirical evidence, that open innovation practices adopted by information technology startups are, primarily, partnerships, which follow an informal implementation, through knowledge and the skills offered by the parties involved, to overcome operational deficiencies and obtain specific learning. Another relevant finding was that non-collaboration with institutional actors favors the implementation of incremental innovations.

Relevance/Originality: Information technology startups are businesses that are known to be active in bringing innovations to the market. However, studies on innovation strategies in this type of business are still scarce and knowing the nature and ways of implementing these strategies is pertinent, since it can foster better results in innovation.

Keywords: Innovation. Strategies for innovation. *Startups*. Open innovation practices. Internationalization.

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1 INTRODUCTION

With the advent of globalization and the expansion of the use of information technology tools, organizations started to deal with the imperative of innovation, which has been indicated as one of the most prominent means for maintaining competitiveness and business performance, differentiation and competitive advantage (Cropley, Kaufman, & Cropley, 2011; Stoilov, 2015).

In this context, it is also necessary to analyze how companies have dedicated themselves to the practice of innovation, as an organizational strategy, especially small businesses, as, as Valaei, Ismail and Rezaei (2017) emphasize, small companies play an important role in the innovation insertion processes, since they are endowed with flexibility and agility capable of fostering creativity, innovation and, consequently, of acquiring gains in competitive advantages.

In addition to traditional small businesses, Hunt (2013) also mentions startups as promoters of innovation. According to the definition adopted in this study, startups are companies, oriented by information technology, whose innovation is at its core to transform ideas into products and services, with great growth potential in the market (Ries, 2012; Robehmed, 2013; Shontell, 2014).

Specifically in Brazil, among the businesses most explored by startups, the market for solutions for education is at the top of the list, with 777 businesses⁴, followed by others, in the areas of finance, health, well-being and internet that are also among the main areas of activity of these businesses (Abstartups, 2019).

It should be noted that, according to Global Startups Ecosystem Report 2019, Brazil represents 55.9% of all turnover in Latin American startups and is among the 30 most promising nations in this area worldwide (GEN, 2019). In addition, in 2018, in the country, startups generated revenues of around 1 billion dollars (Dadalt, 2019).

Regarding the business sectors of startups, the StartSe Census (2017) points out that information technology is predominant in innovative businesses, generally used to solve problems and meet market demands, by offering new products and / or services.

In this context, Turri and Wagner (2015) pointed out that information technology (IT) startups are boosters for innovation, since these businesses insert new products and services, develop new production processes and new organizational techniques (Fernandes, 2015), exploring new market niches and thereby attracting investors.

⁴ The Startup Base, ABSTARTUPS database, offers updated information in real time on the number of registered startups. The information presented refers to the consultation on May 13, 2020.



Corroborating this understanding, Sebrae (2017) explains that startups have recognized potential for the insertion of innovations in the market, mainly those of information technology that, in the last years, were the main responsible for the solution of problems launched in the market, as well as for the insertion of innovations and solutions to meet the most diverse needs of consumers.

Considering the emphasis on innovation as an instrument to achieve and maintain competitive advantages, whether in large organizations and small businesses, or, especially, in startups, it becomes relevant to analyze which strategies for innovation are adopted by these businesses.

In view of these arguments, the following research question is identified: How are the practices of strategies for innovation configured in information technology startups, located in northeastern Brazil? In order to answer the identified research question, the objective was established: to analyze the main strategies that foster innovative activities in information technology startups, domiciled in northeastern Brazil, more specifically in the states of Sergipe, Ceará and Maranhão, investigating inbound actions, outbound and coupled open innovation process practiced, as well as the role of internationalization in this process.

To achieve the proposed objective, this research adopted a qualitative approach, in which semi-structured interviews were used, with four managers of information technology startups, registered in the database of the Brazilian Association of Startups (Abstartups, 2019).

Thus, this study: (a) brings, as its main theoretical contribution, the increment to the existing literature on innovation, mainly with regard to strategies for innovation; (b) reinforces the evidence about startups constituting a business modality, consolidated as an entrepreneurial trend in different parts of the world (Silva, 2017); and (c), from the applied point of view, contributes to the perception about the importance of innovative practice in all organizations, presenting innovation strategies and actions accessible to information technology startups.

2 THEORETICAL REFERENCE

In order to facilitate the achievement of the proposed objective, in this section of theoretical framework, sought to substantiate innovation topics, their conceptual aspects and the innovation strategies.



2.1 INNOVATION: CONCEPTUAL ASPECTS

Regarding the concept of innovation, one of the classic definitions was instituted by Schumpeter (1998), who associated innovation with new combinations of existing resources, to access new markets, produce new products, or improve old ones, more efficiently. Therefore, innovation is a dynamic process, called creative destruction, in which new technologies replace old techniques, promoting the economic development of society.

Another widely accepted definition is proposed by the Oslo Manual (OECD, 2006), according to which innovation is the implementation of a new, or significantly improved, product or service, production process, marketing method and / or organizational method in practices business, organization in the workplace and / or business relationships.

In addition, innovation can also be analyzed from the perspective: (a) macroeconomic, in which it must be examined as the organizational, governmental and / or social capacity to create and implement paradigm shifts in science, technology, the structure of market and industries; and (b) micro perspective, in which it is viewed as the ability of organizations to influence organizational marketing resources, management skills, knowledge, organizational capabilities and strategies (Koc, & Bozdog, 2017).

Additionally, it is possible to treat innovation as a source of competitive advantage, and under a strategic bias, from which it can be considered an instrument for differentiation of competition, competitive positioning, the establishment of essential skills and the encouragement of organizational learning (Imbuzeiro, 2014). In this context, innovation is also a strategic resource, that assists in customer loyalty, the search for innovative products and the creation of barriers to the entry of future imitators (Rosenbusch, Brinckmann, & Bausch, 2011).

Considering the existence of different theoretical approaches to innovation, Figure 1 was elaborated, presented below, with the concepts and aspects relevant to the theme.



Determining aspect	Concept	Author
Business performance	Companies' ability to control organizational marketing resources; management skills; knowledge; organizational capacities and strategies for the benefit of business effectiveness and success.	Bessant e Tidd, (2009), Cropley et al. (2011).
Organizational learning	Visible result of the ability of organizations to create knowledge and job configurations, combination, synthesis and / or improvement for the insertion of novelties in the market.	Camisón and Monfort-Mir (2012), D'alvano and Hildalgo (2012).
Business performance and socioeconomic development	Transformation of a new solution into something that can be marketed or favorable to the prosperity of companies, regions and economies, through social welfare and the creation of wealth.	Imbuzeiro (2014), Mas-Tur, Pinazo, Tur-Porcar and Masferrer (2015).
Introduction of news	Implementation of a new, or improved, product or service, production process, marketing method and / or organizational method, in business practices, in the workplace organization and / or in business relationships, resulting from new combinations of existing resources, to access new markets, produce new products, or produce old products, more efficiently.	Schumpeter (1939), Manual de Oslo (OCDE, 2006).
Introduction of news and participating agents	Promotion and purposeful introduction of new, productive and advantageous ideas, by individuals, teams and organizations.	Bledow, Frese, Anderson, Eres and Farr (2009), Cropley et al. (2011)

Figure 1. Innovation concepts

Source: Elaborated by the authors (2020).

The analysis in Figure 1 reinforces that the concept of innovation, directly or indirectly, encompasses business performance, since the success of the organization is an outstanding element of the concept. Another characteristic, recurring in the concepts presented, is the introduction of novelties, thus reinforcing that the company's successful performance results from the insertion of novelties, generally commercial.

Given the relevance of innovation to the competitiveness and growth of organizations, including startups, some innovation strategies are presented in the following topic.

2.2 INNOVATION STRATEGIES

Innovation currently represents a strategic imperative in economies (Heidenreich, & Kraemer, 2016), and its strategies refer to the selection of the best and most appropriate organizational plans for the development and insertion of new products and services in existing markets, as well as the entry into new commercial spaces (Sanches, & Machado, 2014).



Therefore, innovation strategies are organizational approaches for defining objectives and choosing methods that will be used to enhance business results (Lendel, & Varmus, 2011). Such strategies receive different classifications, since each author considers a different set of aspects and parameters of typification (Barbosa, & Machado). For this reason, traditional strategies were initially cataloged, as listed below (Figure 2).

Typologies of strategies for innovation	Author
Market strategy	Lynn and Akgun (1998), Pavitt (2006).
Technology strategy	
Quantitative innovation strategy	
Play-to-win innovation strategy	Dávila, Epstein and Shelton (2007).
Play Not to Lose	
Explorative strategy	Fauchart and Keilbach (2009).
Exploitative strategy	
Closed innovation	Schumpeter (1998), Stoilov (2015).

Figure 2. Typologies of strategies for innovation
Source: Elaborated by the authors (2020).

In addition to the strategies mentioned in Figure 2, some authors have pointed out other strategies also aimed at innovation. In this context, it must be remembered that in the face of increasing global competition, rising research and development (R&D) costs, as well as shortening product life cycles, companies can no longer rely solely on traditional innovation strategies, as they increasingly need access to external sources of knowledge (Saebi, & Foss, 2014).

In addition to this understanding, Doloreux (2013) explains that, in startups, the innovation process happens with the help of multiple functions, actors and resources, within and between company boundaries, which form an expanded set of divergent and fundamentally necessary competencies the transformation of innovative ideas into economically successful innovations.

In view of these clarifications, in this study, it was decided to detail, according to the academic literature consulted, two strategic aspects of open innovation: (1) cooperation and partnerships; and (2) internationalization.

Open innovation allows combining internal ideas with external technologies, to leverage the potential for novelties in new markets (Lichtenthaler, 2013). In this innovation strategy it is accentuated the ability of organizations to effectively link the use of their resources and their internal and external capacities, that is, ideas, competencies, projects,



infrastructure, technologies, capital, among others, in favor of the assimilation of new knowledge (Chesbrough, 2012).

Chesbrough (2003), with further appreciation by Varichio (2016), stated that the concept of open innovation comprises two parts: the input innovation (outside-in) and the output innovation (inside-out). Similarly, Cândido (2015) cited flows or dimensions: from "inside out" (outbound), which release ideas to the market, selling and / or licensing products and multiplying technologies; or "inbound", which includes the integration of knowledge from customers and external suppliers.

In this context, Gassmann and Enkel (2004) also present the possibility of the occurrence of the coupled process that combines the processes from outside to inside (to obtain external knowledge) and inside to outside (to offer ideas to the market), based on alliances with partners complementary.

Hsieh, Lee and Huang (2016) add that inbound processes refer to the search and use of innovative knowledge and ideas from suppliers, customers, universities, research institutions and other external organizations, to improve operations and business innovation. On the other hand, in the outbound process, the company transfers knowledge and technology to other institutions, and seeks suitable external organizations to sell them.

Gruenberg-Bochard and Kreis-Hoyer (2009) state that one of the best strategies to innovate is cooperation. In this sense, Dahlander and Gann (2010) argue that open innovation is enhanced by the cooperation variant. Thus, open innovation drives the company to open its limits to allow valuable knowledge to flow from outside, creating opportunities for cooperative innovation processes, in inbound, outbound and coupled process (Gassmann, & Enkel, 2004), with partners and / or suppliers (organizational cooperation), customers (cooperation with customers), and also with universities (institutional entities) and complementary companies (Scillitoe, & Chakrabarti, 2001).

With regard to cooperative processes of an organizational nature (partners and / or suppliers), Forsman (2011) lists three reasons why organizations should resort to cooperation: the creation of knowledge for the development of innovations; the transfer of knowledge to learn best practices; and the implementation of the necessary knowledge to produce products efficiently.

In addition, the practice or strand related to organizational partnerships enables companies to acquire expertise, evaluate business contexts and find the appropriate knowledge to complement the internal portfolio of solutions (Lichtenthaler, 2013), as well as to leverage external knowledge inputs, to accelerate internal innovations and expanding markets to use the proposed innovation (Alberti, & Pizzurno, 2017).



Thus, by pursuing an open innovation approach through cooperation and organizational partnerships, startups are subject to several potential benefits, such as: reduced time to market new products, reduced costs and risks, and improved access to specific knowledge (Mercandetti, Larbig, Tuozzo, & Steiner, 2017). Besides that, organizational cooperation is an important catalyst for innovation, especially when the partnership emphasizes and is oriented towards the exchange of organizational knowledge and skills (Alberti, & Pizzurno, 2017).

Open innovation can also be implemented through cooperative relationships with customers (Gassmann, & Enkel, 2004), and in this sense, academics and professionals increasingly recognize the importance of involving customers in the creation of new products and services, in a process that can be called co-participation, co-innovation, collaborative innovation, leading users, and / or user-centered innovation (Greer, & Lei, 2012). From this perspective, the concept of innovation also reveals itself as a process by which organizations find new and effective ways to serve their current customers and to identify, attract and retain new consumers, that is, innovation is linked to perception and demonstration what customers value (Cropley et al., 2011).

On this subject, integration and collaborative competence between company and customer foster the ability to absorb knowledge and innovative practice with the customer, as the consumer of products and services generates new information, thus feeding back the entire innovative process (Belkahla, & Triki, 2011; Tidd, Bessant, & Pavitt, 2008).

It is perceived, in this way, that the customer is the primary source for innovation, and organizations must retain consumer knowledge, based on complaints, frequency of purchases, sociodemographic characteristics, workshops, market studies and other sources of formal exchanges and informal (Brunswicker, & Vanhaverbeke, 2015).

It is also added that the capacities acquired, from open innovation practices, can also be enhanced by the use of external sources of knowledge, made available by institutional agents, such as: universities, research institutes, consulting companies and / or smaller companies (Mas-Tur et al., 2015). The underlying idea is that, aiming at the potential benefits of open innovation, companies are increasingly involved in cooperation, with a wide range of institutional actors (Classen, Gils, Bammens, & Carree, 2012).

After discussing the main practices or aspects linked to open innovation, another strategy, pointed out with the potential to promote innovation, is internationalization, which, for Reddy (2014), represents the process by which the company stops operating only within the limits of the market national, starting to explore foreign markets.



Internationalization, in addition to being a form of innovation (opening new markets), in order to be successful, requires innovation, because exporting companies generally have superior knowledge, reflected in the presentation of news and differentials to the foreign market. These are, therefore, two highly connected strategic activities (Shaw, & Williams, 2009).

Besides that, companies practicing innovation due to internationalization need to have a high capacity for recognition and to capture value in new practices and, for that, they must assimilate, to the maximum, knowledge about different cultures, habits, visions, customer needs and behavior of international suppliers (Mlakar, & Ruzzier, 2011).

The positive relationship between internationalization and innovation is reinforced by the fact that exporting companies can learn from their foreign contacts, adopt new production technologies and, consequently, increase productivity and organizational performance. This is because enterprises that export goods (products or production techniques) are more flexible to acquire new and valuable practices that, later, are used to innovate more effectively (Filippetti, Frenz, & Letto-Gillies, 2013; García, Avella, & Fernandez, 2012).

Discussing the concepts related to strategies for innovation (open innovation / collaboration and internationalization), the methodological aspects adopted for the analysis of these strategies in information technology startups domiciled in northeastern Brazil are discussed in the next section.

3 METHODOLOGY

This study adopted a qualitative approach, since the researcher, instead of being concerned with essentially numerical data, undertook an in-depth analysis of the meanings, knowledge and quality attributes of the phenomena (strategies for innovation), within their specific context (Strauss, & Corbin, 1998), according to the perception of the surveyed agents (Godoy, 1995).

As for the objectives, the research is exploratory and descriptive (Saunders, Lewis, & Thornill, 2012), as it aims to analyze and describe the strategies for innovation in startups, a subject that has not been worked on in the national literature in this type of business. Therefore, in the exploratory context, the Capes Periodicals platform (consultations held on July 1 and 5, 2019) was used to select studies on innovation strategies adopted by startups. In general, the results pointed to strategies for creating, managing, incubating startups and businesses, with a limited focus on innovation



practices. As for the descriptive bias (Newman, 2013), this study was based on detailing the strategies aimed at the practice of innovation in information technology startups.

Finally, with regard to development over time, there is a cross-sectional study, that is, data collection and analysis took place in a single moment (Saunders, Lewis, & Thornhill (2012), with the collection instrument being based on a semi-structured interview script, developed from the literature review and aimed at identifying strategies aimed at the practice of innovation, according to categories and elements of analysis (Figure 3).

Categories		Analysis elements - Practices / strands
Open innovation	<i>Inbound</i>	Cooperation / Organizational partnerships.
	<i>Outbound</i>	Cooperation / Partnerships with companies / customers.
	<i>Coupled process</i>	Cooperation / Partnerships with institutions.
Internationalization		Activities and possible benefits

Figure 3. Analysis categories and elements

Source: Elaborated by the authors (2020).

Four entrepreneurs (founders) of information technology startups were interviewed, identified (and also associated) in the database of the Brazilian Startup Association, with two domiciled in the state of Sergipe, and the others in the states of Maranhão and Ceará. The consulted startups received the fictitious nomination of ST1, ST2, ST3 and ST4. The interviews were conducted between the months of August and December 2017, by means of a telephone call. Each interview lasted an average of 35 minutes, and they were recorded with the aid of technological applications, with the authorization of the interviewees.

The qualitative analysis of the content of the evidence, collected in interviews, followed the following steps, according to Bardin (2011): (1) pre-analysis - organization and initial transcription, using text editors, of the material collected in the interviews, and systematization preliminary evidence collected and ideas presented in the theoretical framework; (2) exploration of the material - analytical description of the evidence collected, and identification, by individual analysis and by building word clouds, of the terms and reports linked to the definition and practice of strategies for innovation, thus allowing codification, the classification and categorization of this evidence, that is, open innovation (inbound, outbound and coupled process) and internationalization. The construction of these categories was done by surveying the words and reports associated with organizational cooperation practices and partnerships with customers and institutional actors, for the open innovation strategy and the export of products / services to the internationalization category (including the benefits each practice) and; (3) treatment of



results, inference and interpretation of evidence in the light of the approach to innovation practices and strategies, especially in startups. Still in this third stage, a cross-case analysis was carried out, through which it sought to identify the differences and common aspects among the researched startups, as well as comparing the results obtained with the consulted theoretical framework.

In the following section, the general characteristics and the research context of the startups participating in this study are presented, as well as the results and discussions on innovation strategies in the companies surveyed.

4 RESULTS AND DISCUSSION

In this section, the results of the research will be detailed and discussed, considering the description of the startups and identification of the strategies of open innovation and internationalization.

4.1. DESCRIPTION OF STARTUPS

The market served by the startups that composed the research is divided between local and national; the gross revenue of startups is up to R \$ 360,000.00, which qualifies them as small companies, with the exception of the startup ST4, categorized as small (Complementary Law 126/2006, 2006).

As for the time of operation, it was noticed a variation from ten months to three years, emphasizing that the startup appointed with more than seven years has adopted information technology more incisively in the last three years, period in which it was classified as startup. In Figure 4, the general aspects of the investigated startups are summarized.

Startup	ST1	ST2	ST3	ST4
State	Sergipe	Maranhão	Ceará	Sergipe
Interviewee	Directress	CEO	Managing partner	Managing partner
Product	Platform for multilateral exchange.	Monthly subscription software.	Mobile application for food delivery and management software for restaurant and marketplace.	Consulting and development of systems for management in the health area.
Market served	Local market	National market	Local market	National market
Billing	Up to R\$ 360.000,00	Up to R\$ 360.000,00	Up to R\$ 360.000,00	Up to R \$ 3.6 million
Operating time	10 months	3 years	1,33 years	Over 7 years

Figure 4. General aspects of surveyed startups

Source: Elaborated by the authors (2020).



4.2 OPEN INNOVATION STRATEGY

The debate about the open innovation strategy is segmented with the classification of cooperation practices or organizational partnership, cooperation or partnership with clients and with institutional actors (research institutions), which are simultaneously classified as inbound, outbound and / or coupled process.

It is anticipated, here, that the startup ST1 develops an innovative process, which simultaneously brings together customers, suppliers and partners, which is why the practices of strategies for innovation, of this company, are described and analyzed in an individual topic, at the end of this subsection.

4.2.1 Cooperation / organizational partnership

Initially, it was asked how the startups participating in this research implemented open innovation strategies, based on organizational cooperation practices. The startup ST2 reported that: “Our company does carry out partnerships, but these partnerships are not formal, not least because we follow the hypothesis validation methodology that each partnership represents. Thus, partnerships are hypotheses that can work or not” (Interviewee ST2). Still, with regard to partnerships with other companies, the interviewee added that:

“In relation to companies in the same sector, we seek products that are complementary to ours and already generate benefits for the business in the sense that we can offer more to the customer. These partnerships also occur with other companies that do not develop scalable and repeatable products, but that are especially important because they help us to develop our product and have a closer contact with other people”. (Interviewee ST2)

When reporting the reasons that drive the establishment of partnerships with other organizations, the interviewee explained that:

“The main purpose is traction, that is, to gain other channels for the dissemination and distribution of our product. The main difficulty, in my case, is the delay in having a return, at least to have an explicit return. Our team is small and the time it takes [to establish and manage a partnership] to validate a partnership or not becomes a difficulty for us”. (Interviewee ST2)

Even so, he indicated some benefits resulting from the partnership with other organizations: “The benefits are to publicize our company, to educate the market for us to generate leads for our business and that later we can work and become a customer” (Interviewee ST2).

As for the risks and lessons learned from collaboration with other organizations, he explained that:



"The learning we have is that they [partnerships] are important channels for growing the business, even in a startup that has to worry about being scalable and repeatable. And the risks are that we can sometimes invest in a partnership and it may not work as well, it may not have the expected attraction. So, the learning we have is that when we do a test with a partner, we end up finding out if that channel really works or not, and we choose some key partners to identify if a certain type of partner will work for us". (Interviewee ST2)

The interviewee's reports from startup ST2 expose some peculiarities that deserve to be discussed. One of them is: the signed partnerships focus not only on companies with related products and / or scalable and repeatable business models, but also those with a more traditional approach that, even so, can provide knowledge for product development, in addition to allowing contact with other groups of people. This finding expands the perception of Dell'era and Vergantti (2010), about companies not only emphasizing the characteristics of individual external parties, when considering a collaborative innovation strategy, but managing a balanced portfolio of external collaborators. In addition, it is possible to detect in this startup the implementation of the inbound practice of open innovation, since it uses the knowledge acquired in partnerships to leverage the internal results of its business (Rosa, 2017).

Another important point is the realization of partnerships intended to reach new means for the promotion of the product and the dissemination of the startup, so that, in this company, the realization of partnerships is associated with the implementation of marketing innovation. When informing that there is learning to evaluate possible viable partners, the interviewee's report can be associated with the placement of Sie, Rijpkema, Stoyanov and Sloep (2014), about the importance of, in addition to establishing partnerships, to decide correctly and strategically how to cooperate.

The interviewee from the startup ST3 also commented on how partnerships were made with other organizations:

"This part is not so simple. We realized that there is an interest by companies in making partnerships that will benefit both, and we have already started some negotiations with this intention, but we have not been able to go ahead and materialize [partnerships]. We realize that partnerships do not advance because there are many factors and risks involved, in addition to the image of our company that can be damaged by an unsuccessful partnership. Of course, there is the intention, but the difficulty in detailing the operationalization ends up making these projects fall asleep... So, there are momentary partnerships". (Interviewee ST3)

Asked about the difficulties in implementing such partnerships, the interviewee said: "I believe that the main difficulty has been the lack of a plan and lack of clarity in the assignments" (Interviewee ST3). And, when talking about the benefits resulting from partnerships with other organizations, he explained that:



“The aim is to seek mutual benefit. When we think of a partnership, the idea is to join forces to generate gains in scale or provide a better service, but as I said before, we have not yet achieved these benefits in a more concrete way”. (Interviewee ST3)

When indicating the search for benefits, such as gains in scale and provision of services with better quality, the interviewee is included in inbound practices for open innovation, since he seeks to attract external knowledge and expertise to his business (Witzeman et al., 2006).

Regarding the realization of partnerships with other organizations, the startup ST4 did not detail how they occurred, it just stated that: “Yes, we do some formal and other informal ones, by project or by market segment” (Interviewee ST4), explaining that “We implemented partnerships in order to expand the capacity to meet customer demands in areas that we do not dominate and that another partner dominates, in order to fully serve our customers or prospects ”(Interviewee ST4). Still, about the benefits and learnings resulting from partnerships with other organizations, he informed that:

“The main benefits came from the expansion of products to be offered to the market, where the benefits are the loyalty of current customers and the expansion of the segment of new prospects. There is always learning, as we treat partners as solutions or services that we can integrate to ours or ours to theirs, so we always have adjustments and technical discussions about different areas / products and subjects, which provides a constant search for knowledge”. (Interviewee ST4)

The interviewee's reports from startup ST4 allow the identification of open innovation practices: (a) inbound, detected from the mention of implementing partnerships to obtain external knowledge, in areas where the startup has no technical mastery (Michelino, Lamberti, Cammarano, & Lamberti, 2014); and (b) outbound, since there is the offer of solutions for the integration in the system of its partners, revealing, in this way, that it transfers knowledge to other organizations, from the systems integration, and through commercial transactions (Lopes, Ferrarese, & Carvalho 2017).

It is relevant to explain that it is not possible to characterize the actions of this startup as a coupled process, since the exchange of knowledge does not occur in the form of an alliance with complementary partners, nor does it generate essential knowledge to the innovation process of the companies involved (Rosa, 2017).

The reports received from this interviewee can be associated with the postulates of Lichtenthaler (2013), since this startup has sought external knowledge to complement its business and partner skills, learning from each other, in addition to seeking appropriate knowledge to complement its internal portfolio of solutions.



Besides that, to the practice of partnering with other organizations, it was also investigated how the startups participating in this research practiced cooperation with customers in order to implement innovations, as discussed in the next section.

4.2.2 Cooperation / partnership with customers

About the implementation of cooperation / partnership with customers as an open innovation practice, the interviewee from startup ST2 reported that:

“From the moment we realize that the customer is good at developing our product, that is, he has some valuable requirement that we need and it is usually an interesting profile that likes to give feedback, we make the partnership. This partnership is always informal, it does not have to be formal for people to have results”. (Interviewee ST2)

Regarding the perceived benefits of cooperation with customers, he reported that:

“These partnerships with customers are what really move what we are going to do and what we are going to prioritize. So, I would say that they provide great benefits and that is what really guides us. Of course, there are risks, so we apply the client's development and business methodologies to the client... The learning we have in this process is always the feedback they give us”. (Interviewee ST2)

It is noticed that, for the practice of partnership with customers, this startup indicated the preponderance of the customer as influencing the proposed innovations. In fact, the startup reinforces that the implementation of innovations follows the demands and needs of customers, and that, although the company does not establish formal partnerships, it has assimilated and implemented knowledge through the feedback received.

The interviewee from the startup ST3 also commented on partnerships with customers, as a practice to foster innovation:

“The partnership with customers happens when we seek to listen and apply what the customer is suggesting, but we do not follow any formalized procedure for this, it happens through natural interaction with customers... Some improvements were implemented informally, however, we recognize that for the effective development of new products, it is necessary to formalize this practice”. (Interviewee ST3)

On that same subject, he added:

“We are still developing this activity, so it is difficult to point out and measure the perceived benefits. I immediately perceive some customer satisfaction in realizing that their need has been considered and even implemented through new solutions. Learning comes as a consequence, every time I implement something new in my products, I am learning more about the features of my service, in addition to increasing its functionality”. (Interviewee ST3)

The reports obtained in the startups ST2 and ST3 show that the partnership with customers has happened in an informal way, constituted by the assimilation of knowledge and suggestions from consumers, so that the positioning of the customer influences the inbound process of open innovation (Gassmann, & Enkel, 2004).



This evidence corroborates what was defended by Tidd et al. (2008), on an important point of the collaborative innovation strategy with the client is the fact that the consumer of products and services generates new information, thus feeding back the entire innovative process (feedback), as was perceived in these startups, more incisively, at startup ST2.

The interviewee from startup ST4 did not detail how partnerships with customers occur, he only informed their existence and nature "Some partnerships with customers are formal and others are informal, by project or by market segment, depending on the focus of each project" (Interviewee ST4).

Incrementing the previous answer, he indicated benefits and lessons learned from partnerships with customers:

"We assimilate always looking at our customers as the main experts in their segment, always seeking to extract and present to customers the best market practices on each process and how the improved technology or management process can help to obtain better results". (Interviewee ST4)

The ST4 interviewee's reports on client partnership practices reveal formality and informality. The inbound character is highlighted, when the interviewee exposes that he assimilates knowledge from his clients, especially those specific to his operating segments; and, with the learning generated from this knowledge, it offers innovations in technologies and management processes, capable of optimizing results (Dahlander, & Gann, 2010).

This evidence can also be associated with the postulate of Belkahlia and Triki (2011), who defended the integration and the collaborative competence between company and client as an aspect that fosters the ability to absorb knowledge and innovative practice in organizations. In the report, absorption capacity is applied when the startup assimilates knowledge and applies it in innovation activities to offer new solutions.

In addition to cooperative actions with organizations and customers, it was also discussed how information technology startups implemented cooperation practices with institutional actors, as shown below.

4.2.3 Cooperation / partnership with institutional actors

It was asked whether the startup ST1 entered partnerships and / or assimilated external knowledge, issued by institutional agents, such as: universities, research centers etc. About this practice, the interviewee explained:

"We always participate in events related to startups, business opportunities, etc., but we don't actually collaborate with research institutions or any of these agents that you mentioned, but when



these institutions participate in these events, we always end up learning something". (Interviewee ST1)

The interviewee from the startup ST2 reported not having implemented concrete partnerships with universities and / or research institutions, but noted that:

"As for the other agents mentioned [universities and research institutes], I can say that our company generally provides a counterpart of knowledge with participation in some event to bring researchers, students from these institutions and other bodies closer, as well we access new information, in addition to gaining more visibility and access to these institutions for when you need them have within our reach. Collaboration to insert a specific innovation, as you ask, has not yet happened". (Interviewee ST2)

When reporting the benefits of interacting with different institutional agents, the ST2 interviewee added that:

"This collaboration always brings some benefit, such as the exposure of our business and also the learning for both sides, because we are sharing our knowledge, but we are also assimilating information at these events. In addition, although it has not yet happened, we recognize that collaborating with these agents can promote partnerships for the development of some new research front or source of human resources". (Interviewee ST2)

When he indicates that he assimilates and provides information, when participating in events with non-economic agents, the interviewee confirms the findings of Varichio (2016), who defends the practice of open innovation with research entities such as inbound and outbound knowledge flows.

It is worth noting that: (a) startups ST3 and ST4 did not report knowledge sharing with institutional actors, such as universities and research institutes; (b) no startup has indicated the incisive use of knowledge made available by universities, research institutes and / or consulting companies.

In this sense, according to Agrawal, Hasija and Bhattacharya (2016), the non-collaboration with these institutional actors favors the implementation of incremental innovation, resulting from partnerships with customers, suppliers and commercial peers. In fact, according to the reports presented, the innovations identified in this study are of an incremental nature, primarily due to the implementation of improvements and adjustments in processes.

The following describes the open innovation practices identified in the startup ST1.

4.2.4 Organizational cooperation / partnership, with customers and coupled process

The ST1 startup develops an innovation process that simultaneously brings together customers, partners and suppliers (other organizations), in addition to



implementing the coupled process, which is why the company is presented individually, in this subtopic.

The operationalization of the service offered by it is the result of constant interaction between the startup, its customers, suppliers and partners:

“In the case of partnerships, I can tell you that my client is my supplier and also a related partner. For example, they [other companies] provide us with services as if we were customers, and we pay them with our currency [offering the services registered on the exchange platform]. On the other hand, these same customers provide the services we use to promote exchanges, so they are also our suppliers. And, in addition, they are our partners, because they are companies associated with “ST1”, which make their services available for exchanges on our platform”. (Interviewee, ST1)

About the relationship, benefits and learning with these partners, the interviewee informed:

“All of our contact with them (partners) is formalized. I cannot even point out one or another specific benefit, the operation of the business is dependent on my partnerships, the associated companies. And yes, I learn a lot from them, in fact, with each company that we register we learn a little about how the company works [managerial aspects], and from that we learn and absorb knowledge that can be applied in our business”. (Interviewee ST1)

The reports by the startup representative ST1 reveal that the innovation implemented is a consequence of the set of partnerships signed by the company. The innovation process, previously described, can be framed as an open innovation practice, corroborated by the postulates of Chesbrough (2012), about the chaining, in an effective way, of the use of internal and external resources and capacities: ideas, competences, projects, infrastructure, technologies, capital, among others, in favor of the assimilation of new knowledge and the insertion of innovations (Silva, 2014).

The coupled process characteristic of open innovation in this business is evidenced in the reports by the description that the startup's internal skills are often related to the services and external knowledge of the partners, in addition to the company constantly learning from the practices of associated organizations.

The coupled process aspect is ratified by the studies by Rosa (2017), which explains its implementation, through alliances with complementary partners (companies associated with the startup), which provide exchanges of knowledge essential to the success of the innovation process. In the case of the startup under analysis, the exchange of knowledge is constant, since each company needs to detail its product, the basic processes and the ways of doing business.

The synthesis of open innovation practices, identified in the analyzed startups, is shown in Figure 5.



Startup	Open innovation	Open innovation practices	Operating method
ST1	<i>Coupled process</i>	Cooperation / partnership with suppliers, customers and partners.	Management of lateral exchanges.
ST2	<i>Inbound</i>	Organizational cooperation / partnership.	Informal hypothesis validation partnerships.
		Cooperation / partnership with customers.	Assimilating customer feedback.
	<i>Inbound e outbound</i>	Cooperation / partnership with institutional agents.	Exchange of knowledge at events.
ST3	<i>Inbound</i>	Organizational cooperation / partnership.	Temporary partnerships.
		Cooperation / partnership with customers.	Partnerships for specific improvements.
ST4	<i>Inbound</i>	Cooperation / partnership with customers.	Formal and informal partnerships by project and market segment.
	<i>Inbound e outbound</i>	Organizational cooperation / partnership.	

Figure 5. Synthesis of open innovation practices

Source: Elaborated by the authors (2020).

After discussing the main aspects of cooperation practices in open innovation, issues related to the internationalization strategy are also discussed in the next section.

4.3 INTERNATIONALIZATION STRATEGY

For the internationalization strategy, the evidence collected identified the non-practice of exporting products, although it has been recognized as having the potential to foster innovation. The startup representative ST1, for example, explained that:

“On this issue of internationalization, I think that today our intention is to improve the service and expand to the Northeast. But due to our advancement, understanding of our product and technological evolution of the platform, I believe that in a maximum of three years we will be promoting this service abroad, because the idea is easily replicable”. (Interviewee ST1)

Regarding the interaction between innovation and internationalization, she believes that:

“The fact of exporting the product, either to another country or even to another region in Brazil, does favor innovation, not least because each region carries a context, its habits and many particularities that end up arousing learning and motivating innovation, due to improving our service, improving the way we operate, serving the customer, and all of this can be reversed in improvements and innovations in our business”. (Interviewee ST1)

When stating that the entry into international markets promotes learning and motivates the implementation of innovations, the representative of ST1 approaches the thinking of Ren, Eisingerich and Tsai (2015), who highlights the advantages of commercialization with foreign markets for learning new ones markets, habits and cultures.



The interviewee from startup ST2 also commented on the internationalization strategy:

“No, today our company does not sell outside the country, we have already made sales to countries that spoke the Portuguese language, but it was sporadic. There is a pretension for the future, but it is not so certain, today we are very focused on the domestic market and the product development has been done here, as I said before in another question we discover the market from of the moment that is innovating in some way. This internationalization issue may or may not be a consequence of these discoveries that we are making, that is, our entry into the international market will happen when we discover an innovation that facilitates our entry into these markets”. (Interviewee ST2)

Regarding the association between innovation and internationalization, the ST2 representative informed that:

“Selling to international markets stimulates innovation and at the same time it is a great difficulty because you are competing in a more demanding market and you have to have more factors, you have to think about more stakeholders that affect your business. I do not know if there is a clear relationship between selling abroad and being innovative, I do not see this relationship at this time, I do not believe that internationalization fosters innovation, but that innovative practice allows entry into new markets, including foreign markets ”. (Interviewee ST2)

The interviewee from the startup ST3, when asked about internationalization practices, explained that: “We do not and do not plan, not least because there are different laws and legal obligations in each country, and this advance in the international market is not in our plans” (Interviewee ST3).

When talking about the relationship between innovation and internationalization, he approached the position defended at startup ST2, stating that:

“I do not believe that the practice of selling to foreign markets directly stimulates innovation. In fact, it is necessary to seek innovation to compete in other markets. It is not easy to enter a market offering the same product. It is necessary to have a differential, to have an innovation”. (Interviewee ST3)

Finally, regarding the internationalization strategy, the ST4 representative commented that: “We have not yet practiced internationalization, but we are putting together strategies to start offering in 2019” (Interviewee ST4). And, as for the possible relationship between innovation and internationalization, he believes that exporting to other countries encourages innovation, because: “It forces you to increase the level of delivery of the product or service” (Interviewee ST4). When evidencing that the presence in international markets results in an increase in the level of delivery of products and services, the interviewee approaches the postulates of García et al. (2012), who explain the performance in foreign markets as a promoter of learning and improvements in what is offered. Although they do not practice internationalization, the reports of the interviewees can be associated with the explanations of Shaw and Williams (2009) about the opening of new markets, through this strategy, requiring exporting companies superior knowledge to present news and differential to the foreign market, as was pointed out, in an incisive way, by interviewees from startups ST2 and ST3.



In Figure 6, the main results obtained in this study are summarized, regarding the practice of internationalization in the consulted startups.

Startup	ST1	ST2	ST3	ST4
Practice	Implementation intention in the next three years.	Sporadic sales to Portuguese-speaking countries.	Strategy not considered by the interviewed manager.	Intended to be implemented in 2019.

Figure 6. Internationalization Strategy
Source: Elaborated by the authors (2020).

Even with different perceptions, except for the ST3 representative, the other companies have already carried out or intend to implement internationalization strategies and, although under different perspectives, link the practice of innovation to the internationalization activity. Finally, Figure 7 summarizes the main benefits reported by the interviewees, based on the adoption of open innovation and internationalization strategies, in information technology startups.

Startup	Open innovation			Internationalization
	Cooperation / organizational partnership	Customer co-participation	Cooperation / partnership with institutional actors	
ST1	Management practices and knowledge in general.	Management practices and knowledge in general.	Unspecified	Learning of the context, habits and peculiarities of other countries that motivate innovation.
ST2	Definition of criteria for choosing the best partners.	Identification of products / services desired by customers.	Accumulation of knowledge and exposure of the startup's brand.	Unspecified
			New research front.	
			Recruitment of human resources.	
ST3	Join forces to generate gains in scale or provide better service	Self-learning about the product's features.	Unspecified	Strategy not considered by the interviewed manager.
		Customer satisfaction.		
ST4	Expansion of the product offer to the market, loyalty of current customers and expansion of the segment of new prospects.	Definition and application of processes more consistent with the needs and demands of customers.	Unspecified	Increased level of product / service quality offered.

Figure 6. Summary of benefits of innovation strategies in startups
Source: Elaborated by the authors (2020).



Among the results presented (Figure 7), it is necessary to remember that the benefits pointed out for the internationalization strategy were assumptions of the interviewees, since the researched startups still do not operate, effectively, in international environments. Similarly, part of the benefits indicated by ST2 for cooperation with institutional actors are personal inferences (expectations) of the interviewee.

5 CONCLUSIONS

The focus of this article was to investigate the strategies for achieving better results in innovation, used by information technology startups. It was noticed that they implement different and simultaneous practices of open innovation, through inbound (from outside to inside), outbound (from inside to outside) and coupled process (coupled process). The inbound process is the most applied, with organizational and customer cooperation being the most common practices, reinforcing the findings of Cândido (2015), for whom this type of open innovation is the most adopted by companies.

It is noteworthy that only one startup was classified as a coupled process practitioner, since in this company there are inbound and outbound flows, from alliances with complementary partners, which provide essential knowledge exchanges for the operationalization and management of the exchange platform.

It stands out that startups ST2 and ST4, simultaneously undertake outbound and inbound procedures, in cooperation with institutional actors and organizational partnerships, respectively, but do not do so in association with complementary partners, to exchange essential knowledge and skills, which is why for which they were not classified as practicing coupled process.

The main contributions offered by this study include the description of open innovation practices in information technology startups, among which organizational cooperation / partnership, most of the time, follows an informal implementation, in which the parties involved provide knowledge and skills, intuiting to supply operational deficiencies and obtain specific learning. In addition, these partnerships are opportunities to make the startup better known among customers and other organizations.

Especially about the open innovation strategy, based on cooperation / partnership with customers, information technology startups, even without an established process, invest time and are attentive to the needs and desires of customers. To this end, they seek to absorb and understand consumer suggestions and guidelines, and they do so even without an explicit partnership between the parties. In fact, the customer is the starting point for the insertion of changes in the innovative process; therefore, another pertinent



interpretation is that, when associating with customers, through formal or informal means, as happened in the surveyed startups, these companies recognize and ratify their role as the main assets of the company, since they are consumers of innovations.

As for the open innovation strategy, based on cooperation / partnership practices with institutional actors, such as universities and research institutes, it was found that the consulted startups have not significantly used this innovation practice, although they recognize the potential innovator of this type of collaboration.

Another relevant finding of this study, which offers an increase to the theoretical postulates about the practice of open innovation, is that none of the researched startups indicated the incisive use of the knowledge provided by universities, research institutes and / or consulting companies.

According to Agrawal et al. (2016), the non-collaboration with these institutional actors favors the implementation of incremental innovations, resulting from partnerships with customers, suppliers and commercial peers, as could be seen in the businesses consulted. This finding opens the possibility for new studies to investigate the factors that hinder the implementation of concrete and formalized collaborative practices between startups, universities and other research institutes.

Finally, it became evident that internationalization is the least practiced strategy, since the startups participating in the research primarily serve the national and local markets. It is pertinent to emphasize that, although this practice was not frequent in the researched companies, they recognize that the performance in foreign environments encourages the practice of innovation.

Regarding the limitations of the study, the main one was observed in the restricted selection of startups willing to grant interviews. Therefore, it is suggested that new studies be developed, with the application of interviews to a larger number of information technology startups and in others, recognized by the relevant market insertions, based on innovation.

There is also, as a limitation, the non-occurrence of internationalization activities, as well as the incipient practice of this strategy in the researched startups, not allowing more structured analyzes on the role of innovation in internationalization and vice versa, which is why new research they are suggested for the analysis, specifically, of the contribution of internationalization, as an instrument to foster innovative practice in startups.

For future work, it is worth considering the development of comparative analyzes, regarding the selection and implementation of innovation strategies between startups and traditional companies. It is also recommended to carry out quantitative studies, in order to



correlate the implementation of innovations (typologies and strategies) and the increase in productivity in information technology startups, in order to verify how positive the relationship is between these variables.

In general, the inferences obtained by this study demonstrate that the innovations implemented by startups do not necessarily result from formal research in the R&D area, but from the daily business development; collaboration with customers, suppliers and related companies; and process optimization by trial and error.

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