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Research Article

Processes in Interorganizational Relationships to Develop Absorptive Capacity in Startups

Processos em Relacionamentos Interorganizacionais para Desenvolvimento de Capacidade de Absorção em Startups

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ABSTRACT

Objective: one of the factors related to dynamic capabilities is the absorptive capacity and until now, empirical work on capabilities has been conducted mainly with large companies and little is known about how they occur in startups. In this context, the aim of this work is to provide an understanding of how absorptive capacity occurs in startups, which maintains interorganizational relationships with large companies. **Methods:** the research used a qualitative multiple case study design and the investigation of seven startups constituted the study corpus. The data were analyzed using statistical analysis, content analysis, and business process analysis. **Results:** the interrelationship between startups and large companies in acceleration programs enhances the development of capabilities for startups because it facilitates access and assimilation of knowledge. On the other hand, knowledge transformation and exploitation help the modification of the structure, processes, and resources of startups to serve the large company, and the development of new products and services to the market occurs modestly and incrementally. **Conclusions:** the study highlights how the formal actions of corporate accelerator programs by large firms contribute to the development of absorptive capacity in startups.

Keywords: corporate accelerator; absorptive capacity; dynamic capabilities; business process management; interorganizational relationships.

JEL Code: L26, D24, N16.

RESUMO

Objetivo: um dos fatores relacionados às capacidades dinâmicas é a capacidade de absorção e, até agora, trabalhos empíricos sobre capacidades foram conduzidos majoritariamente com empresas de grande porte e pouco se sabe sobre como ocorrem em *startups*. Nesse contexto, o objetivo deste trabalho é fornecer uma compreensão de como a capacidade de absorção ocorre em *startups* que mantêm relacionamentos interorganizacionais com grandes empresas. **Método:** a pesquisa utilizou um desenho qualitativo de estudo de casos múltiplos e a investigação de sete *startups* constituiu o *corpus* de estudo. Os dados foram analisados com uso de análise estatística, análise de conteúdo e análise de processos de negócio. **Resultados:** a inter-relação de *startups* com grandes empresas em programas de aceleração potencializa o desenvolvimento de capacidades para as *startups*, pois facilita o acesso e a assimilação de conhecimento. Já a transformação e exploração de conhecimento auxiliam a modificação da estrutura, de processos e de recursos das *startups* para atender à grande empresa, e o desenvolvimento de novos produtos e serviços para o mercado ocorre de forma modesta e incremental. **Conclusões:** o estudo evidencia como as ações formais dos programas de aceleração corporativa de grandes empresas contribuem para o desenvolvimento de capacidade de absorção em *startups*.

Palavras-chave: aceleradora corporativa; capacidade de absorção; capacidades dinâmicas; gerenciamento de processos de negócio; relacionamentos interorganizacionais.

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INTRODUCTION

Dynamic capabilities have proven to be beneficial for organizations in turbulent and changing environments (Schilke, Hu, & Helfat, 2018). For this reason, the phenomenon has aroused the interest of researchers in strategy, organizational changes, and competitive advantage. Although studies on dynamic capabilities show exponential growth (Schilke et al., 2018), empirical work has been predominantly conducted with established companies and little is known about how exactly they occur in startups (Autio, George, & Alexy, 2011; Ma, Zhou, & Fan, 2015).

One of the factors related to dynamic capabilities is absorptive capacity, whose seminal concept by Cohen and Levinthal (1990) was expanded with the incorporation of a dynamic perspective by Zahra and George (2002), defining it as a set of organizational routines and processes by which companies acquire, assimilate, transform, and use external knowledge to produce dynamic organizational capacity. Although highlighted as resources, with few exceptions the specific organizational routines and processes that make up companies' absorptive capacity are little explored by researchers, constituting a promising study area (Lewin, Massini, & Peeters, 2011).

Thus, absorptive capacity is seen as an essential competence for organizations, and the way it is effectively implemented in companies remains relatively poorly known, according to Aribi and Dupouët (2016). These authors argue that the few existing works present absorptive capacity as an essentially linear process and how the different phases of this process are carried out remains little studied, still less in nascent companies or the initial activities of a new business, i.e., the so-called startups (Hindle, 2002).

According to Blank and Dorf (2014), startups are temporary organizations that seek a scalable, recurring, and profitable business model. In this regard, large companies help startups to build their business models as they provide access to established markets, branding, reputation advantages, intellectual property, and technical know-how, in addition to helping startups overcome some barriers to entry and inexperience (Ceccagnoli, Forman, Huang, & Wu, 2012; Eisenmann, Parker, & Alstyne, 2009) to gain market acceptance (Groote & Backmann, 2020).

In other words, interorganizational relationships between startups and large companies can be positive for both, however, the strategic and organizational differences between these companies pose an additional challenge to both approach them and manage these partnerships. One way to build bridges between these organizations is to use structured acceleration programs led by global corporations, which although relatively recent, have been increasing in Brazil and worldwide (Moschner, Fink, Kurpjuweit, Wagner, & Herstatt, 2019; Shankar & Shepherd, 2019; Urbaniec & Żur, 2020). Among the various mechanisms that explain the role of corporate accelerators, we highlight the provision of support to increase access and growth of startups in the market (Crișan, Salanță, Beleiu, Bordean, & Bunduchi, 2019).

Besides, much of the research on interorganizational relationships between companies of different sizes or maturity was carried out from the perspective of large companies, revealing a scarcity of studies focused on startups (Chaudhary & Batra, 2018; Dooley, Kenny, & Cronin, 2015; Evangelista & Mac, 2016; Huang, Rice, & Martin, 2015). However, there is empirical evidence that the relationship with more mature organizations can also benefit nascent companies. Stuart (2000) found that large companies with leading technologies were considered highly valuable partners, particularly for younger and smaller companies, often without the resources that could allow them access to such technology. Also, startups benefit greatly from effective alliances, in part because of improved opportunities to develop capabilities (Baum, Calabrese, & Silverman, 2000). For Wasiuzzaman (2019), alliances with large companies not only help startups in their management and technological aspects, but also improve their financial conditions and competitive advantage.

Considering therefore that interorganizational relationships with large companies benefit startups, it is opportune to understand how absorptive capacity occurs in these companies, to create and sustain competitive advantage. To this end, and considering the dynamics of absorptive capacity, it is necessary to understand the firm's organizational processes, i.e., its routines and patterns of practices and learning, which are at the heart of the concept of dynamic capabilities (Teece, Pisano, & Shuen, 1997).

In this study, the opportunity arises to systematize the empirical and theoretical knowledge, presenting results that describe the business processes related to the operationalization of the concept of absorptive capacity in startups, exploring a problem that has not yet been studied. This was undertaken through the managerial approach to business process management (BPM).

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BPM goes beyond organizational routines and functional structures, representing a new way of visualizing business operations (Burlton, 2010).

Within this problem of investigating the processes that effectively make up absorptive capacity in startups, the motivating question of this study arises: in the interorganizational relationships between large companies and startups, how do startups develop absorptive capacity, from the perspective of business process management, to create competitive advantage?

Based on the research problem, the general objective of this study is to analyze the business processes that constitute the absorptive capacity of startups, as well as their implementation and realization, to promote competitive advantages. To this end, the interorganizational relationship between startups and large companies was analyzed through formal corporate acceleration programs.

THEORETICAL REFERENCE

Interorganizational relationships

Relationships between organizations are seen as important sources of resources and learning, with the potential to lead to competitive advantage as long as they are effectively managed (Ireland, Hitt, & Vaidyanath, 2002). There are at least six different theoretical paradigms widely used to support the formation of interorganizational relationships, including transaction cost savings, resource dependence, strategic choice, stakeholder theory, organizational learning, and institutional theory (Barringer & Harrison, 2000). Organizational learning models the theoretical framework of this study, since it is considered here that companies form partnerships to capitalize on organizational learning opportunities.

In collaboration networks, some cases have been highlighted, such as the alliances between large companies and startups, which are highly different partners, as pointed out by Groote and Backmann (2020). These differences begin with the selection of other organizations with which to innovate: while startups rely on their networks to find a partner, consolidated companies have professional mechanisms for monitoring possible alliances, including startups, but in particular those that offer more innovative solutions (Groote & Backmann, 2020). When it comes to agility, startups have an added advantage over large corporations, while large corporations have control over resources that are out of reach of startups. A trend has been perceived in which large corporations began to see opportunities for business innovation in startups, replacing equity with shared technology, to connect two worlds with less organizational costs and greater speed and agility (Weiblen & Chesbrough, 2015). Additionally, there are opposite traits of innovation between large companies and startups (Jang, Lee, & Yoon, 2017), suggesting that the latter need collaboration to enter the market with their disruptive technologies, and that large companies have technological success based on their large market scale and distribution channels, but they need to use the startup's agility and specialized knowledge to stimulate their innovation activities (Hogenhuis, van den Hende, & Hultink, 2016). These opposing traits, however, imply advantageous possibilities for complementary open innovation between large companies and startups (Jang et al., 2017), but they generate challenges for the management of these partnerships.

Thus, organizations are driven to find suitable forms and structures to minimize these characteristics that are so disparate between large corporations and startups, bringing them together to develop capabilities that result in innovation. Corporate accelerators are an effective model for this, as they are characterized by mechanisms that support the validation of ideas and products, that provide learning models, and that support growth and market entry for companies that are starting their activities in the same way that the accelerators support innovation (Crișan et al., 2019).

Absorptive capacity in startups

Absorptive capacity is a dynamic capability of the firm, and its effects reflect organizational learning, knowledge sharing, innovation, and company performance (Flatten, Engelen, Zahra, & Brettel, 2011). Zahra and George (2002), placing this in a dynamic capability perspective, highlight two subsets of absorptive capacity: potential and realized. Potential capacity includes knowledge acquisition and assimilation, and realized capacity comprises the transformation and use of knowledge. The model proposed by Zahra and George (2002), which connects the two subsets of absorptive capacity, as well as the external sources of knowledge, indicates that both the potential absorptive capacity and the realized absorptive capacity contribute differentially, however, in a complementary way to the development of competitive advantage in organizations.

Although there are many ways in which a company can obtain a competitive advantage, Zahra and George (2002) clarify that innovation and strategic flexibility are the most important

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factors in dynamic markets and belong to the subset of potential absorptive capacity. The transformation and exploitation capacities, which absorptive capacity comprises, are likely to influence organizational performance through the innovation of products and processes.

In this context, innovation can increase the likelihood of survival and sustainability of a startup's competitive advantage as it allows the creation of dynamic capabilities and improves the startup's absorptive capacity (Hyytinen, Pajarinen, & Rouvinen, 2015). Nevertheless, Rodríguez‐Serrano and Martín‐Armario (2019) consider absorptive capacity a distinct dynamic capability to support the innovative performance of internationalized startups when they develop the ability to obtain external knowledge and assimilate its value, in addition to having the ability to use the knowledge and exploit it in global, competitive, and dynamic business environments. In economies with low levels of entrepreneurship and stagnant economic growth, such as Japan, startups face difficulties in accessing external knowledge sources due to the lack of absorptive capacity (Kato, 2020).

In this discussion, the relevance of absorptive capacity for the sustainable development of knowledge and innovation in organizations is perceived. In the case of startups, because they are at the beginning of their activities and are small, this can be more critical since there is a lack not only of accumulation of technical resources and managerial skills (Hoang & Antoncic, 2003) but also of credibility in the market (Stuart, 2000). Thus, learning through absorptive capacity in relationships with other organizations is relevant to minimize these weaknesses (Tidd, Bessant, & Pavitt, 2008).

The relevance of capabilities to startups is recognized in the study by Savarese, Orsi, and Belussi (2016), in which the authors show that the development of dynamic capabilities, considered by them as an investment in human resources and new routines, is significant for the growth of this type of company. However, this topic is little studied. One of the few works on this theme (Ma et al., 2015) shows that the dynamic capabilities of the startups are different from those of well-established companies since they are more developed due to the entrepreneur's experience and the mobilization of complementary external resources. Therefore, it is necessary to better understand how the interorganizational partnership enables the development of capacities, which in turn could lead to the success of startups.

Business process management

According to Teece, Pisano and Shuen (1997), the concept of dynamic capabilities has as its essence the organizational processes of the firm (the company's way of doing things, i.e., the routines and standards of practices and learning of the organization), which are in turn formed by the positions (resources and assets available) and shaped by the evolution of the firm's history (paths already taken by the company, considering the threats and productive opportunities identified). Similarly, Zahra and George (2002) adopt a process perspective on absorptive capacity, emphasizing the use of external knowledge and the combination with the firm's internal knowledge, to influence organizational results. The authors state that absorptive capacity is seen as a dynamic capability embedded in a company's routines and processes, making it possible to analyze stocks and knowledge flows, relating these variables to the creation and sustainability of competitive advantage. As can be seen, there is a latent relationship between constructive absorptive capacity and the managerial approach to managing business processes.

Business process management (BPM) is a managerial approach and a set of technologies that provides support for process management, which in turn is involved with the management of corporate performance. Business processes describe how companies are organized to do a particular job. In a more general concept, business processes are any set of activities carried out by an organization, being initiated by an event, transforming information, materials, or commercial commitments and producing an output of value for the organization or stakeholders in the process. This organized work delivers value to clients or supports/manages other processes, which can be end-to-end, cross-functional, and even inter-organizational (Association of Business Process Management Professionals [ABPMP], 2013).

To analyze the business processes that constitute the absorptive capacity of startups, seeking to describe how they are carried out and implemented, this study used a specialized approach for the initiative to model the processes found in the research, providing an analysis of organizational perspective (ABPMP, 2013). This approach involved the SIPOC documentation style (which stands for suppliers, inputs, process, outputs, and customers), applied by filling in a table with the elements that make up the acronym. Figure 1 shows the representation of the SIPOC matrix (ASQ Service Quality Division, 2016) used in the study.

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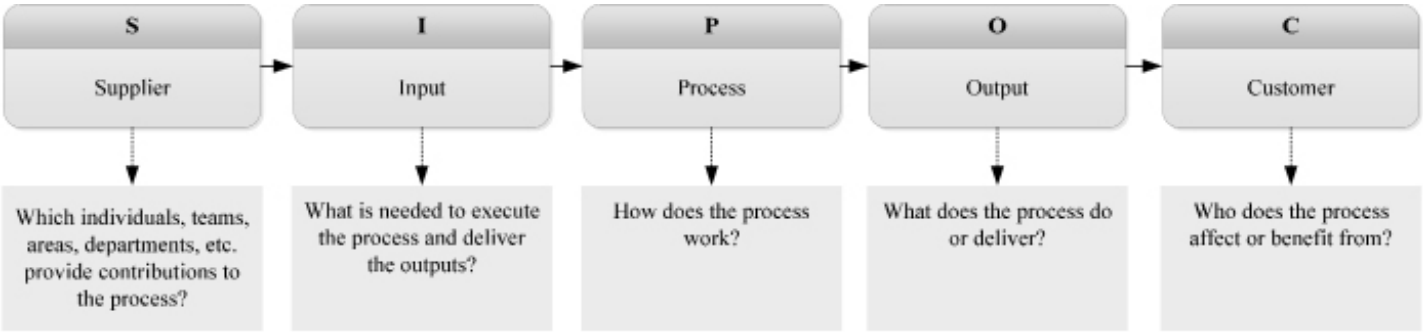

Figure 1. SIPOC Matrix.

Source: adapted from ASQ Service Quality Division (2016, May 6). *SIPOC (suppliers, inputs, process, outputs, customers) diagram*. Retrieved from http://asqservicequality.org/glossary/sipoc-suppliers-inputs-process-outputs-customers-diagram/

According to ABPMP (2013), the SIPOC model can be applied in situations where it is necessary to obtain a consensus on which aspects of a process should be studied. The use of this technique allowed the business processes that make up the startups' absorptive capacity to be identified and arranged in a simplified way in a table, facilitating the visualization of the process inputs and outputs.

Relationship between business process management and absorptive capacity

Business process management and its role in increasing absorptive capacity received special attention in the work of Manfreda, Kovacic, Štemberger, and Trkman (2014), in which process management and its benefits were specifically expressed in terms of the capacity of employees to understand the work of others, propose new changes, or accept the proposals of others, all of which increase the level of absorptive capacity. High absorptive capacity means that organizations can learn to use new knowledge in their processes and implement changes that improve their operations.

For Srivardhana and Pawlowski (2007), the level of absorptive capacity of a company is not simply a sum of the 'absorptive capacities' of individual employees; a company cannot depend only on its employees to develop absorptive capacity. To improve and sustain absorptive capacity, companies must go beyond human development strategies to develop routines and organizational processes to acquire, assimilate, transform, and explore knowledge, and in this context, a wide range of techniques for analyzing processes such as Lean Management, Six Sigma, Workflow Management, and Process Modeling.

Gutiérrez, Bustinza, and Molina (2012) consider process management to be important Six Sigma practices and observe its positive effects on organizational performance, through absorptive capacity. As a consequence, viewing Six Sigma through the lens of knowledge management and organizational learning can lead to insights on how to create, retain, and disseminate knowledge using a structured method. Six Sigma process management seeks to detect and correct errors, encouraging the absorption of knowledge about processes, to the extent that knowledge creation occurs through the learning generated by formal improvement processes. Knowledge can also be created by solving problems programmatically, such as a sequence of steps and a set of tools. Thus, the use of structured procedures and techniques, as well as tools associated with Six Sigma process management, facilitates the acquisition of knowledge, since the existence of a common language, shared goals or tools, etc., favors the absorption of knowledge.

Corroborating the thinking of Manfreda et al. (2014), Gutiérrez et al. (2012) argue that several studies have observed that the use of mechanisms to integrate workers has a positive effect on absorptive capacity, taking into account the management of processes included in the Six Sigma methodology. Teams using lateral communication mechanisms, which facilitate the flow of knowledge across functional boundaries, allow employees to combine existing knowledge with newly acquired knowledge, helping integrate the different bodies of knowledge and create routines within the units.

Srivardhana and Pawlowski (2007) highlight that absorptive capacity does not depend only on the availability of new knowledge or information, but that the members of the organization also need the ability to transmit their learning among themselves and to develop common cognitive structures on the application of shared knowledge. Ultimately, the development of absorptive capacity can provide organizations with favorable conditions

for building new capacities to create and deploy knowledge, thereby improving business processes.

It can be said, therefore, that there is a relationship between business process management and absorptive capacity, where process management can help to operationalize and enhance organizational learning processes through absorptive capacity, in the same way that the development of absorptive capacity can provide organizations with favorable conditions for the continuous improvement of critical processes. As absorptive capacity is a set of routines that involve the ability of companies to initiate changes from within, as well as to identify and assimilate ideas from the external environment, business process management leads to the systematic application of these specific organizational routines and processes that constitute the absorptive capacity of companies, for the generation of value and competitive advantage.

METHOD

Methodological procedures and definition of units of analysis

This research was based on a qualitative design of multiple case studies (Yin, 2015) to examine the partnerships between large companies and startups, highlighting the analysis of the business processes that constitute the absorptive capacity of startups inserted in corporate acceleration programs. Specific measures were developed in the case study protocol to conduct data collection and analysis procedures. According to Yin (2015), the protocol is an important way to increase the reliability of case study research. Figure 2 integrates the research protocol and summarizes the procedures adopted for data collection.

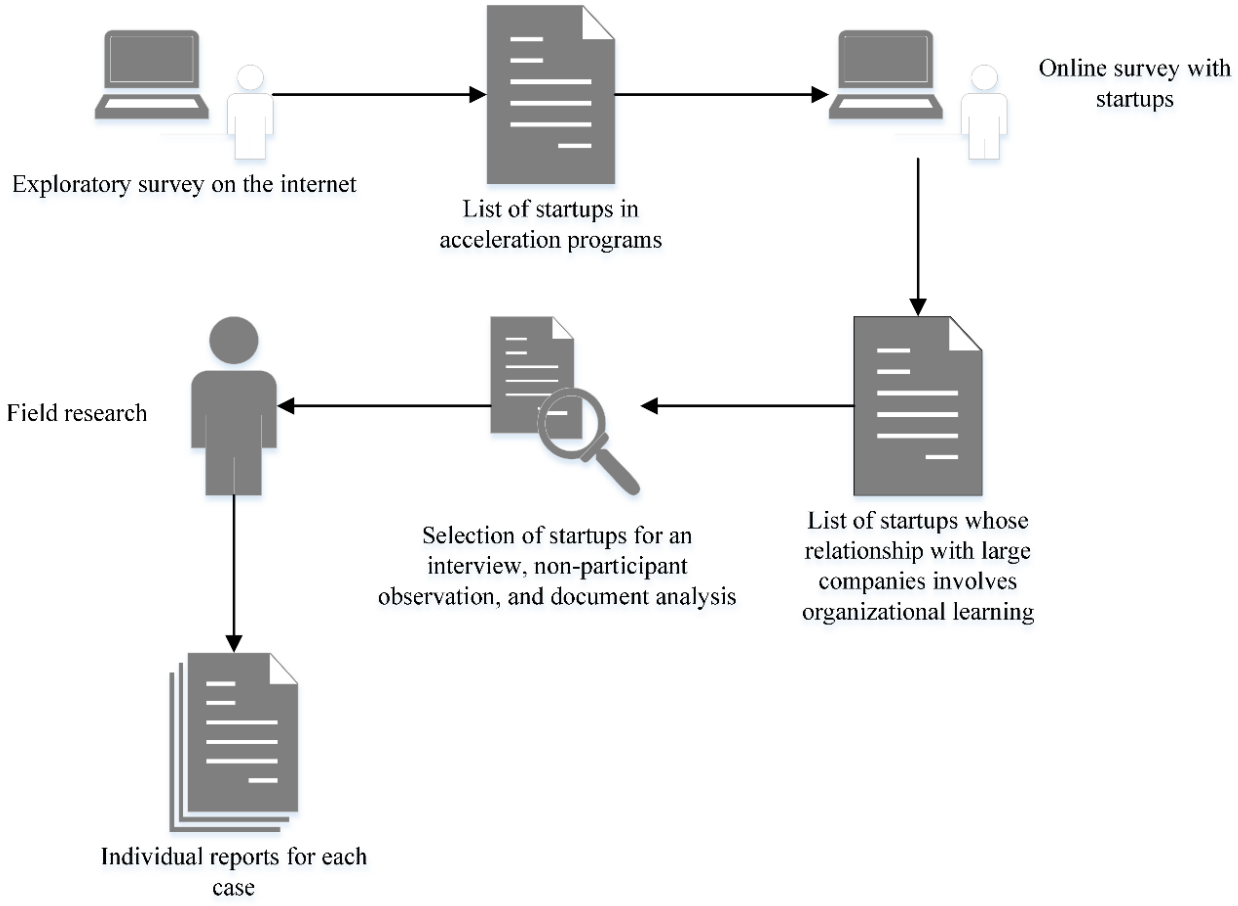

Figure 2. Data collection procedures.

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The first stage of the research involved an exploratory survey via the internet of large companies that invest in startup's corporate acceleration programs, such as AES Brasil (AES Brasil Inovação), Bradesco (Inovabra Startups), Braskem (Braskem Labs), Enel (Energy Start), Google (Campus São Paulo), Itaú Unibanco (Cubo), Oi (Oito), Porto Seguro (Oxigênio Aceleradora), Samsung (Ocean), Senior Solution (Inove Senior), and Telefônica Brasil (Wayra), and later, of startups inserted into these corporate acceleration programs. This latter search resulted in 175 startups; however, only 160 had the data available for the collection of information. The startups were distributed in five acceleration programs promoted by large companies (Braskem Labs, Campus São Paulo, Cubo, Oxigênio Aceleradora, and Wayra).

The second stage of the study was subsequently carried out, which was a survey using an online questionnaire with the 160 startups, to show startups that indicated a reasonable degree of absorptive capacity, highlighting organizational learning together with the large company. To achieve this objective, the scales that propose to identify the absorptive capacity of Pavlou and El Sawy (2006), Camisón and Forés (2010), Flatten, Engelen, Zahra and Brettel (2011), and Jiménez-Barrionuevo, García-Morales and Molina (2011) were used.

The use of survey research was decisive for the definition of the first sample of the study, looking for startups that indicated a reasonable degree of absorptive capacity and relevant information to characterize the interorganizational relationship with the large company. In this stage, 34 startups were invited to participate in the research, generating a sample of 33 startups considered valid for the study. From this sample, 11 startups were selected to be investigated in depth, as they had a positive tendency to absorb knowledge from the large company and recognize the relevance of the partnership. All of them were contacted and seven of them agreed to participate in the study: *BR Goods and Raiz*, linked to the *Braskem Labs* program by *Braskem* and *Bynd, Confere Cartões, Evnts, Nexoos*, and *Psicologia Viva*, inserted in the *Oxigênio Aceleradora* program promoted by *Porto Seguro*.

In the third stage, field research, semi-structured interviews were conducted with the owner, manager, or person responsible for the startup, from where detailed information could be obtained and which were used in the qualitative analysis. The interviews took place between December 2017 and January 2018, being recorded and transcribed to avoid interpretation errors, allowing for a more in-depth analysis. The interview script was based on the scale of Pavlou and El Sawy (2006).

In addition to the interviews, direct non-participant observation and analysis of startups' internal documents were used as evidence sources, such as meeting syntheses, project, and task management dashboards, and materials collected on the internet, building a research corpus (Bauer & Gaskell, 2015) based on the principles of data triangulation (Sampieri, Collado, & Lucio, 2013; Yin, 2015).

Statistical analysis techniques (Field, 2009) were used for survey research, in addition to the analysis of business processes (ABPMP, 2013) and content analysis (Bardin, 2016) for the corpus exploration stage, which had computer-assisted operations constituted essentially by the codification and categorization of the collected information.

Concerning the use of information technology as a tool to aid data analysis, the use of Iramuteq software (*interface de R pour les analyses multidimensionnelles de textes et de questionnaires*) and NVivo 11 for the qualitative analysis of the textual data, and assisting in the codification of the meanings of the material gathered, is evident in this study. Besides, SPSS Statistics 17 software was used to process research survey data and Bizagi Modeler for the business process modeling initiative.

ANALYSIS OF THE RESULTS

Encoding and categorization of the data collected

It is evident in the dendrogram of Figure 3 that from the data obtained from the seven researched startups, there are four central concepts involved in the interviewees' speech when answering the interview questions, according to the analysis by the Iramuteq software.

It is possible to verify that class 3 represents 21% of the text segments of the corpus and presents the main words related to the large companies that relate to the researched startups, in this case, *Braskem* and *Porto Seguro*. In this class, there are also some characteristics of large companies that corroborate the information collected in the interviews and analysis of internal documents, such as the requirement for periodic meetings with the startups participating in the acceleration programs, and the availability of an executive or 'sponsor' to accompany the process, who acted as a mentor. The startups reported that they had easy access to executives from different areas and specialties within the large company, being able to request specific mentoring and training according to their needs.

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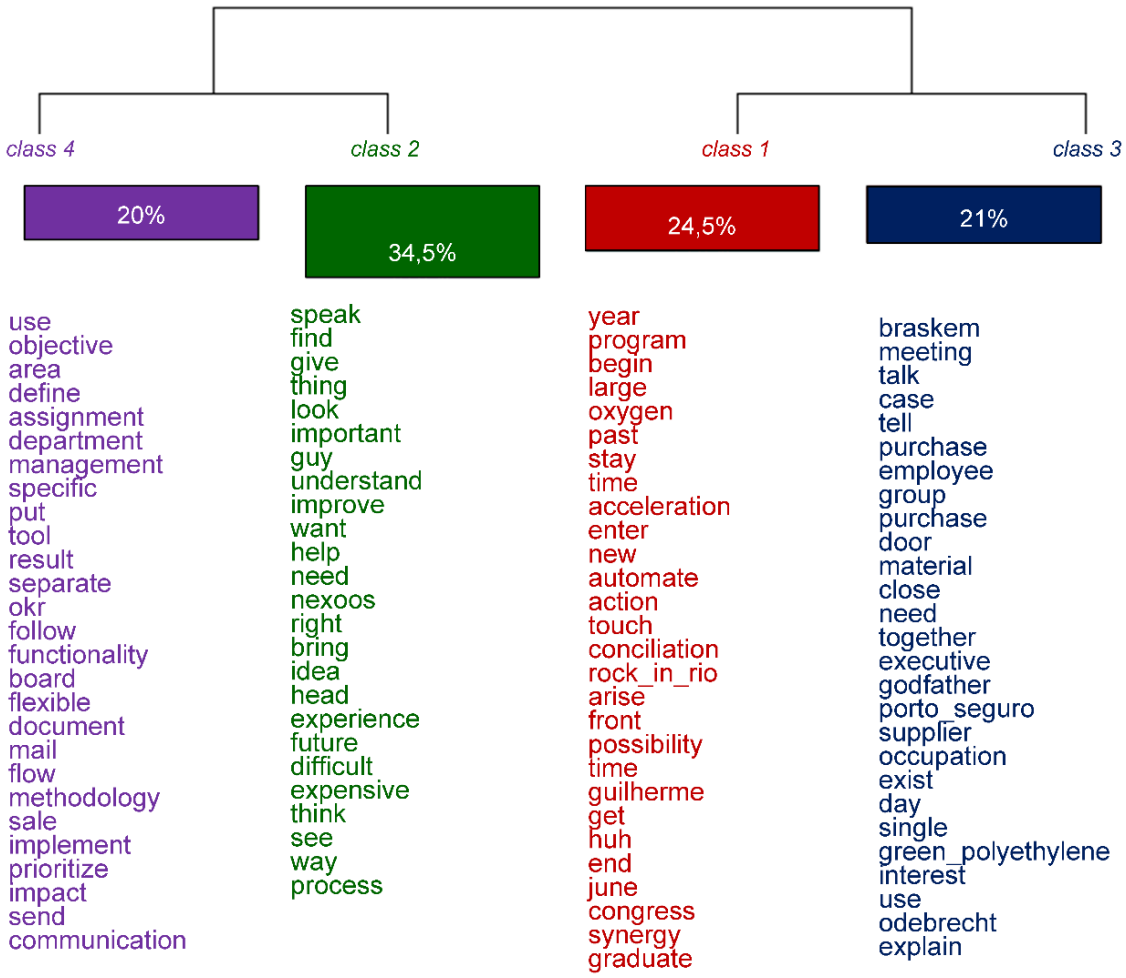

Figure 3. **Dendrogram of the textual corpus with keywords.**

Class 1 represents 24.5 % of the text segments and, in its analysis, it is clear that the central concept is the acceleration program promoted by large companies, and the proximity of context with class 3 is evident. Some words in this class indicate that the acceleration programs are temporal, i.e., they have a beginning, middle, and end. However, it was observed in the interviews that even after the formal end of the acceleration program, startups continued to maintain contact with large companies and have access to mentors. The presence of verbs that indicate the new possibilities that have emerged for startups inserted in the programs is also noticed in class 1, from the expressive change in management and organizational performance to the opening of the market to new customers, facts also observed in the management dashboards of projects and tasks of startups.

Classes 2 and 4, on the other hand, represent 34.5% and 20% of the content of the corpus respectively, which concentrated a set of words that express the speech of the interviewees related to the absorptive capacity and business processes. The analysis of the words in class 2 allowed us to identify that the ability to acquire and assimilate knowledge, i.e., the potential absorptive capacity, is much more developed in startups than the absorptive capacity performed since the words are concentrated in these two dimensions. The focus of the corporate acceleration programs is to make available the knowledge of the large company to share experiences with entrepreneurs in the initial phase, helping the startup to define strategies and use tools to improve management and organizational performance.

The use of the NVivo software as an aid to cutting and coding operations of the textual material from the interviews provided statistical support for the analyzes carried out, presenting the grouping of words by coding similarity represented by a dendogram, as shown in Figure 4.

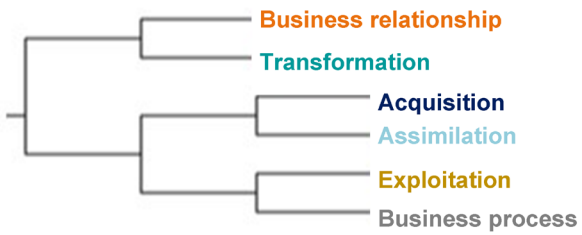

Figure 4. Clustered nodes by coding similarity.

Note the grouping of the 'nodes' Acquisition and Assimilation, showing proximity that corroborates the theoretical basis study, as they are the two dimensions of the potential absorptive capacity. The analysis shows that the investigated startups present a coherent performance in terms of the ability to acquire and assimilate knowledge since the very movement to enter a corporate acceleration program demonstrates the startup's ability to identify and obtain knowledge from external sources. In the same way, the ability of startups to analyze, interpret, and understand the knowledge acquired externally was evident in the interviews and direct observation, creating routines that promote the dissemination of the knowledge acquired from the large company, through meetings, IT tools, and management processes.

The Exploitation and Business Processes group appears at the same level as the first agglomeration. However, before interpreting this discovery, it is necessary to observe the last and most distant grouping: Commercial relations and Transformation. It is known that in addition to the search for knowledge, startups see in the corporate acceleration programs an opportunity to start and maintain commercial relations with large companies. In this context, the ability of startups to combine existing knowledge with the knowledge acquired from the large company underpins the commercial partnership between the two organizations. The Commercial Relations and Transformation group, which is more distant from the others, but linked to the whole agglomeration, is distinguished from the others by presenting a strong representation for startups. Returning to the Exploitation and Business Processes grouping, the transformed knowledge is used by startups to improve their organizational performance. It is at this stage that business processes are structured in the startups, where routines, procedures, and control are created for critical activities. The research showed that the transformation and exploitation capacities, resulting from absorptive capacity, are likely to influence the performance of startups through process and organizational innovation.

The findings presented in these groups indicate that startups within the corporate acceleration program develop the potential absorptive capacity more effectively compared to the absorptive capacity performed. This was observed because the startups concentrate more efforts on the processes related to the acquisition and assimilation of knowledge, since they are relevant for competitive advantage to strengthen commercial relations with the large company. The products and services developed by the studied startups initially serve the large company with which they relate and, later, are expanded to the market. It is also observed that the startup seeks to develop internal processes to improve performance following orientation and guidelines from the partner company. This shows that the startups' efforts are mainly in acquiring and assimilating knowledge of the partner company (potential capacity), but there are also relevant internal transformation initiatives for market exploitation (realized capacity), even though they are still closely linked to the interests of the partner company.

Development of potential and realized absorptive capacity in startups

The mapping of the macroprocesses that make up absorptive capacity, from the perspective of business process management, allowed the identification of the components that appear in the acceleration programs, presented in Figure 5 and Figure 6, giving an understanding of the ability to absorb knowledge through the behavior of the process.

According to Zahra and George (2002), the efforts spent on knowledge acquisition routines have three attributes that can influence the development of absorptive capacity: intensity, speed, and direction. The intensity of the startups' efforts to identify and gather knowledge within the corporate acceleration programs is enhanced by the offer of specialized training and a network of mentors made available by large companies. The aforementioned authors state that the greater the effort, the faster the company will build the necessary capacities, and this statement can be confirmed in this research, as both acceleration programs lasted for only four months and, within that period, determined the quality of startups' acquisition capacity. The direction of accumulating knowledge, i.e., training and mentoring, also met the need to have different areas of specialization within the startup, to successfully import external technologies (Zahra & George, 2002).

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	Supplier Actions promoted by the corporate accelerator	Input Processes initiated by the startup	Process Macroprocesses performed by the startup	Output Capacities developed by startup	Customer Competitive advantage for the startup
Acquisition	Training	Monitoring of the previous schedule by the accelerator; Request, by the managers of the startup, for specific training and according to needs.	Participate in workshops and lectures scheduled by the accelerator; Participate in personalized and specific training.	Acquisition of knowledge by managers and teams; Discovering useful tools for business management; Search for improvement of strategic planning.	Strategic flexibility; Organizational innovation.
	Network of mentors	Align with the entrepreneurial mentoring program established by the accelerator; Request from the startup's managers for mentor support.	Access the network of mentors available; Participate in the mentoring sections.	Acquisition of new perspectives and expertise; Knowledge of relevant market information; Formation and maintenance of a network of contacts.	Strategic flexibility.
Assimilation	Periodic meetings and effective communication	Attend the weekly meetings scheduled by the accelerator; Schedule meetings, according to the startup's needs and requests; Use of software for information management.	Attend meetings; Record the meetings in minutes; Follow-up the meetings; Exchange information between teams.	Creation of an information repository; Effective communication between startup and large company; Interaction between departments; Analysis and information sharing.	Organizational innovation.

Figure 5. **Knowledge acquisition and assimilation process.**

	Supplier Actions promoted by the corporate accelerator	Input Processes initiated by the startup	Process Macroprocesses performed by startup	Output Capacities developed by startup	Customer Competitive advantage
Transformation	Commercial relations	Existing product or service (minimum viable product — MVP) at the startup; Business synergy with the big company and/or its customers and partners.	Adapt to the needs of the large company and/or its customers and partners; Develop products and/or services together with the large company.	Adaptation of products and/or services; Improvements in business management and the development of products and/or services; Structuring of functional areas; Acceptance of changes and new business rules.	Organizational innovation; Organizational performance.
	Organizational transformation and strategic change	Entrepreneurial mindset and action.	Align strategies, structures, and processes; Take ownership of information to adapt to the environment; Make organizational changes.	New insights; Recognition of opportunities; Competitive positioning.	Organizational innovation; Organizational performance.
Exploitation	Structuring business processes	Scalability of the business model; Need to meet the interests of the large company; Need to share information between teams.	Create structured workflows and routines; Use methodologies and tools to improve the performance of work routines; Create a functional structure to support the processes.	Employees acting as an organized and efficient workforce; Production of value for customers and stakeholders; Adoption of structured and systematized procedures; Expansion of functional areas.	Organizational innovation; Organizational performance.
	Development of new products or services	Research and development plan; Contact with the innovation and technical teams of large companies.	Use the accelerator channels and infrastructure.	Modifications, customization, or personalization of products or services; Development of new specific products; Knowledge transfer.	Incremental product innovation.

Figure 6. **Process of transformation and exploitation of knowledge.**

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The knowledge acquisition process generates new ideas and discoveries that many times are beyond the search zone of a company and are neglected because the company cannot easily understand them. External knowledge is also specific, which often prevents outsiders from understanding or reproducing that knowledge (Zahra & George, 2002). Based on these assumptions, holding regular and systematic meetings, as well as effective communication between startups and large companies, promotes the assimilation of knowledge, allowing startups to process and internalize the knowledge generated externally.

Following the theoretical basis proposed by Zahra and George (2002), the transformation changes the character of knowledge through bi-association[1], which occurs when the company can recognize two incongruous sets of information and then combine them to arrive at a new scheme. This ability, which arises from the bi-association process, is evident in startups that relate to large companies, mainly due to the difference between the entrepreneurial and work performance forms, which become real challenges to obtain results when both sides work together. It is in commercial relations between large companies and startups that the source of new skills can be found. Likewise, new knowledge generates organizational transformation and reformulation of competitive strategy in startups, since the acceleration programs offer the possibility of connection and networking with the largest and most strategic players in the market.

The main emphasis of the exploitation dimension is on the routines that allow companies to explore knowledge, providing structural, systemic, and procedural mechanisms that allow companies to sustain the exploitation of that knowledge for long periods (Zahra & George, 2002). It was found in this research that the scalability of the business model of startups, together with the need to meet the interests of the large company, led startups to structure their processes, developing a professional, disciplined, and repeatable set of practices on business processes. For Zahra and George (2002), the results of systematic exploitation routines are the persistent creation of new goods, systems, processes, knowledge, or new organizational forms. In this context, the development of new products and/or services in startups were observed, even if modestly and incrementally.

DISCUSSION

How can a company that is starting its activities and building its business model create competitive advantages to survive in a dynamic business environment? Kaplan and Norton (2004) argue that the competitive advantage of a company arises from the creation of value for the customer and the exploitation and acquisition of existing resources, the same indicated by Zahra and George (2002) when presenting the dynamic concept of absorptive capacity. Considering this, this study seeks to understand how absorptive capacity occurs in startups that maintain interorganizational relationships with large companies.

The results show that the studied startups develop the capacity to absorb knowledge from a large company, especially the ability to acquire and assimilate knowledge (potential absorptive capacity). This corroborates the recent study by Müller, Buliga and Voigt (2020), which indicates that this capacity has a positive relationship in nascent companies, i.e., startups are active in the acquisition and assimilation of external knowledge. The very structure of the acceleration programs favors the acquisition of external knowledge since it is aimed at providing a network of mentors and personalized training to startups, in the same way that it encourages the internalization and dissemination of this knowledge (Cri□an et al., 2019; Lange & Johnston, 2020).

The transformation of knowledge for effective use in startups is directly related to the sustainability of commercial relations maintained with the large company and its customers and/or partners. The transition from potential to realized absorptive capacity materializes in the significant changes that startups have in their culture and business management, partly because they are in direct contact with the management models of large companies and experiencing their organizational culture. On the other hand, Müller et al. (2020) suggest that startups may want to focus on the development of business models centered on novelties, instead of doing more efficiently what has been done before by large organizations. Although startups may exhibit this behavior, they are also influenced by the corporate culture of large companies, which consider collaboration between organizations to be paramount, encouraging multifunctional thinking that promotes the acquisition of external knowledge (Müller, Buliga, & Voigt, 2020).

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The startups involved in the corporate acceleration programs have a strong tendency towards organizational innovation since new business management processes are incorporated into business practices, implementing new organizational methods to deal with the production of value for the customers and stakeholders involved. The Oslo Manual in its 4th edition (Organisation for Economic Co-operation and Development [OECD], 2018) explains that organizational innovation is contained in a type of business process innovation, related to administrative and management functions that include strategic and general business management and the management of external relationships, as well as alliances. Evidence has shown that startups benefit, in terms of innovation, when they carry out commercial interactions with other companies, obtain guidance, and share experiences and benefits from programs sponsored by large companies (Sudiana, Sule, Soemaryani, & Yunizar, 2020).

The analysis of the processes that make up the absorptive capacity of startups showed the relationship between the constructive capacity for absorption and management of business processes, in line with the studies by Srivardhana and Pawlowski (2007), Gutiérrez et al. (2012), and Manfreda et al. (2014). Startups inserted in corporate acceleration programs are led to develop specific organizational routines and processes that operationalize and enhance organizational learning, in the same way that the use of knowledge acquired externally, assimilated and transformed, provides startups with conditions for continuous improvement of business processes that are considered critical.

In the corporate acceleration programs, the ability of startups to create processes to identify and obtain knowledge from sources external to the acceleration program was not evidenced, i.e., in companies other than those that directly promote the acceleration program. However, they are skilled in developing useful processes and routines for analyzing, interpreting, understanding, and disseminating the knowledge acquired from the partner company. These skills are referenced in the work of Flatten et al. (2011), highlighting the flow of information and the effective communication of organizations.

As a result of this ability to process knowledge, startups can transform and apply it to improve their performance, i.e., to transform newly adapted knowledge and exploit it commercially, acquiring a competitive advantage (Flatten et al., 2011). Startups can develop new processes or change their existing ones to meet the needs of large companies or sustain existing commercial relations, appropriating the knowledge absorbed to maintain a competitive advantage in the market.

The business processes that arise in interorganizational relationships between large companies and startups are related to the information flows that are processed by companies in the acceleration programs. The geographical proximity provided by the programs facilitates the regular exchange of information face to face and allows collaboration in open innovation between startups and large companies (Moschner et al., 2019), in addition to the participants having the opportunity to learn from each other by participating in joint training or exchanging information informally over lunch or coffee at the accelerator facilities.

The management of these processes related to information flows, effectively and systematically, emerges in startups while they are being accelerated and has a positive and significant effect in the implementation and realization of absorptive capacity. In startups, organizational learning generates the way they carry out their activities, causing changes in routines and behaviors that were already established. In this context, the possible competitive advantages resulting from the absorptive capacity are realized in startups through strategic flexibility, organizational type innovation, and organizational performance, reflecting in the establishment of a certain formalization of their internal processes.

Thus, based on the results found, Figure 7 presents a process model that answers the research question presented in section 1 of this article and summarizes the study's contributions. It is worth mentioning that the process model was based on the study by Aribi and Dupouët (2016).

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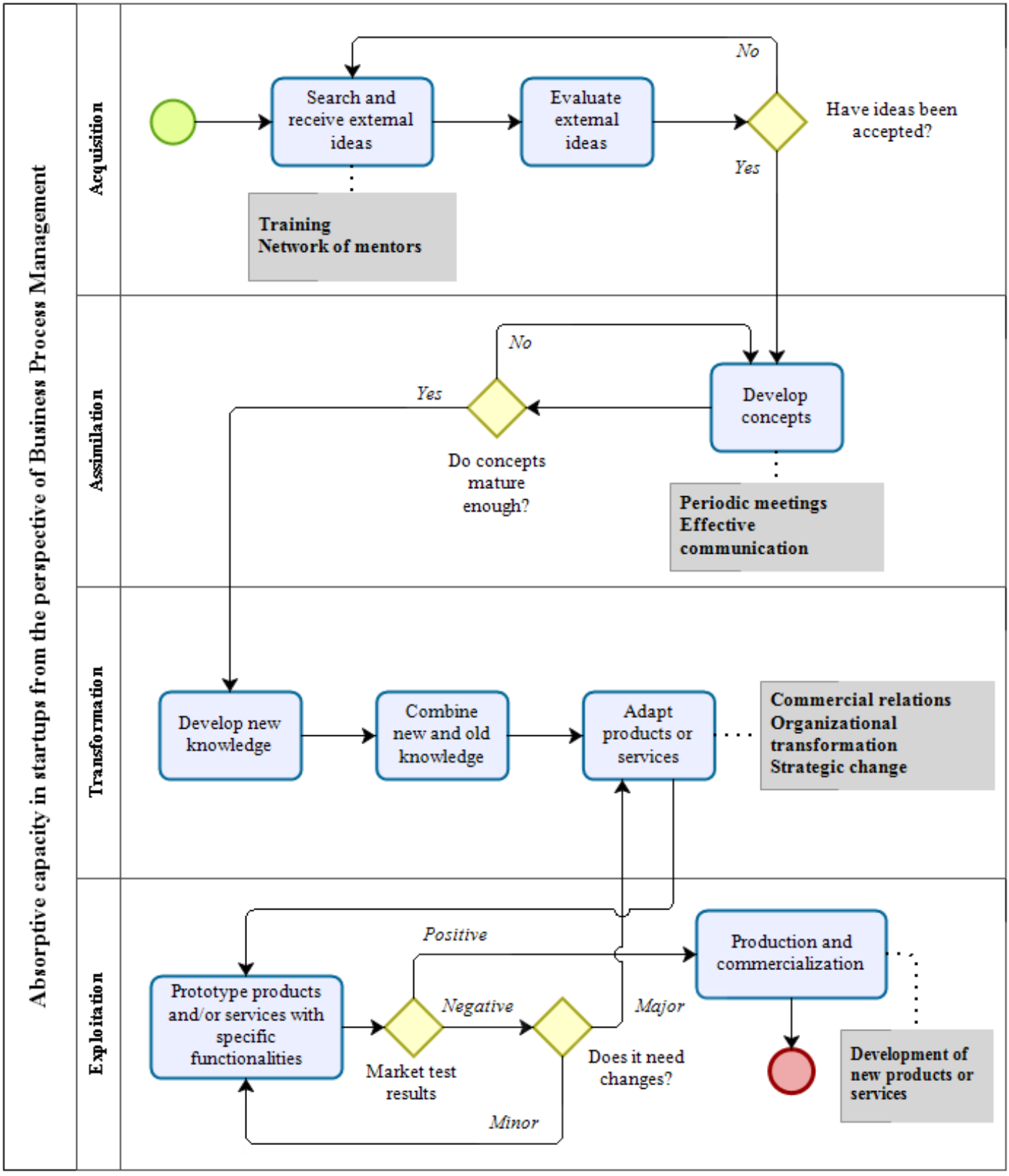

Figure 7. Absorptive capacity in startups from the perspective of business process management.

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CONCLUSIONS

This study provides an understanding of the implementation and realization of the business processes that constitute absorptive capacity in startups that relate to large companies through corporate acceleration programs. This allows for the advancement of knowledge in the area of absorptive capacities, especially because as it is still little known how effectively the dynamic concepts of absorptive capacity (Zahra & George, 2002) are implemented in companies (Aribi & Dupouët, 2016).

The training promoted by the corporate accelerators and the mentoring network made available by the large companies allow access to new ideas, which are later evaluated and accepted or not by the startups, which is part of the knowledge acquisition dimension. The assimilation of knowledge includes the development of concepts that possibly will be transformed into new knowledge. This stage is made operational by holding periodic meetings and effective communication between the members of the startups and those of the large company.

The transformation dimension is the modification of the technological and organizational knowledge base existing in startups, generating products and/or services adapted to the needs of the large company to sustain the existing commercial relations, as well as promoting organizational transformation and strategic changes in startups. Finally, the exploitation of the transformed knowledge base becomes new products and/or services that are introduced in the market, and this was not clearly observed in the cases studied. At most, there was some innovation in products and services that directly met the demand of the large partner company, but there was no exploitation of the competitive market from these developments. Thus, the interrelation with the large company in an accelerator allows the development of absorptive capacity, but it is not integral, being more limited in its final stages (transformation and exploitation).

This description meets the objective of the article, as it answers how the process of developing absorptive capacity by startups occurs and shows how the formal actions of the corporate acceleration programs of large companies contribute to this.

Therefore, it is concluded that the participation of startups in acceleration programs enhances the development of absorptive capacity of these nascent companies since it facilitates access and assimilation of knowledge, and consequent transformation of their base (structure, processes, and resources) to attend to the large partner company. However, it is worth noting that commercial exploitation does not directly benefit from the formal actions of the programs. Thus, for these programs studied, the development of potential absorptive capacity is more clearly observed than the realized absorption.

Finally, it is worth considering that the presented findings are of direct interest to nascent companies, which need to develop capacities to have a competitive business model, and can do so through partnerships with large companies. Not only startups benefit directly from the results of this work, but also large corporations that seek strategic alliances with companies that are starting their activities, and researchers interested in understanding the importance of interorganizational relationships to create competitive advantage.

RESEARCH LIMITATIONS AND FUTURE WORK

The limitations related to the present study involve, at first, the adoption of the case study as a qualitative method for field research, since the results obtained, even with a combination of multiple sources of evidence, cannot be generalized to other companies, restricting themselves to the analysis units chosen due to the specificities of the context.

Besides, this study was carried out at a time when startups were part of corporate acceleration programs, which favored the development of potential absorptive capacity. However, there was no monitoring of startups after the departure of the accelerators, intending to verify the most effective development of absorptive capacity carried out in the market and maintain the competitive advantages obtained. In this limitation, an opportunity for future work is perceived.

ENDNOTE

[1] Bi-association means joining unrelated, often conflicting, information in a new way (Koestler, 1966, quoted by Zahra & George, 2002).

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Cajuela, Alexandre; Galina, Simone (2020), "Data for "Processes in interorganizational relationships to develop absorptive capacity in startups" published by RAC - Revista de Administração Contemporânea", Mendeley Data, v1. http://dx.doi.org/10.17632/pdyvchky3c.1

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