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INNOVATIVE CAPABILITIES: A CASE STUDY OF A SUCCESSFUL COMPANY OF TECHNOLOGY-BASED OF BRAZIL

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ABSTRACT

Innovation is recognized as one of the main factors that positively impact the competitiveness and economic development of nations. Information that contributes to the understanding the process of generation, diffusion and incorporation of innovation by the productive apparatus, as well as institutional conditions that influence it, are of vital importance for the design, implementation and evaluation of public and private policies. The present study seeks to deepen the theme related to the capabilities required for innovation and knowledge generation through research, using the evolutionary trajectory of a technology-based company with a leading role in the health area in Brazil. As a theoretical subsidy, we used the referential of theories of economic development. The results highlight aspects related to the process of evolution and innovation of the company, with emphasis on the development of capabilities focused on innovation, the creation of organizational knowledge and market orientation.

Keywords: Innovation. Innovative capabilities. Technology-based company

1 INTRODUCTION

Innovation has been widely recognized as one of the main factors that positively impact the competitiveness and economic development of nations. Information that contributes to the understanding of its process of generation, diffusion and incorporation by the productive apparatus, as well as institutional conditions that influence it, are of vital importance for the design, implementation and evaluation of public policies and private strategies (IBGE, 2013).

According to the Oslo Manual (OECD, 2006), the implementation of a new (or significantly improved) product, good or service, or a process, or a new marketing method, or a new organizational method in business practices in the organization of the workplace or of the external relations is what is called innovation .

Innovation can be conceptualized as a continuous process of searching, discovering, experimenting, developing, imitating and adopting new products, new processes and new organizational forms (DOSI, 1988). Innovation is not a trivial task, since it is a complex and non-linear process, involving multiple interactions between economic agents (LEMOS, 1999). It is linked to changes in the organization, and it is affected by the organizational culture (PORTER, 1999).

The present study seeks to deepen the theme of innovation, producing information through the investigation and characterization of the evolutionary path of a technology-based Alfa company[1] with a focus on health.

It is impossible today to disassociate the increase of quality and decrease of human errors from investment in technology and management software: the greater the control of the indexes of hospitals, clinics and laboratories, the more doctors and health professionals can worry about what really matters: care and humanization of health. Meanwhile, it is up to health technology companies to provide systems that add value to this evolution (ALFA, 2016). It should be noted that the health market in Brazil grows on average 20% a year and the group of countries known as BRIC (Brazil, Russia, India and China) is expected to increase health spending over the next 10 years by 117%. According to the Brazilian Chamber

1For confidentiality reasons, the companies referred in this present article were denominated as alpha, beta, gamma and delta

of Laboratory Diagnostics (CBDL), the laboratory area grew 7% in diagnostic complementation services in the country (ALFA, 2016).

On the other hand, the technology sector already accounts for 5.3% of the economy of the State of Santa Catarina in Brazil. Of the total of 2.899 Santa Catarina companies operating in the technology sector with a high level of activity, 901 companies are located in Florianópolis (capital of Santa Catarina) and neighborhood (called Grande Florianópolis), accounting for 31%. In addition, 804 are located in the Itajaí Valley, which accounts for 28%.BThe two regions together holds 59% of the companies in this sector. Florianópolis is theBleader of the south region and the 4th pole of the country in terms of density of companies,Bwith 138 companies per 100.000 inhabitants, ahead of poles like São Paulo and Rio de Janeiro (ACATE, 2016).

As theoretical subsidy for the development of the analyzes, the economic development theories were used. Thus, the following research question was formulated: **how has the Alfa company articulated resources and developed capacities along its trajectory to foster innovation?** To answer this question a qualitative research was developed, through a single case study. The data were collected using the technique of semi-structured interviews in depth, documental analysis and direct observation, favoring the triangulation of the data collected. We suppose that the discussion of these issues can contribute to an understanding of the factors driving innovation in the context of technology-based companies within the health area.

2 THEORETICAL BACKGROUND

2.1 A technology-based company

A technology-based company (TBC) is an organization created from technologies developed primarily within the organization itself. This company can come from a university, a research center or a private company. Marcovitch (1986) denotes the importance of the creation of TBCs, since they create economic and social benefits such as: job creation and industrial development; expansion of advanced industrial sectors that are poorly developed; strengthens free enterprise by stimulating business competition and the market becomes more active with increased competition. However, some difficulties are encountered in the process of creating TBCs, ranging from obtaining financial resources, inputs and manpower, to management problems. These difficulties are classified into four barriers: financial, managerial, commercial and production barriers (FERRO; TORKO-MIAN, 1988).

The analyzes and deep understanding of the particular characteristics of the TBCs is necessary to allow the emergence and growth of them (SCHERER, 2006). Andino et al (2004) apud Scherer (2006) cite that TBCs differ from other types of companies because, when compared to large corporations, they use few personnel and produce products and services with high added value. Likewise, they tend to relate to universities and research centers, having a large proportion of highly qualified staff.

Technology-based companies can be characterized by their own product development, high R&D expenditures; existence of a formalized R&D department; high proportion of engineers or technicians; relationship with universities and / or research centers (FERNANDES, CÔRTES; PINHO, 2004). Baêta (1999) relates: (i) the presence of highly qualified researchers among their collaborators; (ii) technology is the most important factor in aggregating the value of the product or service; (iii) investment in R&D for innovation or the improvement of its products. In addition, according to Santos (1985), TBCs operate in several sectors such as information technology, biotechnology, robotics, fine chemicals, mechanics, aerospace, electronics, semiconductors, among others.

In the context of the emerging sectors, the companies of technological base stand out , where innovative activities are the core for the competitiveness in the market. The technology-based company is characterized by the intensive use of technological resources, being defined as the one that bases its productive activity on the development of new products or processes, and on the systematic application of scientific and technological knowledge and on the use of techniques considered advanced or pioneering (BAÊTA, 1999).

This concept emphasizes the use of technology as a basic input of the productive process of this type of company, where the management of information and knowledge are requirements for maintaining competitiveness. For this reason, they can also be called knowledge-intensive companies. Emerging technology-based companies, focusing on knowledge-based innovation, add peculiarities that maximize business complexity and risk, requiring greater managerial and strategic proficiency (DRUCKER, 1986).

2.2 Innovation

Since the beginning of the twentieth century the theme has been the object of study and has its origin in the theory of economic development elaborated by Schumpeter. He conceptualized invention and innovation as: an invention is an idea, outline or model for a new or improved artifact, product, process or system. An innovation in the economic sense is only complete when there is a commercial transaction involving an invention and thus generating wealth (Schumpeter, 1988).

Thus, for Schumpeter (1988), innovation is essentially economic, translating originalBand impactful changes, such as: (i) introduction of a new product in the market; (ii)introduction of a new production method; (iii) opening up of a new market not previouslyBassociated with a particular branch of industry; (iv) achievement of a new source of supply of raw material or semi-finished products; and (v) creating a new way of organizing production in industry. The core of Schumpeter's work is constituted by an original vision of the capitalist economic dynamics, in which the rupture of established routines and the transformation of existing structures assume a prominent role. He sees capitalist development as a process of change, driven by innovations, which in turn result from the initiatives of economic agents that impact economic activity (LAPLANE, 1997).

Innovation triggers a process of destruction of existing economic structures and creation of new structures. To innovate we must go beyond the satisfaction of needs. Capitalist development is thus marked by ruptures, imbalances and discontinuities. Innovation is therefore the ultimate cause of instability in capitalist economies (LAPLANE, 1997; SCHUMPETER, 1989).

Other contemporary concepts have been coined, notably the contribution of neo-Shumpeterian economists, who in the last decades of the twentieth century have re-read Schumpeter's original assumptions. Among them, Dosi (1988) defines innovation as a continuous process of searching, discovering, experimenting, developing, imitating and adopting new products, new processes and new organizational forms.

According to the Oslo Manual (OECD, 2006), the implementation of a product, good or service, is either new or significantly improved, or a process, or a new marketing method, or a new organizational method in business practices in the organization of the workplace or in external relations is what is called Innovation.

From the concepts of innovation developed by numerous authors, Lemos (1999) highlights the following characteristics of innovation: a) it is not something unprecedented only, nor does it result only from scientific research, and can also be emanated from the market itself; b) not only refers to technology, but also includes organizational changes, in the

forms of organization and management of production; c) is a discontinuous and irregular process, occurring through outbreaks that, in the neo-Schumpterian view, are related to the process of economic growth; d) it affects the sectors of economic activity differently, since the result depends on the individual or sector capacity to learn and transform learning into a competitive factor; e) it includes a high degree of uncertainty, since the results will only be known a posteriori; f) is cumulative, insofar as it results from the accumulation of previously generated knowledge, which is constantly changing and improving; g) is an interactive process, presupposing cooperation, because a company does not innovate alone. Sources of information can be located both inside and outside the company; h) is a complex and non-linear process, involving multiple interactions among economic agents; I) is an endogenous process, and is not readily available and transferable to any agent, since it involves a high degree of tacit knowledge.

In the view of Prahalad and Hamel (1990), more than a portfolio of businesses, the corporation is understood as a portfolio of competencies. Thus, to increase competitive advantage, core competences - the activities whose value generation is greater than the competition - are internally maintained, invested and exploited while the other activities are outsourced or placed in the background. The resulting verticalization of activities associated with competencies integrates the latest in the value chain creating a strategic architecture that emphasizes the preservation and development of existing competencies as well as the formation of new competencies.

The development of the concept of innovation system has been the work of economists and other scholars of technological advancement who adhere to the evolutionary theory of economic growth. Since its conception, this theory has been contemplated by institutional analysis. While the neoclassical theory of economic growth assigns a central role to technological advancement, it is totally inadequate in its treatment by ignoring the fact that efforts in technological development are often blind (NELSON; NELSON, 2002).

According to authors Cassiolato and Lastres (2005), the innovation system is conceptualized as a set of distinct institutions that contribute to the development of the capacity for innovation and learning in a country, region, sector or locality - and also affect it. They are elements and relationships that interact in the production, diffusion and use of knowledge. The basic idea of the concept of innovation systems is that innovative performance depends not only on the performance of companies and organizations of education and research, but also on how they interact with each other and with various other actors, and how institutions - including policies - affect the development of systems. It is understood, therefore, that the innovation processes that occur within the company are generally generated and sustained by their relations with other companies and organizations, that is, innovation consists of a systemic and interactive phenomenon, characterized by different types of cooperation.

2.3 Technological trajectory and technological paradigm

The evolutionary current, as advocated by Nelson and Winter, argues that just as Darwinian theory evolves through genetic mutations subjected to environmental selection, economic changes have their origin in the incessant quest to introduce innovations in processes and products by firms operating in the competitive market. These authors conceive two alternative concepts for the rationality and the balance of the neoclassical perspective: the search and the selection (AREND, 2009).

This is precisely the merit of this chain, because it focuses on the competitive dynamics of the industry and focuses on the structure / strategy interaction under the

command of the process of generation and diffusion of innovations. On the other hand, it does not offer theoretical elements about the market structures and the structures of the natural trajectory of the technologies (POSSAS, 1989).

It is in this context that, according to Arend (2009), emerges the neo-schumpeterian current led by Dosi. These authors conceive that market structure is fed by innovations, technological opportunities, degrees of appropriability and is dependent on the cumulativeness and nature of the knowledge base. That is, the structure should not be considered an exogenous variable. When market structures are characterized by these elements, the asymmetries tend to be formed and, consequently, there will be concentration. The evolutionist and neo-Schumpeterian approach offer very promising perspectives for development theories. In particular, the neo-schumpeterian current emerges as one of the most consistent ways of understanding the capitalist dynamics (POSSAS, 1989).

From the concept of scientific paradigm, Dosi (1988) proposes the concept of technological paradigm, which represents a selective heuristic or a set of prescriptions, which define the directions of the technological changes to be followed and those to be neglected. It is defined as a "standard" solution for selected techno-economic problems. Based on highly selected principles derived from the natural sciences, along with specific rules that seek to acquire new knowledge (lots of characteristics of various commodities) and safeguard it, where possible, from the rapid diffusion to competitors. Each technological paradigm involves a technology of specific technological change (DOSI, 1998).

The evolution of a trajectory can be understood by the ability and technological capacity of organizations to find new opportunities for innovations, to develop and implement them in their respective activities. The number of opportunities to be exploited in an industry is one of the key factors in differentiating an economy's sectors from the pace of innovation. Technology opportunities reflect the likelihood of innovation for any amount of money invested in research. Great opportunities offer strong incentives to undertake innovative activities and denote an economic environment that is not functionally constrained by scarcity. The concepts of paradigms and technological trajectories, when associated to the interaction between learning and routines, show how the evolutionary process of firms occurs.

It is necessary to consider that the process that generates the innovations is complex, because it depends intrinsically of elements related to the knowledge that must translate into new products and processes, inserted in an environment that characterizes by mechanisms of feedback and interactions involving science, technology, learning, Production, politics and demand (EDQUIST, 1997). It should be noted that even though most innovations happen within innovative companies, other institutions such as universities, governmental laboratories, government agencies of coordination and financing play a fundamental role in the process of creating new technologies (NIOSI et al, 1992). The learning takes place inside the firm, allowing the solution of technical problems and their improvement; It results from the firm's interaction with consumers and suppliers.

Edquist (2001) systematized some types of learning: learning-by-doing, leaning-by-operating, learning-by-changing, learning-by-training, 2001); learning-by-using, learning-by-interacting, learning from advances in science and technology, learning from inter-industry spillover (MALERBA *apud* EDQUIST, 2001); individual, organizational and institutional learning (EDQUIST, 2001); among others. The lesser or greater importance of each type of learning will depend on how they are combined by the organization, referring to the internal or external or interactive dimension of the company's performance.

Technological change: it is the center of analysis of the neo-Schumpeterian approach. Technological change is not reduced to another effort to describe and study the diffusion

process of innovations and their sectorial and macroeconomic impacts, but to contribute with a new theoretical reference, Centered on the innovative dimension of the capitalist competition process, to think the industrial dynamics (POSSAS, 1988).

Companies that find the best options have expanded more, this leads to a constant economic imbalance - search and selection - the company seeks competitive advantage and for this it is important to break with the old and seek the new. For the neo-Schumpeterians, the essential is the search for imbalances, by asymmetries (POSSAS, 1989).

The company, through a standard technological paradigm, establishes a technological trajectory to improve a certain technology, through the perception of the external environment, observing opportunities, seeking the most advantageous types in the technological frontier, and being able to increase its market share (AREND, 2009) .

There is no element that guarantees the market mechanisms an adequate selection as to which direction should be followed. Thus the firm is organizing itself according to the need / opportunities of the market. To solve problems, it leaves the routine, changing it and evolving the technique, building process innovations, which consequently improves the search for new opportunities. Thus, competitive advantage is rooted in high performance routines and learning processes -conditioned by their historical trajectory (POSSAS, 1989).

In conceiving the company as a production and learning institution, the institutionalist-evolutionary approach has advanced in understanding the causes and effects of its performance as an agent of innovation. In this approach, the company is characterized as the central agent of innovation, playing a fundamental role in the economic dynamics of different capitalist economies. For this reason, it has been considered the unit of analysis for the understanding of the process of transformation, which is constantly underway (PEREIRA; DATHEIN, 2012). The learning process is derived from a context that encompasses the mechanisms of production and transmission of knowledge in the learning economy, treating the development of competences and capacities, by individuals and organizations, as a fundamental process in the search of problem solving (JOHNSON, LUNDVALL *apud* LEMOS, 2013). Because it is fundamental to solve problems, the learning process is even more valued by business institutions, since tacit knowledge has become an increasingly competitive differentiator of companies that innovate (PEREIRA; DATHEIN, 2012).

Cohen and Levinthal (1990) emphasize the existence of a double face of the process of research and development - innovation and learning. The stock of knowledge of a company is a function of its investment in R & D and its capacity to absorb existing knowledge (and that can be absorbed, according to the rate of overflow) in its market and in ther markets, and institutions extramarket . The innovative capacity of a company is also a function of its ability to recognize, assimilate and apply this new information external to it. Thus companies invest in R & D for the direct production of innovations and also to maintain and develop greater capacity to identify, apprehend and exploit available external knowledge. This absorption capacity depends on its accumulated prior knowledge, and is therefore path-dependent. In addition, it is also understood to be dependent on a specific effort of the companies when the knowledge to be acquired is not directly related to their current activity and, in this case, is not merely a by-product of their R & D activities. In this way, companies expand their knowledge stock with greater capacity for absorption (which is a type of learning), expanding their competence to generate innovations.

In terms of resources, the great differential is related to people, through an adequate management of intellectual capital that enables the constant improvement of organizational skills. There is controversy surrounding the work relations model and manager profile that will prevail in organizations in the future, but functional integration seems to be a common

point in all approaches. One of them defines learning organizations as those capable of creating, acquiring and transferring knowledge and modifying their behaviors to reflect these new insights and insights (GARVIN, 1993, apud FLEURY, 2002).

2.4 Dynamic capabilities

The dynamic capabilities approach has examined how firms identify and develop new opportunities, how they coordinate their assets, and how they develop new business models and new forms of governance to exploit them and remain competitive (TEECE, 1994; TEECE et al., 1997). Dynamic capabilities are organizational skills that capture changing customer needs, technological opportunities and changes in competition, and adapt the organization to environmental changes in a timely and efficient manner, as well as redesign and reconfigure the organizational environment. In analytical terms they can be disaggregated in the ability to: a) feel and create opportunities and threats; b) to take advantage of opportunities and; (c) to maintain competitiveness through improvement, combination, protection and, where necessary, reconfiguration of a firm's tangible and intangible assets (TEECE, 2007).

According to Teece (1997), while operational capacity is associated with production or marketing routines and results in technical aptitude (efficiency); dynamic capacity allows to reconfigure, build and integrate operational capabilities and result in evolutionary aptitude (innovation), allowing the organization to change the way it competes in the market by modifying its resource base (including the ordinary capacities) or of characteristics of the own competitive atmosphere competitive environment. Dynamic capabilities are difficult to develop and to be transferred to other countries because of their tacit character and because they are embedded in unique relationship groups and stories. For the development of dynamic capabilities, the ability to integrate and combine assets, such as knowledge, is critical. knowledge creation, sharing and integration procedures are critical to firm performance and a key microfoundation for dynamic capabilities (TEECE,2007).

An important dynamic capability of the organization is its ability to absorb knowledge, that is, the absorptive capacity. Cohen and Levinthal (1990), seminal authors on this topic, describe that firms must invest in the absorptive capacity to recognize the value of new, external information, to assimilate it, and to apply it for commercial purposes. Authors have defined it as the ability to identify, assimilate, and exploit knowledge to foster innovation and performance that allow competitive advantage in their markets. This occurs at both the individual and organizational levels. Thus, the ability to exploit external knowledge is considered a critical point of innovation capabilities. This capacity is closely linked to the previous level of knowledge about the topic explored, that a company has. On the basis of this knowledge are the use of a common language and knowledge of the recent technological and scientific advances of the area. This a priori knowledge, collectively constitutes the absorption capacity of a company and allows it to recognize the value of new information, assimilate it and apply it for commercial purposes.

The capacity for innovation can be driven by research and development efforts, from the technological opportunities, interdependence of competitors and capacity of appropriation of technology. Cohen and Levinthal (1990) pioneered the importance of absorptive capacity in learning and innovation processes.

Powell, Koput, and Smith-Doerr (1996) point out that when knowledge is widely distributed and competitive advantage, the place of innovation is found in networks of interorganizational relationships and that learning occurs in the context of the members of a communnity. Several authors note that the creative process is directly related to previous

knowledge about a subject. This accumulation of knowledge allows us to generate associations and connections in order to feed the discovery process (ELLIS, 1965).

It should be noted that the process of absorption of the corporate collective depends on the absorption capacity of its individuals. However, collective absorptive capacity is not the sum of individuals' ability. It depends on the company's abilities to exploit knowledge. In this way, the absorption process is not only done through external interfaces, with other companies and institutions, but also with the flow and absorption of information through the internal interfaces between the company's sectors.

At this point, one must consider the importance of the agents that are in the internal and external interfaces. There may be some centralization in some individuals or a distributed view of these agents may be adopted. When there is a very large difference or diversity of knowledge among the company's individuals, related to the absorption theme, it may be more interesting to centralize the interfaces in guardian agents. Many authors point out, however, that the absorption capacity of a group is more effective in absorbing knowledge. It should also be noted that overlapping "expertise" and absorption functions allow redundancy in the process. The acquisition of expertise in the same areas of activity is favored and the absorption capacity is amplified. While absorption capacity involves the need to acquire knowledge of the external environment, it also focuses on internal learning processes from past experience and current actions (EASTERBY-SMITH et al, 2008).

The company will be able to develop dynamic capabilities: if you have sufficient resources, superior information, talent and capital, including relationship capital, along with the ability to orchestrate these capabilities and have a good strategy. The company will have to rely on entrepreneurial managers who are not only resource allocators but who perceive, design and exploit opportunities (MARTIGNAGO, 2014).

3. METHODOLOGY

The present study ranks from the point of view of approaching the problem as qualitative, using the methodology of the single case study, since this technique allows the grouping of an expressive number of data (YIN, 2005). From the point of view of the way of approaching the objectives, it is characterized as descriptive.

The case study can be defined as a research strategy that is characterized by studying the phenomena as a dynamic process, within its real context, using several sources of evidence, with the objective of explaining the phenomenon observed globally and having all its complexity (IN, 2005).

Case selection was non-random, intentional, and accessible (EISENHARDT, 1989). In the first place, the case is, as Yin (2005) points out, a critical case to study the categories thatBseek to analyze, that is, the perception about the innovation processes and strategies developed in a technology-based company. The choice of the case under study is justified since the Alfa Company, operating in the market for 14 years, has been standing out as a national reference company in the field of developing technology solutions for the health area.

Three main techniques were used to collect the data: direct observation, documentary analysis and semi-structured interviews. As for the level of analysis, it focused on the strategic level of the company, as well as related to the object of this research, innovation. The subjects of this research are the Director of Services, Research and Development; the New Business Director, who is also the owner and founder of the company; and the New Business Board Advisor.

The documentary analysis involved the reading and analysis of documents available by the company, which discusses the history and context of the company. In addition,

technical and journalistics articles about the company were read and analyzed, which are available on the company's own website and on the Internet.

The type of interview used in the research corresponds to the qualitative interview based on a script, in the sense of Godoi and Mattos (2006). In addition to the script with guiding topics, it was flexible to formulate questions and to approach themes that arose from of the reflections with the interviewees. The interview script was based on questions resulting from the revised theoretical background. The interviews, carried out in November 2017, were recorded for a total of 4 hours and 30 minutes of recording, and were later transcribed for analysis, and the interviewees were aware of the procedure.

The information collected in the interviews refers to the following aspects: a) history of the evolution of the company: b) dynamics of the innovation process; c) method of defining the organizational strategy; c) intervention of intra and interorganizational factors in the innovation process; e) information about the sector of activity of the company; (f) main obstacles to innovation; g) main innovations of the company; h) challenges and opportunities for innovation; i) in differences of the company; among others.

Afterwards, the data were structured and grouped into categories, defined based on the theoretical framework of the study that guided the data collection process, and re-evaluated in the light of the results obtained. The resulting categories were: a) Characteristics of the company; b) Sources of financing; c) Impact of innovations on company performance; d) Organizational and marketing innovations; e) Internal R & D activities; f) Sources of information used / absorptive capacity; g) Main obstacles to innovation; h) Training of personnel; i) Established cooperative arrangements; j) Regulatory framework; k)Differentials; l) Forms of learning; m) Concept of innovation; n) Main challenges / obstacles to innovation; o) Leadership.

4 ANALYSIS OF RESULTS

4.1 Company characterization

The Alfa company was founded in 2003 in Florianópolis, with the initiative of two partners, who worked in an improvised way in an apartment, with the objective of developing solutions that facilitate the processes of medical diagnosis by image. In the same year, after six months, the company underwent the incubation process of MIDI Tecnológico, in the period of two years and won the first customer in 2004.

"The incubation materialized and formalized the company," says founding partner A. The incubator was also important to change the proposal of Alfa. "The marketing consultant made us aware of the importance of the company's identity, its values, its position and how it should be exposed. We arrived at the market with the attitude of a more experienced company, which surprised the customers positively ", evaluates the founding partner. "The commercial adviser has changed the focus of the company. We planned to work with small, inexpensive products, but the consultant showed that we had the potential to develop large, expensive solutions", adds founding partner.

Before even completing the minimum incubation period the company decided to graduate. That was when the time of greatest difficulty in Alfa's trajectory came, generated by a planning error that led the company to debt. "We acknowledge our mistake, breathe deeply and move on," says partner A. The recovery came in 2006, when Alfa won customers who breathed new life into the business. After a troubled phase, 2007 was the great year of the company. From 2006 to 2007, Alfa's revenues grew more than 250%, jumping from US$ 173.000 to US$439.000.

Over the years, Alfa has been perfecting its PACS solutions (picture archiving and communication system), a technology that enables the management and processing of medical images in a totally digital way, bringing lower costs and efficiency gains to hospitals and diagnostic clinics. In 2010 the company installed the first PACS base in Argentina and in 2011 receives the financial contribution of the investment fund Intel Capital. In 2012 the company announces the merger with Beta company, based in São Paulo, with solutions focused on RIS (radiology information system) and LIS (laboratory information system). In 2013 the company receives another financial contribution of US$ 15.674.000 from the Riverwood Capital investment fund, with the proposal to diversify the use of these resources in new product development, improvement of the commercial team and acquisitions of new companies.

In August 2014, Alfa company purchased the Gamma company from Santa Catarina, specialized exclusively in the development of laboratory equipment interfaces (LIS). Four months after the company announces another acquisition, the Delta company, headquartered in Salvador (BA) and second largest national provider in HIS (Hospital Information System) and solutions of Electronic Records, Clinical Management and Laboratories. Recently the company received an MPME Innovative credit line (financing of up to US$ 6.270.000 for innovation projects carried out by micro, small and medium enterprises, of BNDES, created in partnership with the Brazilian Association of Software Companies (ABES).

Alfa company has units in Brazil (Santa catarina, São Paulo, Minas Gerais e Bahia) and Argentina. The CEO of the company operates in the São Paulo unit, and in the Florianópolis unit the company's development center is concentrated. The directories are distributed as follows: Santa Catarina - New Business Directorate and Services and R & D Directorate; São Paulo - Marketing Director, Organizational Development Directorate, President (CEO), Commercial Directorate and Deliverables and Administrative and Financial Directorate; Bahia - Design of New Products.

It is currently composed of 400 employees, serving 2.000 institutions in Brazil and Argentina, with projected revenues for 2017 of US$ 31.348.000, an amount that represents growth of 295% when compared to the results of 2014. The company's goal is to become the largest brazilian company af software for health until 2019, for that, in 2016 the company bet on the unification of the brand, in this way Beta and Delta companies are recognized as Alfa company. The company's goal is to cover the entire healthcare chain - patients, clinics, doctors and hospitals - with collaboration and management tools This position is tied to its portfolio strategy as a "one stop shop software provider" offering a complete line of healthcare technology products with solutions for hospitals, laboratories, imaging centers and clinics.

The long-term sustainable vision has made Alfa company double in size between 2013 and 2015. The growth presented is also a result of acquisitions. Pixeon has acquired Gamma company, specialized in interfacing laboratory equipment, and Delta company, a national reference in HIS (Hospital Information System) and solutions of Electronic Records, Clinical and Laboratory Management, and Delta company, a software developer for diagnostic medicine, the largest installed base of software in health care providers in Latin America.

The upward trajectory intensified after the company received contributions from the international funds Riverwood Capital and Intel Capital, which invest in companies focused on the search for technological innovations, as well as internal development agencies. Overall, the quality of Alfa products is also highlighted. KLAS, an institute that ranks the best global healthcare technology providers - awarded PACS Aurora, the company's solution for diagnostic imaging centers, the best evaluation among all PACS available in Latin America.

This international recognition reflects the company's commitment to the quality of delivery to its customers.

In view of the high competitiveness in the market and the strategy to expand its solutions to Brazil and Latin America, Alfa has eight sales channels that represent the company and maintain the same standard of quality and efficiency, both in the implementation process and in the Customer service. As internal actions aimed at fostering innovation, developed by the company alpha, stands out:

Training Center - The Training Center is an organizational development project created to disseminate technical knowledge to employees and sales channels, combining the company's strategic objectives with individual goals. In this EAD platform, the target audience can enhance their knowledge of a new product that Pixeon is launching, for example, so the person (s) involved in the launch are facilitators explaining to people the details Of the new product. Harvesting feedback from users, the core is improving as the company develops.

I**nnovation Center** - The core purpose of the Center is to cultivate "innovation", the company's key value, in all areas. In this context, the Center proposes that innovation can be widely practiced by any collaborator of the company, and not only by the product development sector. Another major objective is to permeate the core competency of the company that is "systemic vision", so that each employee can improve a process or tool of his or her department or others, demonstrating a broad understanding of the company's processes and impacts that changes can promote . Any employee can submit their idea when the process is open, so the suggestion will go through a group in which it will evaluate among the main factors, if the idea submitted presents at least one indicator, being cost improvement, revenue generation or reduction of time as well as the cost to implement the idea and an established term parameter. Once the idea is accepted and implemented, the employee/ group will receive an award.

Magazine - The internal magazine of the company is the responsibility of the area of organizational development, and with it the employees can find out about what is happening inside and outside the company. The magazine discusses events that Pixeon participated or participated in, travel tips, course suggestions, news in the healthcare market among other subjects that are interesting for employees. The periodicity of the magazine is monthly available digitally and physically.

4.2 Analysis and discussion of data

The present study sought to investigate and characterize the evolutionary path of the Alfa company and to deepen the theme of innovation producing information on aspects such as spending on innovative activities; sources of funding for these expenditures; impact of innovations on company performance; sources of information used; established cooperative arrangements; role of government incentives; obstacles encountered in innovation activities; organizational and marketing innovations; among others.

In order to present the results, some categories of analysis will be used, as follows:

a) General characteristics - Alfa is a Santa Catarina company, from medium to large, which has experienced since its inception a vertiginous process of growth and capitalization. The initial embryo of the company, the dream of two entrepreneurs, was focused on the production of small added value products. In the initial phase of the company can be highlighted some factors that were decisive for its success: the insertion in an incubator; Consultant advice, which suggested that entrepreneurs think "big", in products with higher added value, due to, among others, the level of technological knowledge held by the company at that time; and the fact that the company has maintained itself over time in the same

segment, the technology solutions for the health area. These factors contributed to the company's technological trajectory and its technological paradigm, and to develop expertise in the field in order to truly innovate. The management team is distributed in different units of the company, which means that each unit ends up specializing in a certain area. Santa Catarina, for example, concentrates R & D and New Business activities.

b) Sources of financing - the company obtained funds through development grants (CNPQ, FINEP, BNDS, BRDE), as well as foereing capital contributions. This financial "ballast" has made possible the priority investment in processes of innovation, generation of knowledge and development of "national" technological solutions. However, the analyzes revealed that there is a need for greater government support for innovation promotion, especially for small and medium technology companies.

c) Impact of innovations on the company's performance - the quest for excellence in its trajectory and the delivery of high quality solutions to the market, has contributed to the level of attractiveness of the company. Thus, in addition to external financing, the merger and acquisition of companies has moved the company in recent years, leading to a growing expansion from the point of view of geography, personnel and products developed.

d) Organizational and marketing innovations - innovations in these areas have contributed to the consolidation of the company, repositioning of products and insertion in the national and foreign markets. The company has already started a process of internationalization, nowadays in Argentina, and has as one of the strategic objectives, to expand its insertion in Latin America. The recent certification of an international body, KLAS, which ranks the world's best providers of health technology, contributes to this insertion in the global marketplace. Although there are other international competitors in the same area of the company, its technological and entrepreneurial competence has allowed the insertion in other markets, where it is possible to envisage in the future, the participation in global chain of specific value. The analyzes showed that the company has a managerial and strategic proficiency, supported by a structured planning process.

e) Internal R&D activities - the company has more than 100 professionals in its field of technological development. The R&D area is the heart of the company and comprises creative work undertaken systematically to increase the pool of knowledge and the use of this knowledge to develop new applications, new or substantially improved products or processes. It involves the design, prototyping, testing, adjustments and delivery of the solution.

f) Sources of information used / absorptive capacity - in relation to the strategy of absorption of external knowledge / models of other companies, do not do it directly, because it is a segment that involves a lot of secrecy. However, they constantly monitor the market and information that is accessible, participate in national and international events / technical visits, and participate in specific organs in the health area, as a way of absorbing new knowledge that can be incorporated into the company. The company has already partnered with universities in the area of applied research, but with the expansion period, did not continue this strategy. In 2016 formalized a partnership agreement with a technological institution, to develop projects in the area of technology. They carry out the monitoring of health startups, in order to evaluate the possibility of joint projects. It should be noted that in the acquisition process, other companies' solutions were incorporated, and with this the incorporation of knowledge and innovations occurred. Each acquisition is a process that involves cultural issues, organizational structures, knowledge and technologies. This is a challenging but rewarding process, and the company gradually acquires know-how in this area.

g) Main obstacles to innovation - bureaucratic regulatory frameworks, especially in the health area; the crisis period; cost high Brazil; reduction of beds taken care of by health

plans; the challenge of developing and implementing the strategic plan; professionals specialized in the area of technology, because the training of labor in Brazil lags behind the demand for technology. There is also a new generation Y culture, where you have to understand it in order to attract and retain these people in the company.

h) Training and staff development - Alfa by nature is a training company, where technical leaders - more senior people, foster learning. The IT professional is a little self-taught, and the company sees more productivity in giving a space for this development than sending for training, that is, creating a supportive environment for learning and giving opportunities. Due to the nature of the processes developed, the R&D activities are continuous. The company has an Organizational Development Board that organizes training processes.

i) Established cooperative arrangements - the Alfa company participates in ACATE (Catarinense Association of Technology Companies), FIESC (Federation of Industries of the State of Santa Catarina), UFSC (Federal University of Santa Catarina), Brazilian Society of Health Informatics (SBIS). Participation in these spaces allows the exchange, union forces to achieve common goals, either before the government or other bodies, in order to contribute to the performance of the company.

j) Regulatory framework - most of the rules and regulations are governed by the ANVISA (National Health Surveillance Agency), which is a bureaucratic body and, in some situations, is unaware of the technical variables that involve a certain technological solution. To circumvent this situation the company is seeking to make sure with an American body, so that it can better understand international regulatory milestones and access other markets.

k) Differentials - a genuinely national company that delivers solutions that compete with international; ability to innovate and bring new solutions; on stop solution in health, which makes the client find in a single company a solution that takes care of all the processes, in an integrated way; capillarity in the country; strategic plan; focus on customer satisfaction.

l) Forms of learning (learning by doing, by searching, by source, ..) - the interviewees understand that in practice what happens is a mix of everything. In the new products are using the methodology of design thinking, as an approach, consideration is given to the ability to combine empathy in a context of a problem so as to put people at the center of a project's development; creativity to generate solutions and reason to analyze and adapt solutions to the context.

m) Concept of innovation - innovation is an ongoing process - existing products are the subject of constant research for technological evolution, of new functionalities. The main "input" of the company and for innovation is the human factor. "Many companies end up coming in a comfort zone because no one charges her for more. The charge makes you leave the comfort zone and get more and different, and seek innovation, new markets, new products, new customers ... today businessmen should look at innovation as they reinvent their business ... The biggest innovations of Pixeon were not technological, we had a good technology, not the best, but always looked very much the business model, the offer, small details, how to sell and to relate to the market, ... We were born with a very clear because that is to make a health technology company to improve people's lives. That's because we can not forget. To seek excellence, but with great success for our clients "(full speech by one of the interviewees). It was evident in the analyzes that the company understands that to innovate it is necessary to go beyond the satisfaction of the needs,

n) Main challenges / obstacles to innovation - "...it is a culture that has to be created in the company, you have a driving force that you have to break through, a barrier. One of the pillars that driven the growth of the company is always innovating. You can not stay in the

same. To foster internally, to give space and environment for people to innovate, to think of solutions, the issue of innovation is absorbed by others, innovation is not to think about NASA's project, innovation is to change a process, improve a flow, create a small trigger, a Simple mechanism of communication with the client, all these are actions that we try to preach and disseminate in the company, the direction of the company has to be the guardian of this, to foment, ... to be in tune with what the market yearns and to think that it has Improving, looking for bottlenecks and optimizing. "(Full speech by one of the interviewees).

o) Challenges - "In strategic planning we will not leave the medical area, but we are walking, and our vision is to reach the patient. Today we manage the patient's data, but have no contact with him. We want to start somehow to also include it in our value chain. The second is we can really impact on the patient's life. A platform we call a patient center. What do we achieve the stakeholders that will act in the life of that patient, whether doctors are nutritionists, radiologists, can interact with that patient in a more facilitated way, and we want to empower the patient and also he is able to perform things positive in his health "(speech of one of the interviewees).

p) Leadership - according to the analyzes, formal leaders play a fundamental role in the evolutionary and innovative process of the company, as well as in the development of a culture conducive to learning. In the interviews carried out, it is noticeable the attachment to the company, the "brilliance in the eyes, the will to innovate and grow, maintaining and disseminating the values and culture of the company. The fact that the directories are located in the different units of the company, contributes to the strategic vision of the company is present in all units. Although distant geographically, the company has mechanisms for integrating and aligning formal leaders.

5 FINAL CONSIDERATIONS

The objective of this study was to analyze the capabilities required for innovation in information technology companies, identifying characteristics regarding the type of innovation and how resources are articulated to develop strategic structuring capacities. Therefore, evidence was sought in a case study carried out in the Alfa company, which operates in the health segment, since 2003.

The analyzes made possible to realize that Alpha has reinvented itself along its trajectory and prospected new scenarios, in a process of constant evolution. In this way innovation and the human factor have an essential character. This posture makes the company not be hostage to path dependency and lock-in situations. Its technological and strategic trajectories have determined the processes of learning and innovation.

Considering that one of the great problems of the Brazil is the development of its own technology in different areas, in order to produce products and solutions with greater added value, it is rewarding to look at the evolutionary trajectory of the Alpha company and discover the strategies outlined, as well as the dynamic capabilities that have supported this process. In this sense, we highlight the ability to create knowledge, technological capacity and capacity to market orientation. The analyzes showed that the company has a managerial and strategic proficiency, supported by a structured planning process. And behind all this scenario, the formal leaderships were and are preponderant.

Finally, it should be stressed that reflection on the integration between the productive system and universities, research and innovation institutions is fundamental to the virtuosity of the innovation system and to the improvement of learning and innovation capacities. The macroprocesses concerning the education and training of individuals, in a broader perspective, aimed at consolidating a culture of learning deserve special attention.

The limitations of the research are inherent to the investigation of a single case. The conclusions obtained allow the analysis of a situation within the analyzed context, but should not be extended or generalized to other organizations. It is believed that this study could instigate future research on innovation capabilities in the context of information technology companies. It is from this perspective that the research that resulted in this article is inserted. It proposes to contribute to empirical studies on innovation and strategic capabilities.

As a possibility of future research, it is related to the continuity of this research, in similar organizational contexts, that integrate the context of technology-based companies in the health area. Another research perspective refers to the deepening of the analyzes carried out in the company itself, either by broadening the subjects of the research, or by selecting some themes that are transversal to innovation, for the elaboration of in-depth research.

REFERENCES

ACATE. **ACATE Tech Report 2015**: Panorama de Inovação e Tecnologia de SC. Florianópolis: ACATE.

ALFA, **Site institucional**, 2016. Disponível em: xxxxxxxxxxx. Acesso em 22 set. 2016.

ALLEN, T, J.**Managing the flow of technology.** Cambridge, MA: MIT Press, 1977.

Arend, Marcelo. **50 Anos de Industrialização do Brasil (1955-2005)**: uma análise evolucionária. Tese de doutorado em economia, UFRGS, Porto Alegre, 2009.

ARGYRYS, Chris; SCHON, Donald. **Organizational learning II**: Theory, method and practice. Reading, MA: Addison-Wesley. 1996.

ARROW, Kenneth J. **The economic implications of learning by doing**. The Review of Economic Studies, 29: 155-173, 1962.

BAÊTA, Adelaide Maria Coelho. **O desafio da criação**: uma análise das incubadoras de empresas de base tecnológica. Petrópolis, RJ: Vozes, 1999.

CASSIOLATO, José Eduardo; LASTRES, Helena M.**Sistema de inovação e desenvolvimento** – as implicações de política. São Paulo Perspectiva, 19: 34-45, 2005.

COHEN, Wesley M.; LEVINTHAL, Daniel A. Absorptive capacity: a new perspective on learning and innovation. **Administrative Science Quarterly**, 35 (1): 128-152, 1990.

DOSI, G. Fontes. Sources, procedures and microeconomic effects of innovation. **Journal of Economic Literature,** 26: 1120-1171, 1988.

DRUCKER, Peter F. **Inovação e espírito empreendedor (entrepreneurship)**: prática e princípios. São Paulo: Pioneira. 1996

EDQUIST, C. Systems of innovation: perspectives and challenges. In: FAGERBERG, J., D.

EISENHARDT, K. M. Building theories from case study research. **The Academy of Management Review,** 14 (4): 532-550, 1989.

EISENHARDT, K.; MARTIN, J. **Dynamic capabilities**: what are they? Strategic Management Journal, 21: .1105-1121, 2000.

ELLIS, H. C. **The transfer of learning**. NewYork: MacMillan Company, 1965.

FERNANDES, A. C.; CORTES, M. R.; PINHO, M. **Caracterização das pequenas e médias empresas de base tecnológica em São Paulo**: uma análise preliminar. Economia e Sociedade, 13: 151-173, 2004.

FERRO, José R.; TORKO-MIAN, Ana Lúcia V. A criação de pequenas empresas de alta tecnologia. **Revista de administração de empresas**, 28 (2): 43-50, 1988.

FIORI, J. L. **Estados, moedas e desenvolvimento.** In: FIORI, J. L. (ed.) Estados e moedas no desenvolvimento das nações. Petrópolis: Brasil: Editora Vozes, 11-48, 1999.

FURTADO, Celso. O subdesenvolvimento revisitado. **Economia e Sociedade**, 1: 5-19, 1992.

GODOI, C. K.; MATTOS, P. L. C. L. Entrevista qualitativa: instrumento de pesquisa e evento dialógico. In: GODOI, C.K.; BANDEIRA-DE-MELLO, R.; SILVA, A.B.; et al. **Pesquisa qualitativa em estudos organizacionais**. São Paulo: Saraiva, 2006.
IBGE. **Pesquisa de inovação**. Pintec 2011. Rio de Janeiro : IBGE, 2013.
KRETZER, J. **Sistemas de inovação**: as contribuições das abordagens nacionais e regionais ou locais. Ensaios FEE, 30: 863-892, 2009.
KATO, J. Path dependency as a logic of comparative studies: theorization and application. In: **Annual meeting of american political science association (APSA): San Francisco, 1996.**
LAPLANE, M. **Inovações e dinâmica capitalista**. In R. Carneiro (ed.). Os Clássicos da economia. São Paulo: Ática, 1997.
LEMOS, D. C. **A interação universidade-empresa para o desenvolvimento inovativo sob a perspectiva institucionalista-evolucionária:** uma análise a partir do sistema de ensino superior em Santa Catarina.Tese de doutorado em administração, Universidade Federal de Santa Catarina, Florianópolis, 2013.
MARCOVITCH, J, Santos, S. A.; DUTRA, I. Criação de empresas de base tecnológica. **Revista de administração**, 21: 3-9, 1996.
MARTIGNAGO, G. **O papel do conhecimento no processo de internacionalização:** o caso de uma multinacional brasileira. Tese de doutorado em administração. Universidade Federal de Santa Catarina, Florianópolis, 2013.
NELSON, R. ; NELSON, K. **Technology, institutions, and innovation systems.** Research Policy, Elsevier, 31:265–272, 2002.
NIOSI, J. National systems of innovations are x-efficient (and x-effective): Why some are slow learners. **Research policy**, Elsevier, 31: 291–302, 2002.
OCDE. **Manual de Oslo:** diretrizes para a coleta e interpretação de dados sobre inovação tecnológica. FINEP: Brasil, 2006.
PEREIRA, A.; DATHEIN, R. Processo de aprendizado, acumulação de conhecimento e sistemas de inovação: a co-evolução das tecnologias físicas e sociais como fonte de desenvolvimento econômico. **Revista Brasileira de Inovação**, 11: 137–166, 2012.
POSSAS, M. L. Em direção a um paradigma microdinâmico: a abordagem neo-schumpeteriana. In: Amadeo, E. (ed.) **Ensaios sobre Economia Política Moderna**: teoria e história do pensamento econômico. São Paulo: Marco Zero, 1988.
POWELL, W.W.; KOPUT, K.W.; SMITH-DOERR, L. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. **Administrative Science Quarterly**, 41: 116-145, 1996.
PRAHALAD, C. K.; HAMEL, G. The core competence of the corporation. **Harvard Business Review**, Boston,68: 79-91, 1990.
SCHERER, F. O. Utilização de capital de risco como fomentador de empresas de base tecnológica: o caso da FK biotecnologia. In : **Enanpad**, Salvador: Brasil, 2006.
SCHUMPETER, J. **Capitalismo, socialismo e democracia**. Rio de Janeiro: Editora Fundo de Cultura, 1984.
SCHUMPETER, J.**Teoria do Desenvolvimento Econômico**. São Paulo: Abril Cultural, 1989.
TEECE, D. J. Towards an economic theory of the multiproduct firm. **Journal of Economic Behavior and Organization**, 3: 39-63, 1997.
TEECE. D. J. et all. Dynamic capabilities a strategic management. **Strategic Management Journal**, 18: 509-533, 1997.
TIDD, J., Bessnt, J.; PAVITT, K. **Managing innovation** - integrating technological, market and organizational change. England: John Wiley & Sons Ltd., 2001.
YIN, R. K. **Estudo de caso**: planejamento e métodos.Porto Alegre: Brasil: Bookman, 2005.