

Matrix of Strategic Entrepreneurship Process in Small and Medium Enterprises of the Brazilian and Canadian Aeronautical Industry

Marcela Barbosa de Moraes, Eveline Galvan, Erivaldo Alves Ribeiro, Eudes da Silva Vieira, Zilma Cardoso Barros Soares, Leonardo Santos da Cruz

Department of Management and Regional Development, University of Taubaté (UNITAU), Taubaté, Brazil

Abstract— The central proposal of this paper is to study the process of strategic entrepreneurship in small and medium enterprises in the Brazilian and Canadian aeronautical industry. The research was based on the qualitative approach with multiple case studies, following the recommendations of Eisenhardt (1989). The study addressed the reality of four small and medium technology-based companies in the aeronautical industry, being two Brazilian and two Canadian. Data were collected with in-depth semi-structured interviews, lasting approximately 2h and 40min, with owner-managers and analyzed with Atlas-ti software. The analysis took place in depth in each case and then in a comparative way between the cases in search of similarities and differences that led to the formation of valid results for the whole sample studied. Finally and based on the analysis of the results, it was concluded that the companies analyzed, through the process of strategic entrepreneurship, obtained a competitive advantage, since they incorporated to the entrepreneurial activity, strategic partnerships and the development of innovation as activities to be developed in a continuous, identifying the innovative elements of production chains in which companies viewed greater potential for profit and ultimately worked together with customers to develop and improve processes and products. This allowed the Brazilian and Canadian SMEs to identify and explore new opportunities in the face of the greater circulation of tacit and explicit knowledge in the productive chain and the execution of R&D together.

Keywords— Strategic Entrepreneurship, Small and Medium Enterprises, Aeronautical Industry, Brazil, Canada.

I. INTRODUCTION

Historically, small and medium-sized enterprises (SMEs) have a substantial importance in the evolution of societies, contributing to the economic, social and political factors of nations, both from the point of view of employment generation and income, as well as their potential for generation of innovation (Acs; Tarpley, 1998; Amato Neto, 2000). His importance also extends to SMEs in the aeronautical industry, since they contribute to import substitution with the technological products that they produce internally in the country; contribute to increasing the number of exports; help in the transfer of technology from research and development centers (R&D); value the country's scientific and technological system; and help in the formation of centers of technological competence (Montoro; Migon, 2009).

Another relevant aspect is that SMEs, both the high technology companies in general and those of the aeronautical industry, are inserted in the new economic scenario based on the techno-economic paradigm of the knowledge age, in which the business environment is becoming more competitive every day. Small and medium organizations are continually facing changes in the economic landscape. In addition, how to deal with ambiguities and how to achieve competitiveness and the level of performance expected are real challenges for any organization.

In this environment, where many factors and variables intertwine in an increasingly complex way, identify new opportunities and create a competitive advantage that leads organizations to success, especially small and medium technology-based companies, to success are activities increasingly difficult to be developed by the owner-

managers who are ahead of these companies. Given this context, this work was developed with the intention of contributing to the expansion of knowledge about the identification and exploration of new opportunities and the creation and maintenance of competitive advantages in the aeronautical industry SMEs, exploring a new field of knowledge called strategic entrepreneurship.

The scientific papers on strategic entrepreneurship began in the early 21st century, when Ireland, Hitt, Camp and Sexton in 2001 highlighted the importance of the integration between strategic management and entrepreneurship to create wealth for organizations (Hitt et al., 2011). Ireland, Hitt and Sirmon (2003), complementing the initial idea, have created a model of strategic entrepreneurship with four fundamental dimensions: (1) mentality, culture and entrepreneurial leadership; (2) the strategic management of organizational resources; (3) the application of creativity; and, (4) the development of innovation. Based on additional research and critical analysis, Kyrgidou and Hughes (2010) developed an alternative model, adopting the initial structure of Ireland, Hitt and Sirmon (2003), but adding bi-directionality to evidence the interactivity between dimensions, contributing, thereby, for the refinement of decision-making.

Already Hitt et al. (2011) elaborated a model richer than the previous ones. The authors extended the models created by Ireland, Hitt and Sirmon (2003) and Kyrgidou and Hughes (2010), incorporating a larger and multilevel domain, with the aim of improving the understanding of this new field of study. The model encompasses three types of focus (environmental, organizational, and individual) and three dimensions (input of resources and factors, resource orchestration processes and benefits outgoings) that contribute to the process of seeking opportunities and competitive advantage.

A major difficulty with which studies in strategic entrepreneurship are confronted is the fact that the studies show little compatibility with the need for flexibility and dynamism of SMEs. In this context, it is necessary to seek new ways of thinking about the strategic management and entrepreneurship of SMEs (Lima, 2010), especially in the aeronautics industry. In this context, and according to the literature review made as basis for the present study, there is no study in the national or international literature that relates the dimensions of strategic entrepreneurship to the particularities of SMEs, not even those of the aeronautical sector. It is precisely this gap that this work aims to explore, generating contributions that help to heal it. Thereby, the research question that guided the work was: How does the process of strategic entrepreneurship in

small and medium enterprises of the Brazilian and Canadian aeronautical industry occur?

II. CONCEPTUAL BASES OF STRATEGIC ENTREPRENEURSHIP

Work on strategic entrepreneurship began in the early 21st century, when Ireland, Hitt, Camp and Sexton in 2001 highlighted the importance of the integration between strategic management and entrepreneurship for wealth creation for organizations (Hitt et al., 2011). Strategic actions are those adopted to select and implement company strategies (Ireland et al., 2001). They are activities that organizations develop, exploit, and take advantage of current advantages while supporting entrepreneurial actions to explore opportunities that will help create competitive advantages for the company in the future (Hitt et al., 2002). Already entrepreneurial are actions through which companies identify and then seek to exploit business opportunities that have not been fully exploited by their competitors (Hitt et al., 2002).

For Ireland et al. (2001), strategic and entrepreneurial actions are often adopted with the purpose of finding a new market or a new competitive space for the organization to create wealth, but to generate wealth, it is necessary first to create value (Hitt et al., 2011). Companies seek to find new ways of doing business that may interrupt existing rules in each sector, leading to the development of new business models that will create new competitive advantages. It is important to emphasize that the level in which the organization acts in an entrepreneurial way in terms of innovation, risk acceptance and proactivity will be related to the dimensions of strategic management (Ireland et al., 2001).

Ireland et al. (2001) point out those common variables between entrepreneurial and strategic actions, which occur naturally, will help companies to create wealth. These variables are: innovation, networks, internationalization, organizational learning, management teams and governance and growth. In this perspective, the first definition of strategic entrepreneurship is the integration between entrepreneurial action (search for opportunity) and strategic action (search for competitive advantage) for the development and adoption of measures to create wealth (Ireland et al., 2001).

Although useful, the research efforts carried out by Ireland et al. (2001) to explain strategic entrepreneurship through the integration of strategic and entrepreneurial actions, as a single construction, did not adequately describe its various dimensions. To complement the idea of these authors, Ireland, Hitt and Sirmon (2003) developed a

linear and sequential model which is composed of four dimensions: (1) mentality, culture and entrepreneurial leadership; (2) strategic management of organizational resources; (3) application of creativity; and (4) development of innovation. These dimensions integrate several theoretical bases, including resource-based view (RBV), human capital, social capital, organizational learning, and creative cognition.

Ireland, Hitt and Sirmon (2003) argue that the integration between dimensions and the combination of the search for opportunity and competitive advantage will lead to the creation of wealth. For these authors, the entrepreneurial mindset, culture, and leadership are fundamental aspects for strategic entrepreneurship and are intrinsically linked, because they promote and support the continuous search for entrepreneurial opportunities that can be exploited with sustainable competitive advantages.

The second dimension of the model, strategic management of organizational resources, is an essential process for strategic entrepreneurship. Ireland, Hitt and Sirmon (2003) report that resources are the basis of organizations' differentiated performance in value-creating suits. Barney and Arikan (2001) show that the use of idiosyncratic resources by enterprises has a strong influence on performance, rather than the characteristics of the sector. Another important aspect of the model presented by Ireland, Hitt and Sirmon (2003) is the application of creativity that is a vector of wealth creation that grows from the attributes of individuals, going towards the demands of a given market. For Barney and Arikan (2001) and Ireland, Hitt and Sirmon (2003), creativity is increasingly important, especially for organizations operating in markets with multiple opportunities to differentiate their goods and services.

The last dimension, development of innovation, is an essential tool for increasing productivity and competitiveness of the organization, as well as for boosting the economic development of regions and countries. For Tigre (2006), development does not derive from a mere growth in existing economic activities, but it resides fundamentally in a qualitative process of transformation of the productive structure, in the sense of incorporating new products and processes and adding value to production by intensifying the use information and knowledge.

After describing the dimensions of the strategic entrepreneurship model developed by Ireland, Hitt and Sirmon (2003), it is important to highlight that the actions associated with these dimensions are complex and challenging. It is difficult for new enterprises, for example, to obtain and manage resources strategically, mainly to

establish and sustain a competitive advantage. The authors above explain that these firms are more likely to be flexible and entrepreneurial and less likely to have the resources and capacity to build a competitive advantage. Likewise, for companies that are already consolidated in the market, and that already have a competitive advantage, it is difficult to continue to seek and exploit entrepreneurial opportunities.

Based on additional research and critical analysis, Kyrgidou and Hughes (2010) suggest that Ireland, Hitt and Sirmon (2003) model did not have the robustness needed to capture the gestalt of strategic entrepreneurship. For the authors, the previous model contains several limitations and absences that compromise the understanding of how strategic entrepreneurship can be performed to succeed in practice. For example, although strategic entrepreneurship is defined as the pursuit of opportunity and competitive advantage (Ireland; Hitt; Sirmon, 2003), the model is linear and sequential between the concepts of entrepreneurial and strategic activities and lacks a cycle feedback between the two concepts.

In addition, the model is linked to behavior variables, such as the entrepreneurial mindset to identify opportunity; or application of creativity to create innovation, but does not take into account the conditions of the organization's internal environment, which provides a conceptual framework in which these variables are embedded (Kyrgidou; Hughes, 2010). The last critique that Kyrgidou and Hughes (2010) make to the model of Ireland, Hitt and Sirmon (2003) is that the authors do not take into account the dynamic capacities, since in environments of rapid changes the resources that sustain the entrepreneurial and strategic actions deteriorate over time. For Kyrgidou and Hughes (2010), dynamic capabilities favor strategic and entrepreneurial processes and balance the pursuit of opportunity and competitive advantage, leading to wealth creation.

To correct these limitations and absences, Kyrgidou and Hughes (2010) developed an alternative model of strategic entrepreneurship. Although critical, the alternative model developed by Kyrgidou and Hughes (2010) adopts, in its initial structure, the model developed by Ireland, Hitt and Sirmon (2003), but adding bidirectionality to evidence the interactivity between stages, which contributes to the refinement of decision making.

The alternative model of Kyrgidou and Hughes (2010) is almost linear, focusing on the internal organizational environment and top management vision. For the authors, the search for a new opportunity begins with the analysis of the mindset, culture and leadership entrepreneurial of

the company, which then manages the strategic resources and, finally, applies the creativity so that it can develop an innovation. These three steps are intrinsically linked as they promote and support the continuous pursuit of entrepreneurial opportunity, contributing to the development of competitive advantage.

Kyrgidou and Hughes (2010) also considered the feed forward and feedback mechanism to help organizations improve the use of strategic entrepreneurship and thereby create wealth over time. The interaction between the four dimensions occurs when a company and its managers or employees detect a problem, such as the execution of a certain activity that then triggers a review and learning process.

Hitt et al. (2011), supporting the statement of Kyrgidou and Hughes (2010), argue that strategic entrepreneurship is broader and more dynamic than originally conceived. To contribute to the continued development of this young field of research, Hitt et al. (2011) developed a richer model, extended the models created by Ireland, Hitt and Sirmon (2003) and Kyrgidou and Hughes (2010), and incorporating a broader and multilevel domain with the objective of improving the understanding of strategic entrepreneurship.

This new model, encompasses three types of focus: (a) environmental; (b) organizational; and (c) individual and three dimensions: (i) input of resources and factors, (ii) resource orchestration processes, and (iii) outputs of benefits that contribute to the process of pursuit of opportunity and competitive advantage.

The first dimension of the advanced model of strategic entrepreneurship presented by Hitt et al. (2011) emphasizes that munificent and dynamic environments, relationships between companies, individual knowledge, individual and organizational competencies, together with the motivation and passion of entrepreneurs, are important sources of long-term success for an organization to explore opportunities and achieve competitive advantage.

The second dimension of the advanced model of Hitt et al. (2011) is the resource orchestration process. This stage is characterized by gaining competitive advantage in the decision making of the leaders of the organizations and by the control of the valuable and rare resources. For the authors, resource orchestration is concerned with the actions taken by entrepreneurs to facilitate efforts to effectively manage the company's resources. Sirmon, Hitt and Ireland (2007) and Helfat et al. (2007) point out three important actions for an organization to gain competitive advantage, (1) structure the company's resource portfolio; (2) aggregate resources into the organization's capabilities;

and (3) leverage capabilities to create value for customers and wealth for entrepreneurs.

The third dimension of the advanced model of Hitt et al. (2011) indicates that entrepreneurial activity generates wealth creation for entrepreneurs and creates value for clients and can also contribute to the construction of new economic, social, institutional and cultural contexts, providing significant benefits for the entrepreneur, the organization and society.

As described, the advanced strategic entrepreneurship model developed by Hitt et al. (2011) is based on the concept of multilevel where resources can exist and / or be created in the spheres of the individual, organization, and society. The results of entrepreneurial activities, which are creating wealth for entrepreneurs and creating value for clients, can generate benefits for individuals (entrepreneurs, managers, employees, clients, etc.), organizations and society. The authors conclude that there are few studies that cross these levels. They point out that more research is needed to understand the influence of the interaction of individual and organizational attributes on entrepreneurial activities and their outcomes.

The analysis of the three models presented by Ireland, Hitt and Sirmon (2003), Kyrgidou and Hughes (2010) and Hitt et al. (2011) highlight the importance of innovation in the global economy, from entrepreneurial activity to economic growth and the critical value of strategic management to the survival and success of organizations and increase the importance of strategic entrepreneurship.

In short, strategic entrepreneurship allows organizations to apply their knowledge and skills in the current context and explore the opportunities to take advantage of them in the future by applying new knowledge and new and / or advanced skills. To be more specific, strategic entrepreneurship requires companies to strike a balance between the pursuit of opportunity (entrepreneurship) and the pursuit of advantage (strategic management).

Hitt et al. (2011) and Kraus, Kauranen and Reschke (2011) emphasize that, to some extent, entrepreneurship in strategic entrepreneurship requires flexibility and novelty, while strategic management seeks stability and predictability. Achieving this balance is a major challenge because companies have limited resources and are often in highly constrained economic environments. The brief review of the literature presented provides a small base of support and suggests a robust set of opportunities to enrich future research on the effective use of strategic entrepreneurship and its benefits.

III. METHODOLOGICAL PROCEDURES

To prepare a robust study, it was used the methodology of multiple case studies according to Eisenhardt's (1989) recommendations. The study addressed the reality of four aeronautical SMEs, two Brazilian and two Canadian, and described how these companies identify and exploit new opportunities and create and sustain competitive advantages. For Eisenhardt (1989), the choice of cases is a very important aspect because it defines the characteristics of the research design. In addition, the appropriate choice of the sample to be studied makes it possible to control the external variations and define the limits of consideration of the results for other contexts.

The sample of SMEs who participated in the study is presented in Table 1. The cases were chosen intentionally, based on the contributions they could provide to the study, in other words, the study sample was characterized as theoretical and intentional.

Table 1. Composition of the Sample of SMEs that Participated in the Study

SMEs of Aeronautical Industry (Foundation, Location)	Activities/Products	Interviews and Duration of Interviews
Empreendimentos Aeronáuticos (fictitious name) 1998 – São José dos Campos – SP - Brazil (inside the Univap Technological Park)	Medium company, with 128 employees, specializing in the development of landing gear solutions. The company also designs and manufactures civil and military aircraft.	Interviewed: president of the company and the technical director and co-founder. Duration : 2h 42 min.
Aero Brasil (fictitious name) 2005 – São José dos Campos-SP - Brazil (company graduated in Incubaero)	Small company, with 31 employees, specializing in the development of command, control and intelligence solutions based on Unmanned Aerial Vehicles (UAV). In addition, it develops a family of multi-function displays for	Interviewed: 2 owner-managers. Duration : 1st interview lasting 1h15 min and 2nd interview lasting 2h.

	air navigation in special applications.	
Altitude Aerospace 2005 – Montreal – Canada	Small company with 70 employees; specializing in the design, structural analysis and certification for both the development of new aircraft and the maintenance of fleets.	Interviewed: Nancy Venneman, president and founder of the company. Duration : 1h 36 min
Mechtronix 1987 – Saint-Laurent – Canada	Medium company, with 200 employees, with multidisciplinary specialization in design and engineering.	Interviewed: Fernando Petruzzello (president and co-founder) and Thomas Allen (vice president of engineering and co-founder). Duration : 3h 15min

To answer the research question and to elaborate a study of multiple cases, it was adopted as data collection procedure the semi-structured interview, individual and in depth and documentary analysis. In this research, the semi-structured interview has open questions, elaborated from a script that gave the interviewer the flexibility to order and formulate the questions during the interview, which becomes richer given the possibility of deepening the questions from the answers obtained.

The procedure of data analysis occurred in two stages: within-case and across-case. Within-case analysis is the one that describes, understands, and explains what happens in a single, limited context, that is, in a single case (Miles; Huberman, 1994). For Lima (2010), this form of analysis aims to highlight the conceptual contents that are most important to describe and explain a phenomenon, taking each case of the sample separately. On the other hand, the purpose of the across-case analysis is to describe, understand, explain and cross-reference the conceptual contents, processes and results of a given phenomenon in a

multiple-case context, thereby, developing more detailed descriptions of all cases of sample (Miles; Huberman, 1994). Data from the interviews were analyzed and studied using the Atlas-ti software.

IV. RESULTS

5.1 Matrix of the Strategic Entrepreneurship Process in Empreendimentos Aeronáuticos Company

The matrix of strategic entrepreneurship has two dimensions: the search of opportunity in the Y axis and the search of competitive advantage in the X axis. To create long-term wealth, Empreendimentos Aeronáuticos needed to make the best combination of these two dimensions, as explained in Figure 1.



Fig.1: Matrix of the Strategic Entrepreneurship Process in Empreendimentos Aeronáuticos Company.

When there is a low search for opportunity and a low search for competitive advantage, the company works to monitor the environment, both internal and external, and for the management of its activities. It is worth mentioning that monitoring the environment helps identify future opportunities and create competitive advantage. In this case, flexibility and efficiency are the values on which their strategic and entrepreneurial actions are based.

Based on the respondents' reports, flexibility is related to the ability of the company to deal with the uncertainties of a changing environment. The efficiency is linked to the reduction of costs, agility in the processes and increase of the productivity of the factors of production. Given the high dependence of the strategic action for being subcontracted to a large company that develops regional aircraft projects, Empreendimentos Aeronáuticos must have high capacity for internal coordination and adaptability to new environments. Its internal

organizational structure therefore allows direct communication between employees and the board, there is little standardization of procedures and owner-managers participate in all activities of the organization.

When there is a high search for opportunity and a low pursuit of competitive advantage, the company focuses on the development of innovation and strategic partnerships. This is the time to explore new opportunities. In this situation, strategic and entrepreneurial actions reveal the owner-managers' concern with the development of an environment of creation and experimentation, which stimulates freedom of initiative for their employees; the amount of investment in R&D and its orientation to solve problems and create novelties; as well as the way it takes advantage of meetings such as fairs and exhibitions, to seek technological innovations or to do business. Within this process, strategic partnerships aim to distribute the risks inherent in the development of innovation and increase the exchange of knowledge between the parties.

When there is a low search for opportunity and a high search for competitive advantage, the company considers more important the management of strategic resources such as financial, human and technological capital. It is evident the creation of competitive advantage by the Empreendimentos Aeronáuticos Company. The management of the strategic resources of this company is related to the agility of the processes, to the establishment of financial goals, to productive restructuring, to the creation and management of knowledge, to the development and valorization of personnel, to creativity and to quality certifications.

When there is high search for opportunity and high search for competitive advantage, the company elaborates strategic management focused on technological leadership, sustaining its competitive advantage. Leading technology companies establish and maintain a competitive position with the development and exploitation of technologies within a given market, which gives them a dominant position in this market (Narayanan, 2001). As already mentioned, technology is the primary instrument for the creation and maintenance of the competitive advantages of the company that seeks the competitive in the technological appropriability.

In short, Empreendimentos Aeronáuticos Company identifies a new opportunity in monitoring the environment, both internal and external, and explores this opportunity by developing innovation and strategic partnerships. At the same time, it creates a competitive advantage with the management of strategic resources and

sustains this advantage by developing strategic management as a technology leader.

5.2 Matrix of the Strategic Entrepreneurship Process in Aero Brasil Company

A matrix was elaborated to clarify the search for opportunity and competitive advantage of Aero Brasil Company, as shown in Figure 2.



Fig.2: Matrix of the Strategic Entrepreneurship Process in Aero Brasil Company.

The matrix analysis indicates that when there is a low search for opportunity and low search for competitive advantage, the company identifies new opportunities with participation in research groups of the Aeronautical Technological Institute (ITA). The interviewees' reports indicate that when they participate in the ITA Aeronautical Techniques Studies Center, the company is at the frontier of technological knowledge, because the research groups that are part of this nucleus of studies are considered efficient instruments for the exchange of information.

When there is a high search for opportunity and a low search of competitive advantage, the company explores the new opportunities with the development of innovation and strategic partnerships. Based on the data collected, the company encourages employee creativity by stimulating the sense of prosperity that feeds innovative behavior. It also stimulates spontaneous behavior and the continuity of the study of ideas. In relation to strategic partnerships, the company encourages the free exchange of information and honest feedback from all those involved in this partnership.

At the time there is a low search for opportunity and a high search for competitive advantage, Aero Brasil creates a competitive advantage with strategic actions and strategic knowledge. The interviewees explain that before undertaking any strategic action, it undergoes a process of

strategic reflection: it makes a diagnosis of the situation that needs to be changed, then evaluates the alternatives and, finally, makes the strategic choice.

Action, reflection and strategic choice are linked to the strategic knowledge of owner-managers, and encompass knowledge related to planning, description, impact, prediction, evaluation and generation of previous strategies. The reports show that any strategic action must be related to the vision and strategic objectives of the company.

Aero Brasil's strategic vision is to be a Latin American leader with global projection in Intelligence, Surveillance, Monitoring, Navigation, Command and Control solutions. The objectives are: (i) to promote technological innovation linked to business as a way to develop a sustainable and growing company; (ii) be an excellent choice for human and professional development; (iii) be considered by customers and partners the best option in solutions in Intelligence, surveillance, monitoring, navigation, command and control; (iv) be considered by shareholders and investors as the best return in the segment; and, (v) be a strategic company for the country.

When there is high search for opportunity and high search for competitive advantage, the company elaborates a strategic management with a prospective position, thus sustaining its competitive advantage. For Nakano (1997), prospectors continuously seek new products and markets. They are constantly changing, often passing on an idea of inefficiency, although they remain always as a powerful force in the market. This strategic position is evident, since Aero Brasil is seeking new markets, such as in the biotechnology sector.

When the search for opportunity and the search for competitive advantage reaches the highest point of the matrix, it can be said that the company object of study reached the creation of wealth. Based on the interviewees' reports, Aero Brasil presents an increase in financial revenues and, consecutively, an increase in profits, growth of internal knowledge and development of individual and organizational learning.

5.3 Matrix of the Strategic Entrepreneurship Process in Altitude Aerospace Company

Just as in previous cases, it is important to explain how Altitude Aerospace Company identifies and exploits a new opportunity and creates and sustains a competitive advantage. For this purpose, a matrix was elaborated to clarify the search opportunity and competitive advantage, as shown in Figure 3.

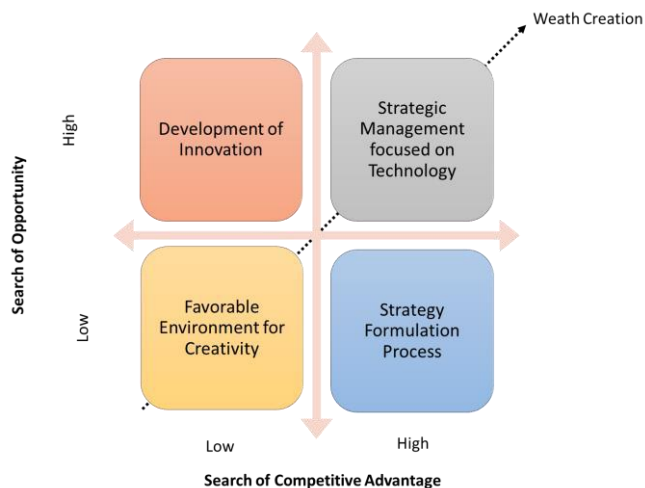


Fig.3: Matrix of the Strategic Entrepreneurship Process in Altitude Aerospace Company.

By analyzing the matrix points out that when there is low search of opportunity and low search of competitive advantage the company identifies a new opportunity, promoting a favorable environment for creativity. It is worth emphasizing that creativity is a key factor for innovation and adds value to knowledge to make it progressively more useful. The reports indicate that creativity flourishes when the individual performs activities mobilized by pleasure and satisfaction, not by obligation and duty. The company analyzed stimulates initiative, independence of thought and action, flexibility, persistence, and self-confidence.

The moment there is a high search of opportunity and a low search of competitive advantage, the company explores new opportunities to the development of innovation. Based on the data collected, Altitude Aerospace reveals the concern with the development of an environment of creation and experimentation, which stimulates the freedom of initiative of its employees; the amount of investment in R&D and its orientation to solve problems and create novelties.

When there is low search of opportunity and high search for competitive advantage, Altitude Aerospace creates competitive advantage by developing a strategy formulation process. As already mentioned, the formulation of the strategy is understood as a process of development of the strategic reflection, which results from a strategic plan that involves the analysis of the internal and external environment, the evaluation of the alternatives and the strategic choices. For the interviewee, with a well-structured strategy formulation process, the company gains competitiveness compared to its competitors who are also small and medium-sized. She points out that many of her

competitors have not devised a formalized strategy such as Altitude Aerospace.

At the moment there are high search of opportunity and of competitive advantage, the company draws up an offensive strategic management focused on the technology, supporting thus their competitive advantage. The company's success is therefore in incorporating technology management into strategic management. For Freeman and Soete (1997), technology-oriented offensive strategic management is characterized by the attainment of technological and market leadership by the introduction of new products and services. It is usually intensive in R&D and includes involvement in fundamental research.

When the search for opportunity and for competitive advantage reaches the highest point of the matrix, it can be said that the analyzed company has reached the creation of wealth. Based on the reports, Altitude Aerospace shows an increase in its financial assets (revenue and profit), as well as value gains in its tangible and intangible assets. This value gain is due to the voluntary, creative, and proactive organizational attitude, with collective engagement in all stages of the strategic entrepreneurship process.

5.4 Matrix of the Strategic Entrepreneurship Process in Mechtronix Company

In this section, the matrix of the strategic entrepreneurship process of the Mechtronix Company was analyzed to clarify the search for opportunity and competitive advantage, as shown in Figure 4.

The analysis of Figure 4 shows that when there is a low search for opportunity and for competitive advantage, the company identifies a new opportunity to monitor the internal and external environment and the management of information. For the interviewees, the internal environment monitoring corresponds to the analysis of the current situation of the company. The internal factors that cause change in organizational and strategic management are: infrastructure, finances, vision of the future and internal competence.

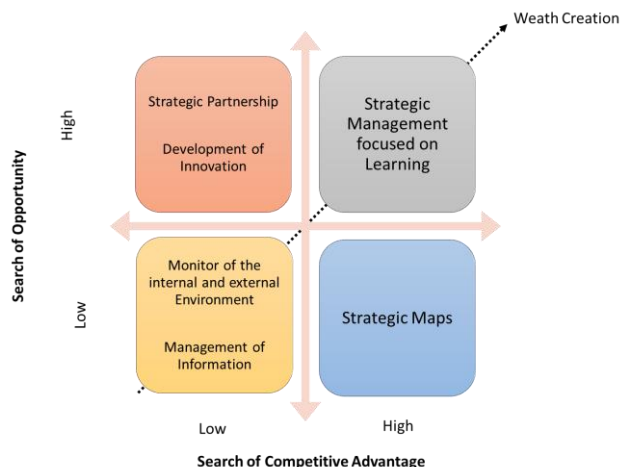


Fig.4: Matrix of the Strategic Entrepreneurship Process in Mechtronix Company.

The monitoring of the external environment corresponds to the analysis of macro and micro environment. It is understood macro environment in which the external factors impact Mechtronix are horizontal in nature, not specific to the company's performance, although they are capable of provoking changes in its strategic management. Based on the data collected, the external factors for the company are: political, social, regulatory (International Civil Aviation Organization) and government investments. Regarding the microenvironment, the key focuses are those external factors that are more specific to the field of activity of the company. These factors are: production chain, customers, partnerships and technologies.

Information management, in turn, corresponds to the process of collecting, organizing, processing, and disseminating information. For the interviewees, the information is a good of high added value and needs to be managed in the same way as the human and technological resources of the company and must be equally administered.

At the moment there is a high search for opportunity and a low search of competitive advantage, the company explores the new opportunities with strategic partnerships and the development of innovation. Based on the reports, the strategic partnerships represent the articulating and collaborative capacity of Mechtronix, offering strategic visions and contributing to the creation of wealth. The analysis of the development of innovation indicates that Mechtronix considers innovation as one of the foundations to guarantee a lasting future. An innovative environment for respondents has the ability to articulate and mobilize human, financial and material resources to capture

opportunities and neutralize threats. Based on the data collected, the company has an innovative business philosophy, favoring a work environment that stimulates trust among employees, a business culture tied to a philosophy of tolerance to errors and that the ideas generated are evaluated and implemented.

When there is low search of opportunity and high search of competitive advantage, Mechtronix creates competitive advantage by developing strategic maps. The respondents' reports indicate that these maps assist the owner-managers at the time of the strategic decision. For this, this visual representation of the strategy is formed by five stages that are: (i) formulation of the strategic intention; (ii) definition of the critical factors of organizational performance; (iii) formulation of strategic objectives; (iv) definition of cause and effect relationships between goals; and, (v) definition of strategic indicators.

At the moment of high search for opportunity and high search for competitive advantage, the company elaborates a strategic management focused on learning, sustaining its competitive advantage, so the success of the company is in incorporating learning in strategic management. Mintzberg, Ahlstrand and Lampel (2000), in the book *Safari of Strategy*, propose ten schools of thought regarding the formulation of the strategy, and one of them is that of learning. For this school, the world is too complex for strategies to be developed at once with clear plans or visions. The strategy should emerge in short steps as the organization adapts or learns. The authors complement that strategies emerge when people, individually or collectively, learn about a situation.

When the search for opportunity and the search for competitive advantage reach the highest point of the matrix, it can be said that the analyzed company reached the creation of wealth, the benefits generated for the company, financial results, and for society, creation of new innovations and generation of qualified jobs.

V. CONCLUSION

The recognition of the contribution of SMEs to economic development has attracted the interest of studies and research in applied social sciences. However, the complexity generated by the various types of SMEs requires different approaches to understand the numerous sectors and ranges that make up the universe of these companies. About the most dynamic sectors, such as the aeronautics sector, composed of knowledge and technology-intensive SMEs, studies are still recent and require research that seeks to collaborate in understanding strategic management and entrepreneurship.

In this way, this paper was developed with the intention of contributing to the expansion of knowledge about the identification and exploration of new opportunities and the creation and maintenance of competitive advantages in the SMEs of the aeronautical industry, exploring a new field of knowledge called strategic entrepreneurship. Therefore, this study aimed to study how the process of strategic entrepreneurship in SMEs in the Brazilian and Canadian aeronautical sector occurs. With this research, it was verified that the search and use of the opportunities include the identification and exploration of new opportunities through the monitoring of the internal and external environment, participation in research groups, strategic partnership, and innovation development. To emphasize the interactivity between these three elements, bi-directional and feed forward and feedback mechanisms were adopted, which helped Brazilian and Canadian SMEs to refine the use of strategic entrepreneurship and improve the effectiveness of each step over time. It is noteworthy that feedback and feed forward mechanisms are composed of three key factors: (a) exploration and exploitation of skills, (b) entrepreneurial culture (c) collaborative production.

Another aspect identified was that the elements of the search and exploitation of opportunity promote strategic information, the system of strategic information, strategy formulation and strategic management, which is the basis of the search and exploitation of competitive advantage. Consequently, they support the ability of the companies studied to create wealth over time. Strategic management encompasses the actions and choices taken by owner-managers to explore the competitive advantages of their company.

In summary, it was concluded that the companies that participated in the research, through the process of strategic entrepreneurship, obtained a competitive advantage, since they incorporated to the entrepreneurial activity, strategic partnerships and the development of innovation as activities to be developed in a continuous character, identifying the innovative elements of the productive chains where the companies saw a greater potential of gain and, finally, worked together with the clients in the development and improvement of processes and products. This allowed the Brazilian and Canadian SMEs to identify and to explore new opportunities in relation to the greater circulation of tacit and explicit knowledge existing in the productive chain and the execution of R&D as a whole.

It can be said that the study of strategic entrepreneurship in SMEs in the aeronautics industry was quite enriching because it produced results that could be useful both for future research on the subject and for the

development of new solutions for the growth of Brazilian and Canadian SMEs. Despite being a pioneer initiative, the study of the strategic entrepreneurship process in SMEs in the aeronautical industry and although the objective proposed in this paper has been achieved, the research carried out has limitations.

The limiting factor that deserves attention is the accessibility of company information was restricted, since some owner-managers were not comfortable in divulging data considered as confidential, mainly concerning the issues of strategy, innovation and financial. Another limitation that deserves to be highlighted is the limited number of selected cases, with information that largely reflects the point of view of the owner-managers, and contemplating companies from a single sector of the economy, the aeronautical industry.

To contribute to the development of the concepts of strategic entrepreneurship in small and medium enterprises, the study left inquiries for future research. That way, some recommendations are presented: (1) the topic of strategic entrepreneurship in SMEs is still a new field in research. The complexity of the topic implies great potential for research. It is interesting to develop an analytical framework that becomes an instrument capable of assisting SME owner-managers in the search for and use of opportunities and competitive advantage; (2) The inclusion of companies from other sectors of the economy could be contemplated in new studies, to verify the possible validity of the models presented by Ireland, Hitt and Sirmon (2003), Kyrgidou and Hughes (2010) and Hitt et al. (2011); (3) the expansion of the number of companies in the sample can bring important information and, therefore, contribute to a better understanding the process of strategic entrepreneurship in SMEs; and (4) another study of relevance is to better understand the facilitators and difficulties for the integration of entrepreneurship and strategic management in both technology-based and traditional SMEs.

REFERENCES

- [1] Acs, Z., & Tarpley, F. (1998). *New American Evolution: The Role and Impact of Small Firms*. NASA.
- [2] Agarwal, R., Audretsch, D., & Sarkar, M. B. (2007). The process of creative construction: knowledge spillovers, entrepreneurship, and economic growth. *Strategic Entrepreneurship Journal*, 1(3-4), 263-286.
- [3] AMATO NETO, J. (2000). *Redes de cooperação e clusters competitivos*. São Paulo: Atlas.
- [4] Barney, J. B., & Arian, A. M. (2001). *The resource-based view: Origins and implications*. The Blackwell handbook of strategic management, 124-188.

- [5] Baron, R. A., & Henry, R. A. (2010). How entrepreneurs acquire the capacity to excel: Insights from research on expert performance. *Strategic Entrepreneurship Journal*, 4(1), 49-65.
- [6] Kathleen, E. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- [7] Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.
- [8] Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. (Eds.). (2002). *Strategic entrepreneurship: Creating a new mindset*. Wiley-Blackwell.
- [9] Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. A. (2011). Strategic entrepreneurship: creating value for individuals, organizations, and society. *Academy of management perspectives*, 25(2), 57-75.
- [10] Ireland, R. D., Hitt, M. A., Camp, S. M., & Sexton, D. L. (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. *Academy of Management Perspectives*, 15(1), 49-63.
- [11] Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of management*, 29(6), 963-989.
- [12] Kraus, S., Kauranen, I., & Reschke, C. H. (2011). Identification of domains for a new conceptual model of strategic entrepreneurship using the configuration approach. *Management research review*, 34(1), 58-74.
- [13] Kyrgidou, L. P., & Hughes, M. (2010). Strategic entrepreneurship: origins, core elements and research directions. *European business review*, 22(1), 43-63.
- [14] Lima, E. D. O. (2010). A Gestão estratégica de pequenas e médias empresas segundo a abordagem da aprendizagem sistêmica. *Gestão & Planejamento-G&P*, 9(2).
- [15] Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage
- [16] Montoro, G. C. F., & Migon, M. N. (2009). *Cadeia produtiva aeronáutica brasileira: oportunidades e desafios*. Banco Nacional de Desenvolvimento Econômico e Social.
- [17] Nakano, D. N. (1997). *Uma comparação entre tipos de estratégia tecnológica de oito empresas brasileiras*. Anais do ENEGEPE.
- [18] Narayanan, V. K. (2001). *Managing technology and innovation for competitive advantage*. Pearson Education India.
- [19] Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of management review*, 32(1), 273-292.
- [20] Tigre, P. B. (2006). *Gestão da inovação*. A economia da tecnologia no Brasil. Rio de Janeiro: Editora Campus.
- [21] Woolley, J. (2010). Technology emergence through entrepreneurship across multiple industries. *Strategic Entrepreneurship Journal*, 4(1), 1-21.