



STRATEGIC ENTREPRENEURSHIP IN SMALL AND MEDIUM ENTERPRISES OF BRAZILIAN AND CANADIAN AERONAUTICAL INDUSTRY

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Purpose: The general objective of this article is to analyze the process of strategic entrepreneurship in small and medium companies of the aeronautical industry operating in Brazil and Canada.

Design/Methodology: This is a qualitative multiple case study. Data were collected through detailed semi-structured interviews. Intra and inter-case analyzes were used to identify similarities and differences among data segments to obtain final results which were valid to all the cases

Originality/Relevance: The article focuses an important research gap regarding strategic entrepreneurship related to high development generating small and medium enterprises, specifically technological ones and studied in an international comparison.

Findings: In their strategic entrepreneurship, the Brazilian companies identify a new opportunity monitoring the environment, both internal and external, and participating in research groups, and they exploit the opportunity with innovation development and strategic partnerships. At the same time, they create a competitive advantage managing strategic resources, strategic actions and strategic knowledge, and sustain this advantage by developing a strategic management as technological leader with a prospective and competitive posture. The Canadian companies identify a new opportunity promoting an environment conducive to creativity together with the monitoring of the internal and external environments and to information management, and exploit the opportunity also with strategic partnerships and innovation development. Concomitantly, they create a competitive advantage developing a process of strategic formulation and mapping, and sustain the advantage by developing an offensive strategic management focused on technology and learning.

Theoretical/methodological contributions: The article enlarges knowledge about the identification and exploitation of new opportunities, and about creating and sustaining competitive advantages in small and medium technological enterprises; its results can be useful in theoretical and practical terms.

Keywords: Strategic Entrepreneurship. Small and Medium Enterprises. Aeronautical Industry.

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1. Introduction

Historically, small and medium-sized enterprises (SMEs) have played an important role in the evolution of societies, contributing to the economic, social and political factors of nations, both from the point of view of job and income generation and their potential for generation of innovation (Acs, Tarpley & Phillips, 1998; Amato Neto, 2000). In Brazil, SMEs help regional development and boost local society, and through the efficient use of available resources, are able to stimulate economic growth, creating jobs and improving the quality of life of the population (Martinelli & Joyal, 2004).

The value of small and medium technology-based companies (SMETBs) to the local, national and international economy is also widely recognized as essential for entrepreneurial activity, innovation in high potential products in the market and generation of skilled jobs, contributing to boosting economy (Santos, 1987; Afuah & Utterback, 1997; Grégoire & Shepherd, 2012). Moreover, these companies stimulate the process of developing science and technology in a society and strengthen the relationships between various sectors of the economy (Silva, Oliveira & Moraes, 2016).

This importance also extends to the aeronautical SMETBs, as they contribute to the substitution of imports with the technological products they produce domestically in the country; collaborate to increase the number of exports; assist in technology transfer from research and development (R&D) centers; value the country's scientific and technological system; and assist in the formation of technological competence centers (Montoro & Migon, 2009).

Another relevant aspect is that SMEs, both the technological base in general and the aeronautical sector, are inserted in the new economic scenario based on the knowledge-age techno-economic paradigm, in which the business environment is becoming more competitive every day. Small and medium size organizations are continually facing changes in the economic scenario (Silva, Oliveira & Moraes, 2016). In addition, how to deal with ambiguities and how to achieve competitiveness and expected performance are real challenges for any organization.

In this environment, where many factors and variables increasingly intertwine, identifying new opportunities and creating a competitive advantage that leads organizations to success, especially SMBTs, to success are increasingly difficult activities for owners to master. leaders who are in charge of these companies (Silva, Oliveira & Moraes, 2016). Given this context, this work was developed with the intention of contributing to the expansion of knowledge about the identification and



exploitation of new opportunities and the creation and sustaining of competitive advantages in aeronautic SMETBs, exploring a new field of knowledge called strategic entrepreneurship.

Given the above, the following question was formulated to guide this research: **How does the process of strategic entrepreneurship occur in small and medium-sized companies in the Brazilian and Canadian aeronautic sector?**

2. Theoretical Referential

2.1 Strategic Entrepreneurship in Ireland, Hitt and Sirmon's view

In order to identify and critically analyze the dimensions of strategic entrepreneurship, Ireland, Hitt and Sirmon (2003) developed a linear and sequential model, as presented in Figure 1, which is composed of four dimensions: (1) mentality, culture and leadership entrepreneur; (2) strategic management of organizational resources; (3) Application of Creativity; and (4) innovation development.

These dimensions integrate several theoretical foundations, including Resource Based View (VBR), Human Capital, Social Capital, Organizational Learning, and Creative Cognition. Ireland, Hitt and Sirmon (2003) argue that the integration between dimensions and the combination of opportunity seeking and competitive advantage will lead to wealth creation.

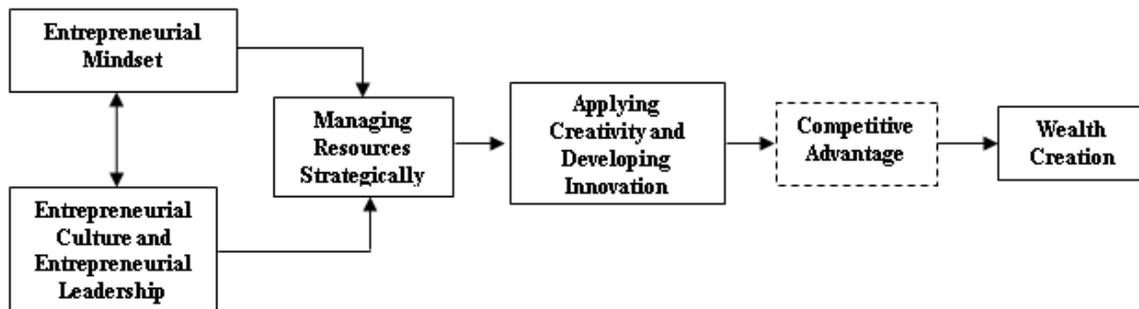


Figure 1: Strategic Entrepreneurship Model.
Source: Ireland, Hitt and Sirmon (2003, p. 967)

For Ireland, Hitt and Sirmon (2003), entrepreneurial mindset, culture and leadership are fundamental aspects of strategic entrepreneurship and are intrinsically linked, as they promote and support the continuous pursuit of entrepreneurial opportunities that can be exploited with sustainable competitive advantage.



McGrath and MacMillan (2000) explain that an entrepreneurial mindset is a way of thinking about the business that focuses on capturing the benefits of uncertainty. Thus, the entrepreneurial mindset can be defined as a growth-oriented perspective by which individuals promote flexibility, creativity and innovation (Alvarez & Barney, 2002; Ireland, Hitt & Sirmon, 2003).

Organizational culture, on the other hand, is a system of shared values and beliefs that form the company's structural arrangements and its members' actions for the production of behavioral norms (Dess & Picken, 1999). It is important to highlight that culture influences the cognitive framework that affects how entrepreneurs perceive issues as well as how they view their company's competitive scenarios (Johnson, 2002).

Committed to the importance of opportunity seeking and competitive advantage, an effective entrepreneurial culture is one where new ideas and creativity are expected, risk-taking is encouraged, failure is tolerated, learning is promoted, product innovations, process and management are advocated, and continuous change is seen as an opportunity carrier (Ireland, Hitt & Sirmon, 2003).

Entrepreneurial leadership is the path to innovation, creativity and organizational sustainability. It adds value to the organization, employees and society. For the organization, it enhances the skills of its employees; for employees, by encouraging self-development; to society for the benefits of innovation and creativity (Covin & Slevin, 2002).

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 underlie organizations' differentiated performance in terms of value creation. Barney and Arikan (2001) show that the use of idiosyncratic resources by companies has a strong influence on performance, rather than industry characteristics. For Miller and Shamsie (1996), different types of resources explain organizational performance in different types of environments.

Hitt, Bierman, Shimizu and Kochhar (2001) found that human capital, a type of idiosyncratic resource, has a direct and indirect effect on company performance through interaction with strategy. The authors add that the results of some studies initially indicate that the cost of human capital exceeds the value of the benefits it produces, however, as human capital increases (knowledge increase), the value created exceeds the costs. In addition, there is growing evidence that a company's



ability to effectively manage its resource portfolio directly affects its performance (Zott, 2003).

For Ireland, Hitt and Sirmon (2003), the strategic management process of organizational resources for wealth creation is implicitly assumed in the Resource Based View (RBV). The authors argue that resources are strategically managed when their deployment facilitates the simultaneous and integrated use of the pursuit of opportunity and competitive advantage.

Strategic management of organizational resources, on the other hand, affects the value that derives from the intangible (image, reputation, etc.) and tangible (strategic inputs) assets that organizations use to develop and implement their strategies, suggesting that the creation, maintenance and sustainability of Resource accumulation and deployment techniques can become a focal point of research (Kantur, 2016; Lyver & Lu, 2018).

Another important aspect of the model presented by Ireland, Hitt and Sirmon (2003) is the application of creativity, a vector of wealth creation that grows from the attributes of individuals, towards the requirements of a given market. For Barney and Arikian (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.

Defined as "[...] an approach to work that leads to the generation of innovative and appropriate ideas, processes or solutions" (Perry-Smith & Shalley, 2003, p. 90), creativity is an ongoing process. One can say that creativity adds value to knowledge and makes it progressively more useful. From this perspective, Ireland, Hitt and Sirmon (2003) show that creativity is the basis for innovation and is favored when resources are strategically managed.

Creativity therefore affects the quality and quantity of both disruptive and sustainable innovations (Anderson, Eshima & Hornsby, 2019). In general, organizational actors with substantial knowledge in a particular area are likely to be creative in developing sustainable innovations. Actors with broad knowledge in various disciplines are likely to be creative in many ways that result in disruptive innovation (Ireland, Hitt & Sirmon, 2003). Sustainable creativity results from organizational actors that generate new ways to create value through their work, while disruptive creativity results from actors who reconfigure the procedure and create value through new work alternatives (Perry-Smith & Shalley, 2003).



The last dimension, innovation development, is an essential tool for increasing the organization's productivity and competitiveness, as well as for boosting the economic development of regions and countries (Coutinho, 2004). For Tigre (2006), development does not derive from a mere growth of existing economic activities, but lies primarily 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 use of information and knowledge.

For Schumpeter (1982), new combinations of factors of production are the essence of innovation. Ireland, Hitt and Sirmon (2003), based on Schumpeter's work, argue that innovations resulting from new combinations of factors of production are fundamental to wealth creation and, in turn, relevant to strategic entrepreneurship. With strategic entrepreneurship, organizations are able to develop two types of innovations: (a) disruptive or radical; and (b) sustainable or incremental.

Sustainable or incremental innovation occurs continuously in any industry, although it may vary by sector or country depending on demand pressure, sociocultural factors, opportunities and technological trajectories. Technological change does not necessarily derive from Research and Development (R&D) activities, but is more commonly the result of internal learning and accumulated training (Tigre, 2006).

On the other hand, disruptive or radical innovation breaks the boundaries of incremental innovation, bringing a new balance of productivity and initiating a new incremental technological trajectory. Radical technological change occurs when there is a breakdown of existing trajectories, inaugurating a new technological route. Radical innovation is often the result of R&D activities and is discontinuous in time and sector (Tigre, 2006).

From this point of view, sustainable or incremental innovation contributes to the pursuit of competitive advantage, and disruptive or radical innovation contributes to the identification and exploitation of new opportunities, given the new combinations of resources that create productive capacities and lead to competitive advantage (Ireland, Hitt & Sirmon, 2003).

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 ventures, for example, to obtain and manage resources strategically, especially to establish and sustain a competitive advantage.



Ireland, Hitt and Sirmon (2003) explain that these companies are more likely to be flexible and entrepreneurial and less likely to have the resources and capacity to build a competitive advantage. Similarly, for companies already established in the market and already have a competitive advantage, it is difficult to continue to seek and exploit entrepreneurial opportunities.

2.2 Strategic Entrepreneurship in Kyrgidou and Hughes' view

Based on additional research and critical analysis, Kyrgidou and Hughes (2010) suggest that the Ireland, Hitt and Sirmon (2003) model lacked the robustness needed to capture the Gestalt of strategic entrepreneurship. For the authors, the previous model contains several limitations and absences that undermine the understanding of how strategic entrepreneurship can succeed in practice. Thus, for example, although strategic entrepreneurship is defined as the pursuit of opportunity (entrepreneurship) and competitive advantage (strategic management) (Ireland, Hitt & Sirmon, 2003), the model is linear and sequential between the concepts of entrepreneurial activities and strategic and lacks a feedback loop between the two concepts.

In addition, the model is linked to behavioral variables such as entrepreneurial mindset for opportunity identification; or applying creativity to create innovation, but does not take into account the conditions of the organization's internal environment, which provides a conceptual framework within which these variables are embedded (Kyrgidou & Hughes, 2010).

The last criticism that Kyrgidou and Hughes (2010) make to the model of Ireland, Hitt and Sirmon (2003) is that the authors do not take into account dynamic capabilities, since in rapidly changing environments the resources that underpin 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, as presented in Figure 2. Although the critiques, 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 highlight the interactivity between the steps, which contributes to the refinement of decision making.

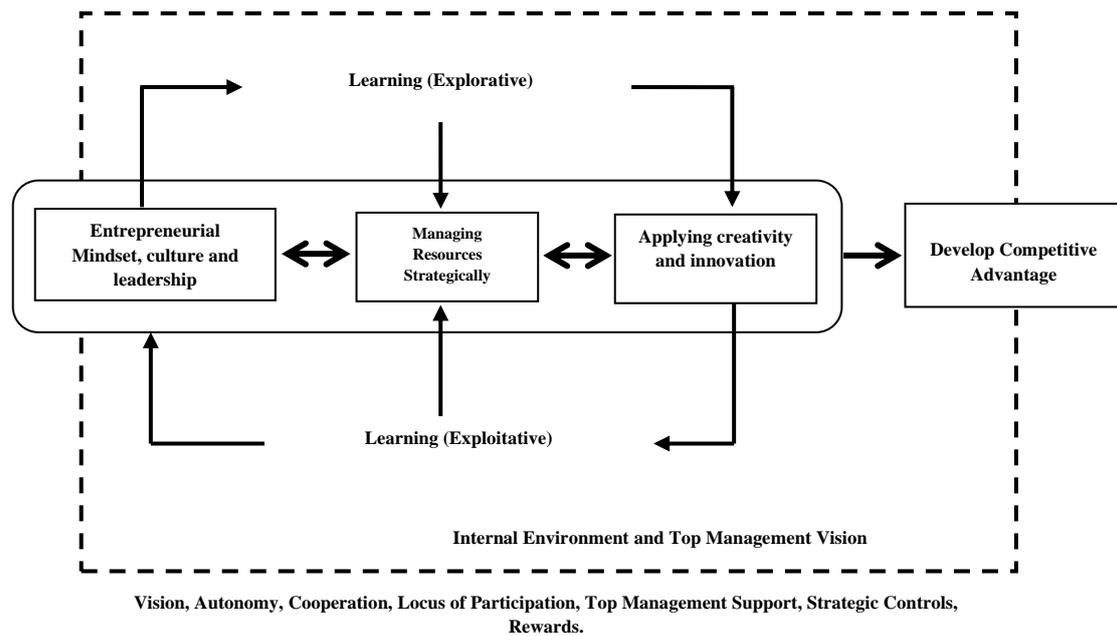


Figure 2. A practical model of Strategic Entrepreneurship.
Data: Kyrgidou and Hughes (2010, p. 53)

The alternative model by Kyrgidou and Hughes (2010) is almost linear, focusing on the internal organizational environment and the vision of top management. For the authors, the search for a new opportunity begins with the analysis of the company's mindset, culture and entrepreneurial leadership, which then manages strategic resources and, finally, applies creativity so that it can develop an innovation. These three steps are intrinsically linked, as they promote and support the ongoing pursuit of entrepreneurial opportunity, contributing to the development of competitive advantage (Lyver & Lu, 2018).

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

The authors used March's (1991) perspective learning theory to understand exploratory learning and exploitation learning, and Teece, Pisano and Shuen's (1997) view of dynamic capabilities theory.

For better understanding, Teece, Pisano and Shuen (1997) explain that dynamic capabilities refer to the ability to renew competencies to achieve an appropriate relationship with the ever-changing business environment. The term



capacity emphasizes the role of strategic management in adapting, integrating and reconfiguring internal and external organizational skills, resources and functional competencies to meet the demands of a changing environment. Dynamic capabilities are based on sustained competitive advantage.

Regarding learning, March (1991) explains that the exploratory reflects the efforts to create a new and unique vision, as well as knowledge, through the process of discovery and experimentation. Exploitation learning, on the other hand, reflects a process of acquiring and refining existing knowledge to improve current activities or solve immediate problems.

He and Wong (2004) and Kyrgidou and Hughes (2010) point out that exploratory learning is like a process of knowledge refinement that depends on identifying a problem or gap in how the organization conducts its business. It represents an initiative to improve the current activities of the company and build, over the past and present, new technological trajectories. In the alternative model by Kyrgidou and Hughes (2010), the feedback effect reflects exploratory learning efforts to refine current activities and analyze how the company interacts through the process of strategic entrepreneurship.

On the other hand, exploitation learning is associated with a change in both technological and business trajectory (Benner & Tushman, 2002). That is, it occurs when an organization seeks to explore new and innovative ways of doing business (He & Wong, 2004). In the alternative model, exploitation learning takes place through feedforward interactions, helping the company develop new initiatives to enhance the process of strategic entrepreneurship.

In dynamic sectors and in an internal environment conducive to entrepreneurship, the integration between exploratory and exploratory learning; the ability of the organization to continually improve resource transfer and build new capabilities; and owners-managers' views are critical to achieving competitive advantage through entrepreneurial behavior (Kyrgidou & Hughes, 2010). This integration overcomes the static limitation of the model developed by Ireland, Hitt and Sirmon (2003) and conceptualizes how organizations can sustain long-term wealth creation through the process of strategic entrepreneurship.

2.3 Strategic Entrepreneurship in the view of Hitt, Ireland, Sirmon and Trahms

Hitt, Ireland, Sirmon and Trahms (2011), supporting the claim of Kyrgidou and Hughes (2010), argue that strategic entrepreneurship is broader and more dynamic



than was originally conceived. To contribute to the continued development of this research field, Hitt et al. (2011) developed a richer model, extended the models created by Ireland, Hitt and Sirmon (2003) and Kyrgidou and Hughes (2010), and incorporated a broader, multilevel domain to improve understanding of strategic entrepreneurship.

This new model, presented in Figure 3, encompasses three types of focus: (a) environmental; (b) organizational; and (c) individual and three dimensions: (a) input of resources and factors, (b) resource orchestration processes, and (c) benefit outputs, which contribute to the opportunity seeking process and competitive advantage.

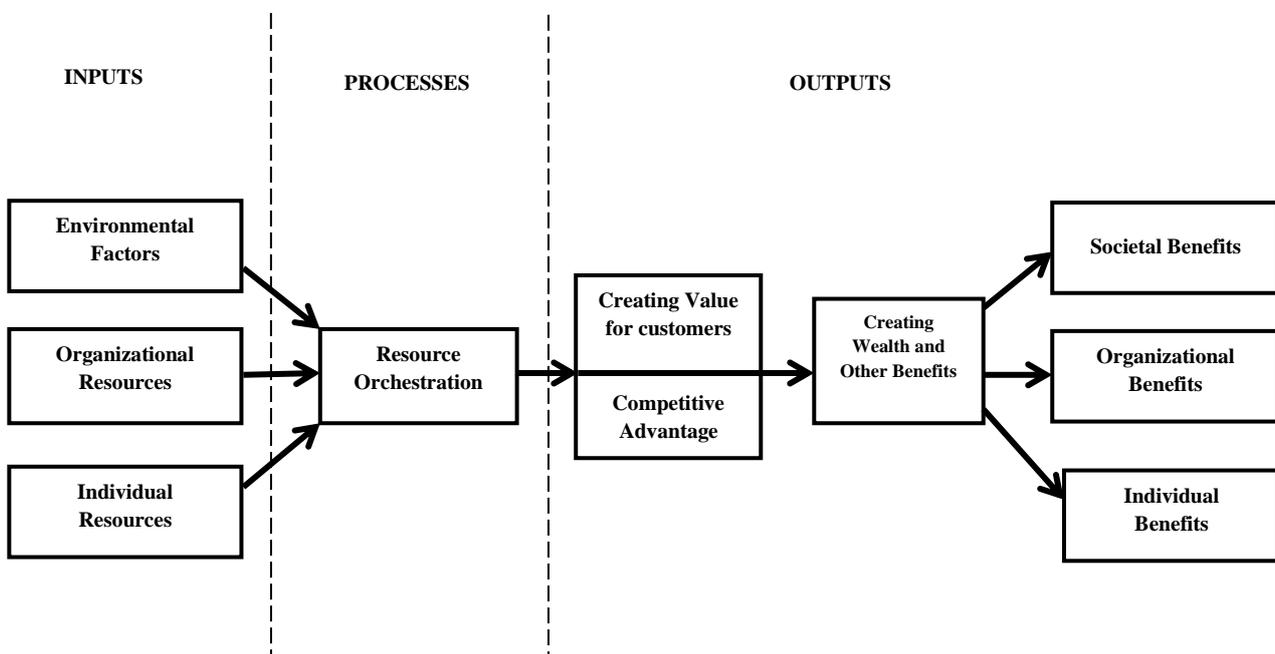


Figure 3: Input-Process-Output Model of Strategic Entrepreneurship.

Data: Hitt et al. (2011, p. 60)

Hitt et al. (2011) explain that the first dimension of the model describes the features and factors that serve as input to the strategic entrepreneurship process at different levels, including environmental, organizational and individual factors. For better understanding, environmental factors are related to three variables: munificence, dynamism and interconnection; that are important for strategic entrepreneurship. For Agarwal, Audrestsh and Sarkar (2007), a munificent environment is a liberal environment that facilitates the acquisition of resources and the identification of opportunities, as well as the creation of competitive advantage.



Munificence enables organizations to acquire resources such as raw materials, financial capital, labor, and intangible assets from a particular sector or geographic region, contributing to the sustained growth, stability, and survival of organizations (Kantur, 2016; Anderson, Eshima & Hornsby, 2019). Gaglio and Katz (2001), complementing the munificent environment, suggest that entrepreneurial individuals seek opportunities in dynamic markets, using their knowledge and skills stocks to identify and deal with uncertainty. For McMullen and Shepherd (2006), dynamic environments are fraught with uncertainties that pose a threat but reveal opportunities.

In dynamic environments, some companies use relationship networks to access the resources needed by some partners, and then use them to explore opportunities for competitive advantage and wealth creation (Hitt et al., 2011). From this perspective, interconnection theory includes relationship networks and social capital that explain the ways in which organizations build their capabilities. Ketchen, Ireland, and Snow (2007) argue that collaborative innovation underpins strategic entrepreneurship when large and small companies share ideas, knowledge, skills, and opportunities.

Organizational factors include culture and entrepreneurial leadership, which for Hitt et al. (2011) are perhaps the most critical resources for a given organization. Thus, leadership is important for developing and supporting the culture through which entrepreneurial actions assist profitable growth (Kuratko et al., 2005). An enterprising culture is one in which creativity and new ideas are expected, risk acceptance is encouraged, failure is tolerated, learning is promoted, innovations are defended and continuous change is seen as a carrier of opportunity (Ireland). , Hitt & Sirmon, 2003).

Similarly, entrepreneurial leadership is the ability to influence others to emphasize the pursuit of opportunity and competitive advantage (Covin & Slevin, 2002). In the view of Shepherd, Patzelt and Haynie (2009) and Hitt et al. (2011), leadership and culture are interdependent and symbiotic, and influence a leader's future decisions and actions with judgments that affect organizational culture and cultural attributes.

Finally, the individual factors that are composed of finance capital (tangible resource) and social and human capital (intangible resources) are important for understanding strategic entrepreneurship (Hitt et al., 2011). Financial capital alone is relatively less important than social and human capital in achieving, and especially in maintaining competitive advantage (Chaddad & Reuer, 2009, Hitt et al., 2011).

Financial capital is often crucial for acquiring resources for companies to exploit opportunities. Thus, for example, new ventures with a strong financial positioning in the



early stages of development are more likely to survive and grow, experiencing better outcomes (Chaddad & Reuer, 2009). In addition, established companies with vast financial resources have time off, which can facilitate the innovation developments (Kim, Kim & Lee, 2008).

On the other hand, the company's social capital, which is the sum of its internal social capital (relations between individuals) and its external social capital (relations between organizations and individuals outside the focus company), facilitates access to resources, favoring pursuit of opportunity and competitive advantage (Hitt, Lee & Yucel, 2002).

In a specific context, evidence indicates that an entrepreneur's social skills and social networks influence the results of both new and established businesses (Baron & Tang, 2009, Batjargal et al., 2009). Additional evidence points out that within a company, individuals with well-developed social skills who recognize and create opportunities, often through social networks, can gain prominence in resource-intensive projects beyond the confines of the company (Kleinbaum & Tushman, 2007).).

The last variable that makes up individual factors is human capital, which is the set of individual capacities, knowledge, and experiences related to the task and ability to increase "capital" through learning (Dess & Lumpkin, 2001). For Chandler (1962 as quoted in Hitt et al., 2011), of all resources available to companies, human capital is perhaps the most important. Within this context, idiosyncratic human capital may be critical to the survival of a new venture (Baker, Miner & Easley, 2003).

In sum, the first dimension of the advanced model of strategic entrepreneurship presented by Hitt et al. (2011) stresses that munitive and dynamic environments, business relationships, individual knowledge, individual and organizational skills, along with entrepreneurial motivation and passion, are important sources of long-term success for an organization to explore opportunities and opportunities achieve competitive advantage.

The second dimension of the advanced model by Hitt et al. (2011) is the process of orchestrating resources. This stage is characterized by gaining competitive advantage in the decision-making of organizational leaders and controlling valuable and rare resources. For the authors, resource orchestration is concerned with actions taken by entrepreneurs to facilitate efforts to effectively manage company 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 capabilities of the organization; and (3) leverage capabilities to create customer value and wealth for entrepreneurs.

More specifically, structuring includes acquisition, accumulation and divestment of resources; Aggregation involves company actions to consolidate existing capabilities, enrich current capabilities, and pioneer new capabilities by providing a learning context. Leverage, on the other hand, requires a sequence of actions that includes mobilizing resources to create configurations of the capabilities required for a given organization; coordinating these settings to enhance value creation; and the implementation of a specific strategy for the company.

Importantly, while each action and subprocess is useful for resource orchestration, it is critical that they are synchronized correctly, as they will influence the company's future results, creating value for customers and wealth for entrepreneurs (Ndofor, Sirmon & He, 2011).

The last dimension of the model by Hitt et al. (2011) refers to the outputs of the strategic entrepreneurship process, those processes and actions that compose it, such as the pursuit of opportunity and competitive advantage, and that generate several potential benefits contributing to the creation of wealth for entrepreneurs and the creation of value for the employees. customers. The authors explain that there are three types of benefits: individual, organizational and social.

Individual benefit is related to the entrepreneur's financial and socio-emotional wealth creation (Baron & Henry, 2010). Importantly, this wealth creation is a process whereby entrepreneurs' skills, abilities, knowledge, behavior and values contribute to the recognition, assessment and exploitation of new opportunities.

Organizational benefit is associated with innovation and the creation of new technology. It is considered one of the valuable resources that contribute to competitive advantage (Hitt et al., 2011). For Woolley (2010), the organizational benefit is the creation of new knowledge that, in turn, provide new market opportunities, favoring the organization's competitive success, regardless of the sector in which it is inserted.

Finally, increasing entrepreneurs' wealth can produce social benefits by injecting more financial capital into the economy, promoting economic growth (Agarwal, Audretsch & Sarkar, 2007). Indeed, many scholars debate that entrepreneurial activity plays an important role in the development and economic growth of a country and in the creation of new jobs.

Entrepreneurial activity can also provide other benefits to society. A new area of research entitled Social Entrepreneurship examines how entrepreneurs develop



organizations to help members of society who are often low-income and underprivileged (Kistruck et al., 2011). According to Zahra et al. (2008) and Short, Moss and Lumpkin (2009), this focus has become a significant and growing field of research.

Essentially, social entrepreneurs create organizations to meet social needs and, in the same way, improve the quality of life of members of society, increasing the rate of human development over time (Zahra et al., 2008).

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

As described, the advanced model of strategic entrepreneurship developed by Hitt et al. (2011) is based on the concept of multilevel in which resources can exist and / or be created in the spheres of the individual, organization and society. The results of entrepreneurial activities, which are wealth creation for entrepreneurs and value creation for customers, can generate benefits for individuals (entrepreneurs, managers, employees, customers, etc.), organizations and society. The authors conclude that there are few studies crossing 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, entrepreneurial activity for economic growth, and the critical value of strategic management for the survival and success of organizations, and increase the importance of strategic entrepreneurship.

In short, strategic entrepreneurship enables organizations to apply their knowledge and skills in the current context and to explore opportunities for harnessing 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) point out 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 economical environments.

3 Research Methods

In order to elaborate a robust study compatible with the research needs, we used the multiple case study methodology according to Eisenhardt (1989) recommendations. The study addressed the reality of four technology-based SMEs in the aeronautical sector, two Brazilian and two Canadian, and described how the process of strategic entrepreneurship occurs. For Eisenhardt (1989), the choice of cases is critical because it defines the characteristics of the research design. Additionally, the appropriate choice of the sample to be studied makes it possible to control external variations and to define the limits of consideration of the results for other contexts.

The sample composition of the studied SMEs is presented in Chart 1. The cases were intentionally chosen based on the contributions they could make to the study, i.e., the study sample was characterized as theoretical and intentional. For the sample selection, each participating company had, among the basic characteristics, the following traits:

- Nature: Technology-based companies subcontracted to a large company that develops regional aircraft projects;
- Size: Small (20 to 99 employees) and medium (100 to 499);
- Location: Metropolitan Region of Paraíba Valley and North Coast and Metropolitan Region of Montreal;
- Business Trajectory: Aeronautical Sector; and
- Constitution Time: With more than 5 years of operation.



Aeronautical Sector PMEBT (Foundation, Location)	Activities / Products	Interviewees and Interview Duration
Aeronautical Ventures (notional name) 1998 - São José dos Campos - SP - Brazil (inside Univap Technological Park) Aero Brasil (fictitious name)	Medium company with 128 employees specializing in the development of landing gear solutions. The company also designs and manufactures civil and military aircraft.	Interviewees: company president and technical director and co-founder. Running time: 2h 42min.
Aero Brasil (nome fictício) 2005 - São José dos Campos - SP - Brazil (Incubaero graduated company)	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 multifunction displays for air navigation in special applications.	Interviewees: 2 owner-managers. Duration: 1st interview lasting 1h 15min and 2nd interview lasting 2h.
Aerospace Altitude 2005 – Montreal – Canadá	A small company with 70 employees, specializing in the design, structural analysis and certification for both new aircraft development and fleet maintenance.	Interviewee: Nancy Venneman, president and founder of the company. Running time: 1h 36min
Mechtronix 1987 – Saint-Laurent – Canadá	Medium company with 200 employees, with multidisciplinary expertise in design, engineering.	Interviewees: Fernando Petruzzello (president and co-founder) and Thomas Allen (vice president of engineering and co-founder). Running time: 3h 15min

Table 1: Sample Composition of SMEs studied.

It is important to highlight that the owner-managers of the Brazilian companies, at the time of data collection, requested that the authors keep the real name of the companies confidential. In Canadian companies, there was no such request, that is, the participating owner-managers authorized the disclosure of the company name.

Survey data collection procedures were mainly based on in-depth semi-structured interviews with owner-managers. The interview script was based on the developed models Ireland, Hitt and Sirmon (2003) and Kyrgidou and Hughes (2010). Interviews were conducted in July 2012 at Canadian companies and March 2013 at Brazilian companies. This qualitative technique helped to gain and explore in-depth data and to consider respondents' perceptions and experiences.

The collected data were analyzed according to intra and inter-case analysis procedures (Miles & Huberman, 1994). This analysis aims to describe, understand, explain and cross-conceptualize the conceptual contents, processes and outcomes of a given phenomenon in a multi-case context and thus develop a more detailed understanding of all cases in the sample (Miles & Huberman, 1994).



4. Analysis of Results

4.1 Description of the Company's Strategic Entrepreneurship Process Aeronautical Enterprises

In order to deepen the knowledge about the strategic entrepreneurship process of the company Aeronautics Enterprises, a graphical representation was elaborated based on the strategic events presented in the previous section, presented in Figure 4. This representation shows the stages of the strategic entrepreneurship process, including the pursuit and exploitation of opportunity and competitive advantage, resulting in the creation of value for organizations, individuals and society.

The analysis in Figure 4 indicates the beginning of the process of strategic entrepreneurship with the search and seizing of opportunity through entrepreneurial activity of owner-managers, strategic partnerships and the innovation development, which are associated with each other.

This activity, represented by the identifier “A”, was and is motivated by three elements: professional experience, vision and passion for the sector. As for his professional experience, the founder of the company had a degree in aeronautical engineering from the Technological Institute of Aeronautics (ITA), and before starting Aeronautical Enterprises, was founder and organizer of Embraer's Equipment Division (EDE) - known today as ELEB- Embraer - Division.

Current owner-managers also have extensive industry experience. The first owner-officer is an honorary member of the Brazilian Air Force (FAB), a mechanical engineer graduated from the University of Brasilia (UnB) in 1980. He has 25 years of experience in technology and systems development in the aeronautics industry, and has held positions. leadership and direction at Embraer in the commercial, corporate marketing and sustainability areas. He currently serves as CEO.

The second is an aeronautical engineer graduated from ITA in 1964 and has 40 years of experience in aviation, ten of which as director of Embraer. Created and designed the aircraft Urupema, Embraer's first product. He currently serves as technical director, responsible for aeronautical engineering and systems engineering, mainly in the areas of design, methods and industrial processes and quality control.

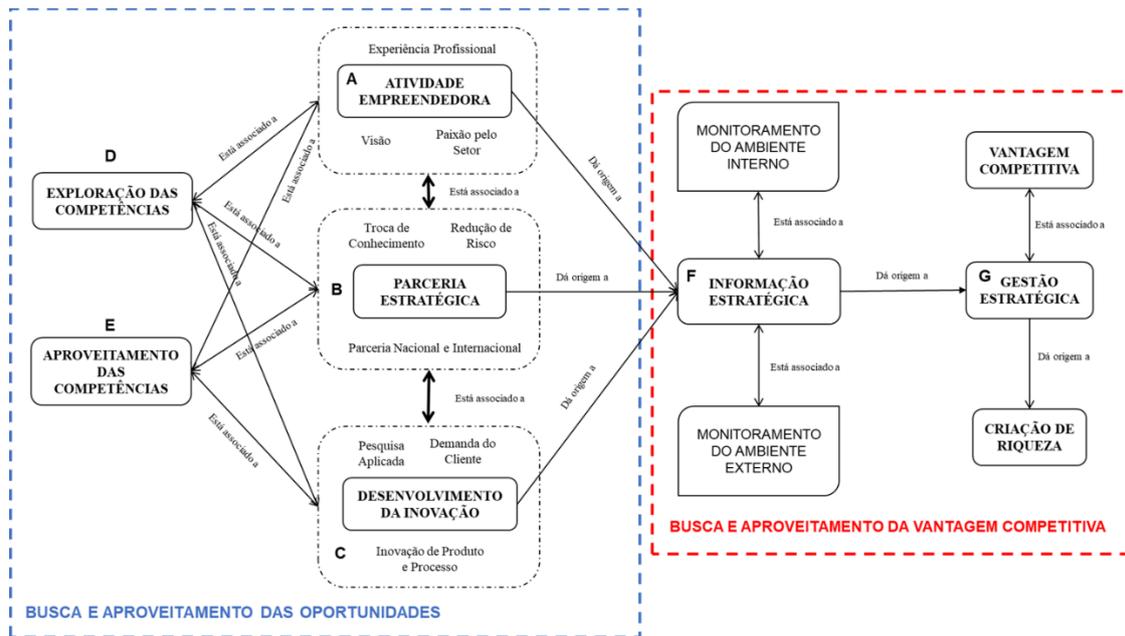


Figure 4: Graphic Representation of the Strategic Entrepreneurship Process of the Company Aeronautical Enterprises

Vision, one of the enablers of entrepreneurial activity, was paramount to the establishment of the company and, above all, a driver for future opportunities, providing indicators for owner-owners to organize and develop activities. The excerpts from the following interview provide a brief explanation of the importance of vision for entrepreneurial activity and as a source of opportunity search for the creation of the company:

The [founder] was a visionary person and had a dream to make a difference for his country. I remember a conversation in which he told me that he wanted Brazil to be a reference in the development and manufacture of landing gear for commercial and defense aircraft. For that to happen, he could not stand behind an office desk. That's when he decided to open [Aeronautical Enterprises].

One of the interviewees continues:

Based on his view of the landing gear market, the opportunity to create the company was identified in 1997 when the [founder] attended an aeronautical fair in Toulouse, France. During this period, there was an intense discussion about the development of a specific landing gear for defense aircraft. One of the proposals made at the fair was for ELEB to manufacture this type of landing gear. However, the company had no experience and knowledge in this area. That's when [Aeronautical Enterprises] came into being.

To complement the professional experience and vision, presented in Figure 4, the passion for the sector is a motivating factor for the entrepreneurial activity of the



company. Respondents report that even knowing that the aeronautical sector is one of the most complex and dynamic sectors in the world, due to the complexity of the system that makes up the aircraft and the amount of innovation involved in the projects in the area, what drives the company is the passion of all by aviation. Respondents add that this passion stems from the stories of Santos Dumont, especially of the flight made by the Brazilian in a heavier-than-air device, the "14-Bis", on September 13, 1906, in Paris.

Identifier "B" of opportunity search and seizure - which is associated with identifier "A" presented in the Strategic Entrepreneurship process of Aeronautical Enterprises - is the strategic partnership. The data obtained from the interviews indicate that the realization of strategic partnerships acted as a response to globalization and the increasing uncertainty and complexity of the markets, and thus implied knowledge exchange and risk reduction, providing a better competitive position for companies. The following interview excerpts provide a brief explanation of strategic partnerships:

We find strategic partnerships extremely important. In the case of [Aeronautical Enterprises], these partnerships were crucial to our success and, in some cases, essential to the company's survival.

One of the interviewees complements:

The main reason why the company seeks new partners is risk reduction, as our projects are of high technological intensity. Another important factor is the knowledge exchange of everyone involved. However, it is interesting to note that in this sector it is very difficult to make good partnerships.

Based on the data collected it was found that the process of finding new partners is slow and requires a lot of trust between the parties, as it involves industrial secrets given the high technological intensity of the projects. Possible future partners are identified at meetings at AIAB and the Center for Competitiveness and Innovation of the Eastern Cone Paulista (Cecompi), national and international business fairs; and with advice given by the owner-managers at the Technological Park and Incubaero in São José dos Campos.

The main national partners are: (a) **Embraer**: Empreendimentos Aeronauticos develops and supplies landing gear for Embraer aircraft; (b) **Celog**: development and manufacture of landing gear for the T-27 Tucano; (c) **Winnstal** and Flight Technologies: development and manufacture of military training aircraft (Project T-Xc); and (d) **Higher Education Institutions** and **Research Center**: Research,



Development and Innovation (PD&I) agreements with ITA, CTA and UFMG. The international partners, both American, are: (a) **Eviaton Jets**: development and manufacture of landing gear and wings for the EV-20 Vantage aircraft; and, (b) **US Aircraft Corporation**: development and manufacture of light military strike aircraft.

The “C” identifier for the search and seizure of opportunities - which is associated with the “B” identifier, shown in Figure 4 - is the innovation development. This factor is multifaceted, characterized by complex interrelationships between people and institutions. It involves new ideas and problem-solving in terms of creativity and intellectual endeavors, often in large proportions and under uncertain conditions at high risk. The innovation development, both product and process, should be understood as the process that aims to turn opportunities into new ideas and to put them widely into practice (Schumpeter 1982; Kemp, Smith & Becher 2000; Ireland, Hitt & Sirmon, 2003).

Respondents point out that innovation is a central factor of the company and technology becomes one of the bases of strategic management, guiding the fundamental question of how to establish a competitive advantage and how to ensure the survival of the company.

Other elements related to the search and seizure of the opportunities of the Strategic Entrepreneurship process of the company Aeronautics Enterprises are associated with the exploration and exploitation of competences. Therefore, entrepreneurial activity, strategic partnership and the innovation development are associated with the exploration and exploitation of skills.

As already seen, the exploration of competences, represented by the identifier “D”, reflects entrepreneurs' efforts to create visions and possibilities, based on research, experimentation, creativity and innovation development, risk acceptance and learning (March, 1991). On the other hand, exploitation, represented by the identifier “E”, is related to the refinement of existing knowledge (product, process and market), contributing to the improvement of current activities or immediate problem solving (March, 1991).

The data collected indicate that, given the dynamism of the economic scenario, Aeronautical Ventures always takes advantage and exploits all the skills of 30 aeronautical engineers who, on average, have 25 years of experience in the aeronautical sector. An example of exploring and harnessing the skills of engineers at Aeronautical Enterprises, which respondents cited, was the T-Xc Project. It is important to highlight that this project was created with the purpose of increasing and diversifying the company's product portfolio: from manufacturing only landing gear to producing



aircraft with specific objectives. Based on the interviewees' reports, it is evident that the analyzed company does not stand still in the face of change and that by changing, everyone involved in the process learns.

The identifier “F” of the strategic entrepreneurship process, as shown in Figure 4, is strategic information, which initiates the search and harnessing of competitive advantage. It is worth highlighting that strategic information is originated by the elements of the search and seizure of opportunities. That is, entrepreneurial activity, strategic partnership and the innovation development give rise to strategic information. Consecutively, strategic information is associated with monitoring the external and internal environment. The following interview excerpt provides a brief explanation of the importance of information for the company:

As an entrepreneur, I think every company should be able to collect, select and analyze information regarding the state and evolution of the environment in which it finds itself. That is, always seek new opportunities, either through innovation or for any other reason relevant to it.

Based on the data collected, Empreendimentos Aeronauticos dynamically responds to information obtained from domestic and foreign markets and the impact of decisions based on this information configures its strategic positioning in the market. The monitoring of the internal environment corresponds to the analysis of the current situation of the company with the purpose of managing owners to know the strengths and weaknesses of the company. That is, by observing and analyzing company resources and capabilities and results, and the current performance is that owner-owners have the ability to identify the company's strengths and weaknesses.

To this end, the interviewees explain that internal monitoring takes place through two steps: (1) identification of the factors that lead the company to fulfill its mission and vocation; and (2) identification of the company's strengths and weaknesses. Respondents complement that the company's strengths are human resources (employees with great knowledge and extensive experience in the sector) and the production area (produces quality products). The weak point is the internal communication between some departments, especially between the innovation creation and development department and the finance department.

In turn, monitoring the external environment corresponds to the search for information in the external environment. The types of information monitored by the company studied correspond to customer needs, new technologies, innovation and competitors' products, macroeconomic conditions (mainly interest rates, inflation and



exchange rates), socio-cultural conditions, market growth and export procedures and standards. and importation.

The data collected show that both internal and external monitoring contributed to better align the company with the conditions of its internal and external environments, as well as to reach higher levels of performance. Given this context, the strategic information gives rise to the strategic management of Aeronautics Enterprises, which is another element of the search and exploitation of the competitive advantage identified in the strategic entrepreneurship process, presented in Figure 4.

Based on this information, it was found that the Strategic Entrepreneurship process of Aeronautics Enterprises is a systematized process, based on the search and use of opportunities and competitive advantage. The pursuit and exploitation of opportunities comes from entrepreneurial activity, strategic partnership and innovation development, which give rise to strategic information, and, in turn, give rise to strategic management that is the basis for seeking and harnessing competitive advantage.

Based on the interviewees' reports, it was noted that the strategic management, represented by the identifier "G", uses the analysis of the external environment and for an adequacy of the internal structure, in order to obtain the necessary resources and capacities to achieve the organizational goal, which is wealth creation.

In this way, respondents report that the company's success is based on technology and partnerships, key factors for strategic management that leads to competitive advantage. According to the interviewees, the survival capacity of a company depends, in part, on its attitude to adapt to changes in its environment, especially in the world scenario that favors the globalization of markets and intensifies competition and cooperation.

4.2 Description of Aero Brasil Company Strategic Entrepreneurship Process

In order to deepen the knowledge about Aero Brasil's strategic entrepreneurship process, a graphical representation was elaborated based on the strategic events presented in the previous section, presented in Figure 5. This representation shows the process steps, including the search and seizing opportunity and competitive advantage, resulting in value creation for organizations, individuals and society.

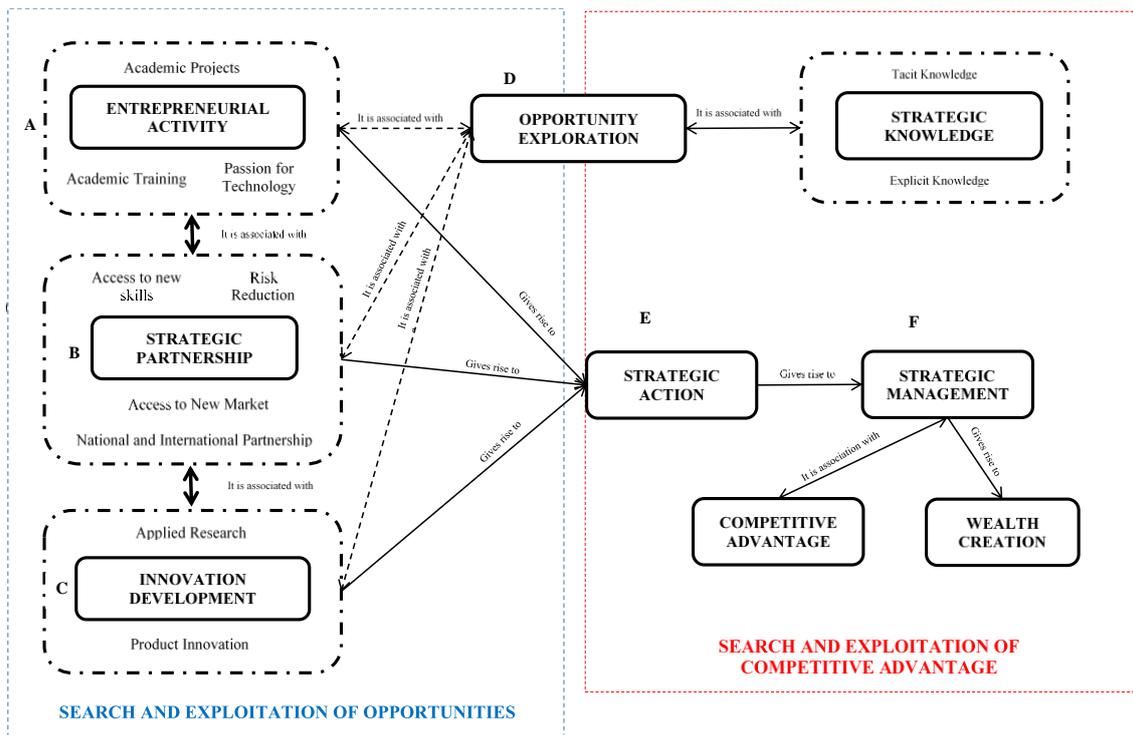


Figure 5: Graphical Representation of Aero Brasil Strategic Entrepreneurship Process

In the analysis of Figure 5, as in the previous case, it is noted that the process of strategic entrepreneurship in the analyzed company manifests itself with the search and seizure of opportunity by the entrepreneurial activity of owner-managers, national and international partnerships and of product innovation development. The entrepreneurial activity, represented by the identifier “A”, was and is motivated by three concepts: academic projects, academic formation and passion for technology.

As for academic background, the first owner-director is a graduate in aeronautical sciences from PUC Rio Grande do Sul, has a specialization in Aviation Safety and Aero Navigability from ITA and Strategy, Change and Innovation from Fundação Getúlio Vargas (FGV) and is a master in Aeronautical and Mechanical Engineering from ITA. The second owner-director has a degree in Mechanical Engineering from the University of São Paulo (USP), a master's degree in Electrical Engineering from the same institution and a doctorate in Aeronautical Mechanical Engineering from ITA. Both had no professional experience before setting up Aero Brasil.



The passion for technology, one of the mobilizers of entrepreneurial activity, was fundamental to the constitution of the company. The following interview excerpt provides a brief explanation of the importance of the passion for technology for entrepreneurial activity and as a source of opportunity search for the creation of the company:

I have a huge passion for technology and big challenges. From an early age, I was very creative and my family encouraged me a lot. I loved to open my toys to see how they worked. This passion has been increasing day by day. When I started my aeronautical science course, I immediately noticed that this was what I wanted for my life. Today I can say with tranquility, I am passionate about what I do and the daily challenges that the company provides me.

Complementing the academic background of the owner-managers and the passion for technology, the academic projects contributed to the formation of Aero Brasil. Respondents report that the partners participated in the research group on Mechanical and Aeronautical Engineering of the Center for Studies on Aeronautical Techniques of ITA. During this time, they were designing a new UAV, and the project advisor greatly encouraged them to become entrepreneurs.

Entrepreneurial activity is associated with the strategic partnership, which is represented by the identifier “B” in the search and seizing of opportunities, presented in Aero Brasil's strategic entrepreneurship process. From the data obtained, the objectives of the partnerships are: access to new skills, access to new markets, and risk reduction. The following interview excerpts provide a brief explanation of the importance of strategic partnerships:

Partnerships are essential to any business. By integrating with other companies in our portfolio, we deliver to our customers a more complete solution with respect to our competitors in the Brazilian market and this is a differential. Another factor is that the combination of skills, determination and competencies of both companies involved in the partnership is another sign of the strengthening of the national industry and our customers are the winners.

One of the respondents adds:

The big reason I have been looking for new partners in both Brazil and Canada is the diminishing dependence we have on our main customer which now accounts for 60% of our revenue. Currently, the industry is very hot and our client is closing several international



contracts. But if something negative happens to the market and our main customer, we will suffer the consequences directly.

Based on the interviewees' reports, it was found, once again, that the process of finding new partners is slow and requires a lot of trust between the parties, as it involves industrial secrets implicit in the high technological intensity of the projects. In the case of Aero Brasil, the identification of potential future partners occurs by participating in national and international technology fairs and events within ITA. The main national partners of the analyzed company are Embraer and CTEEx. The international partner is a Canadian company from the biotechnology sector, whose name was not mentioned by the interviewees.

Another factor in the search and seizing of opportunities in the strategic entrepreneurship process presented in Figure 5 is the innovation development, represented by the identifier "C". Thus, identifier "C" is associated with identifier "B", the strategic partnerships. It is known that the innovation development and its process are the main objectives of Aero Brasil company.

For the interviewees, innovation is the sustainability, continuous growth and continuity of Aero Brasil. Innovation is what keeps them alive today: it is the foundation of their strategic vision.

One element that lies between the pursuit and exploitation of opportunities and competitive advantage in the process of strategic entrepreneurship is the exploitation of competencies, represented by the identifier "D", which is associated with entrepreneurial activity, strategic partnerships and the innovation development. Based on the collected data, it was observed that given the complexity of the aeronautical sector Aero Brasil explores all the skills of its employees, especially the engineers involved in some research project.

The company currently has four aeronautical engineers, a mechanical engineer, two mechatronics engineers and a system analyst. The company tries to manage human resources from an innovative perspective by creating an environment with a strong incentive for innovation. The degree of autonomy for innovation, the acceptance of creative behaviors, the appreciation of originality and creativity in individual evaluation are remarkably high.



Another factor associated with the exploitation of competences is strategic knowledge, which is the combination of tacit and explicit knowledge. The following interview excerpt shows this step:

For knowledge to grow within our company, we encourage and sometimes pay courses for our employees. Thus they will have an accumulation of both theoretical and practical knowledge. With this, the company will profit a lot. In 2011, one of our aeronautical engineers spent two months at the Université de Toulouse honing his avionics skills.

The “E” identifier of Aero Brasil's strategic entrepreneurship process, as shown in Figure 5, is strategic action, the first element in the pursuit and exploitation of competitive advantage. Hitt et al. (2002) explain that strategic actions are activities by which organizations develop, exploit and take advantage of current competitive advantages. At the same time, strategic actions support entrepreneurial actions that exploit opportunities and help create competitive advantage for the company in the future.

For respondents, strategic action is a daily, pragmatic business activity that makes strategy tangible and measurable. They emphasize that strategic actions originate from entrepreneurial activity, partnerships and, mainly, from the innovation development.

Strategic actions give rise to Aero Brasil's strategic management, represented by the identifier “F”, as shown in Figure 5. From the data obtained, strategic actions contribute to the creation of the company's competitive advantage, which provides the creation of wealth. . Respondents say a company's ability to survive depends in part on its attitude to adapting to changing business environments, especially on the world stage, and that is strategic management. They add that Aero Brasil is preparing to address these challenges and to seize opportunities to ensure their growth, financial sustainability and sustainability.

4.3 Description of the Altitude Aerospace Strategic Entrepreneurship Process

The graphical representation, presented in Figure 6, presents Altitude Aerospace's strategic entrepreneurship process, including the search for opportunities and competitive advantage, resulting in the creation of value for



organizations, individuals and society. Altitude Aerospace's strategic entrepreneurship process is systematized, based on seeking and seizing opportunities and competitive advantage.

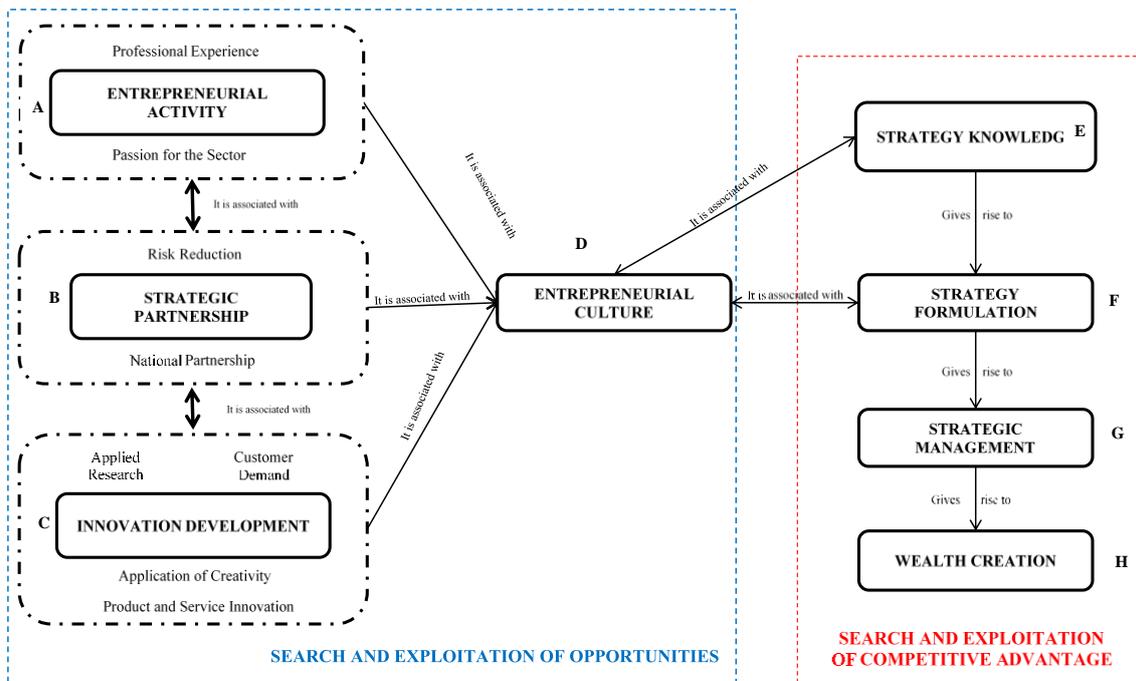


Figure 6: Graphic Representation of Altitude Aerospace Strategic Entrepreneurship Process

This pursuit and seizure of opportunity occur through entrepreneurial activity, strategic partnership, and the innovation development associated with the entrepreneurial culture that feeds the formulation, decision making, and strategic management that underpins the pursuit and exploitation of competitive advantage.

The process begins with the entrepreneurial activity, represented by the owner-manager identifier “A”. Based on the interviewee's reports, this activity was motivated by two elements: professional experience and passion for the sector. As for professional experience, Nancy Venneman graduated in mechanical engineering from the Université de Montréal - École Polytechnique de Montréal, with a postgraduate degree in finance from McGill University.

From 1996 to 2006 he worked at Bombardier Aerospace in the department of structural modification development, repairs and preventive



modifications for the Canadair Regional Jet (CRJ) fleets. In 2010, Réseau des Femmes d'affaires du Québec (RFAQ - Quebec Businesswomen Network) awarded her the title of Businesswoman of the Year in the category of International Entrepreneur. In 2011, Nancy was also named Entrepreneur of the Year by Ernst & Young in the province of Quebec.

To complement Nancy Venneman's entrepreneurial activities in 2008, Fadi Al-Ahmed was hired as Altitude Aerospace vice president and chief engineer. Fadi holds a degree in aeronautical engineering from the Sherbrooke University. From 1993 to 2000, he worked as a mechanical engineer at Canadair Defense System Division and between 2000 and 2008 at Bombardier Aerospace as head of structural engineering service section for CRJ aircraft.

In addition to the creation of the company, another entrepreneurial activity that the interviewee showed interest in performing was the acquisition of DICI Industries-Sokotech, a manufacturing company specializing in precision machining and assembly that provides services to the aerospace, telecommunications, defense and health sectors. In a recent contact, the interviewee stated that the acquisition was made in May 2013.

Passion for the industry, one of the enablers of entrepreneurial activity, was paramount to the founding of the company and the acquisition of DICI Industries-Sokotech. The interviewee explains that the passion for the sector has a family origin. His father was a distinguished Bombardier aeronautical engineer and actively participated in the launch of the following aircraft: Challenger 600 in 1976; CRJ 100 in 1992 and Global 5000 in 1993.

The following interview excerpt provides a brief explanation of the importance of the passion for the sector for entrepreneurial activity:

I remember that in my childhood I followed my father's enthusiasm and passion for the aeronautical projects he participated in. This passion and enthusiasm went from father to daughter, especially when I made my first visit to Bombardier at the age of 9. On this occasion, I got a miniature of the Challenger 600 aircraft that my father had helped build. On this day, I made a promise: I would be just as important to the aviation industry as my father. So, I develop my work with great love and try to do my best.

The “B” identifier of Altitude Aerospace's strategic entrepreneurship process is the strategic partnership. The data obtained from the interviews show



that the reason for the partnerships was the reduction of risk in the technological projects that the company develops. The interviewee points out that the aviation industry is the most complex and dynamic in Canada, and that partnerships are a response to industry uncertainties. The following excerpt from the interview provides a brief explanation of strategic partnerships:

Strategic partnerships were essential to the company as we improved our strategic positioning. The main reason for seeking new partners is risk reduction in our technology projects. I emphasize that companies in the aeronautics sector are very closed, thus hindering the formation of new partnerships.

Based on interview reports, the process of finding new partners is slow and requires a lot of trust between the parties. Possible future partners are identified at meetings at the Consortium de recherche et d'innovation en Airepatial au Québec and the Association Québécoise du transport air (AQTA), and at national trade fairs.

Altitude Aerospace currently has two national strategic partnerships. The first partnership is with Avianor Groupe, and aims to serve the aircraft maintenance and component maintenance market, such as seats, wheels and brakes, and manufacturing repairs such as crew seats and cabin interior items. The second strategic partnership is with Chartright Air Group. The partnership with the two companies aims to improve the corporate jet logistics system with the SAP program entitled All-in-One-Fast-Start.

The identifier “C” of the strategic entrepreneurship process, presented in Figure 6 is the innovation development. Innovation and its development process are known to be the main pillars of the company's business model. The reports show that innovation projects are placed in the future full of uncertainties and risks. To reduce uncertainties, the company develops the innovation in four interacting phases, described below.

(1) **Ideation of Innovation:** It is the most creative phase of the innovation model. The interviewee argues that innovative ideas are not born ready. Idealization can occur in two ways: (a) customer demand: it is the



customer's request for the development of a new product to increase productivity and competitiveness; and (b) applied research: includes research projects that represent research aimed at discovering new knowledge and that have specific business objectives with respect to particular products and processes.

(2) **Idea Generation:** It is a phase of refining ideas. The data collected show that this is an important phase, as there is interaction between employees and information sharing to generate ideas. Business opportunities can be created at this stage.

(3) **Development and Experimentation:** It is a phase of high investments in R&D, creation and experimentation of pilot projects. Reports indicate that development and experimentation reduce uncertainties and accelerate the creation of strategic management focused on the technology developed. The interviewee adds that the sooner innovation emerges, the faster the company will gain competitive advantage. The company conducts pilot projects, simulations and tests to verify the solution's adherence before bringing them to the market.

(4) **Commercialization:** This is the last phase of Altitude Aerospace's innovation development model. After approval of the pilot projects, the sale of new products and the provision of new services begin.

The innovation development process at Altitude Aerospace is part of the Montreal Metropolitan Region's regional innovation system. This system is interested in spreading the culture of innovation as a competitive differential of aviation and aerospace companies in the globalized world.

For Sáenz and García Capote (2002), the innovation system seeks to understand how the process in which technological innovations emerge, both in relation to the emergence and diffusion of knowledge elements and in relation to their transformation into new products and production processes. .

The interviewee also points out that innovation for Altitude Aerospace is the practical application of creativity, and adds that creativity contributes to the increase of the company's results. He concludes by saying that to innovate it is



necessary to focus, prioritize what is really important and have discipline in the execution of projects.

The last element of the search and seizing of opportunities presented in the process of strategic entrepreneurship and that is associated with the previous elements is the entrepreneurial culture, represented by the identifier "D". Schmidt and Dreher (2008) explain that the entrepreneurial culture is related to the organizational environment in which the individual is inserted. The following excerpts from the interview provide a brief explanation of entrepreneurial culture and meet Schmidt and Dreher's (2008) statement:

We try to develop in our employees the ability to create their own opportunities. In my view, individuals are not born entrepreneurs, they develop this trait in their environment, and the environment is a positive or negative influence on this trend. Bombardier provided an innovative and entrepreneurial environment and today I am what I am due to this incentive. Thus, I encourage new ideas and creativity and stimulate learning, that is, I value the entrepreneurial spirit.

The interviewee complements:

However, the environment is not the only factor in entrepreneurial culture. I believe knowledge is very important to the organization. Knowledge is the bridge between opportunity identification and strategy formulation, i.e. between entrepreneurship and strategic management.

The interview report shows that entrepreneurial culture is associated with strategic knowledge, represented by the identifier "E" and the strategic formulation of the company, represented by the identifier "F", being one of the factors in the search and use of competitive advantage. Thus, strategic knowledge generates faster responses to the problems and challenges that the aeronautics sector provides for the analyzed company.

By analyzing the strategic formulation, which originates in strategic knowledge and is associated with the entrepreneurial culture of the company, it was found that the owner-manager of Altitude Aerospace understands it as a process of strategic reflection, which results from the elaboration of a strategic plan that involves the analysis of the internal and external environment; the evaluation of alternatives; and the strategic choices. The interviewee adds that strategy formulation is influenced by factors such as organizational structure; emotional; and the power exercised by the customer.



The element that precedes strategy formulation is strategic management, represented by the identifier “G”, which, as shown in the data, is the integration between strategic objectives and company actions. The following interview excerpt provides a brief explanation of this element in the process of strategic entrepreneurship:

Deciding which strategy is best for the company is a painstaking and difficult process to back down and is related to our strategic goals. I remember that our main strategic objective is to be a leader in the aerospace segment in the Montreal region. All actions are linked to this goal. The result of the decision is the strategic management that we will execute.

Another important aspect is that Altitude Aerospace's strategic management is in line with the strategic management of its main client, Bombardier Aerospace, and is a rational, learning and adaptation process, vital to the company's future: to the origin of the creation of wealth.

According to the interviewee, the creation of wealth is the gain in value in tangible assets (product and service), financial assets (revenue and profit) and intangible assets (reputation and company image). This value gain comes from a voluntary, creative and proactive organizational attitude, with collective engagement at all stages of the strategic entrepreneurship process.

4.4 Description of Mechtronix Company Strategic Entrepreneurship Process

The graphical representation of Figure 7 shows Mechtronix's strategic entrepreneurship process including seeking and seizing opportunities and competitive advantage, resulting in value creation for organizations, individuals and society.

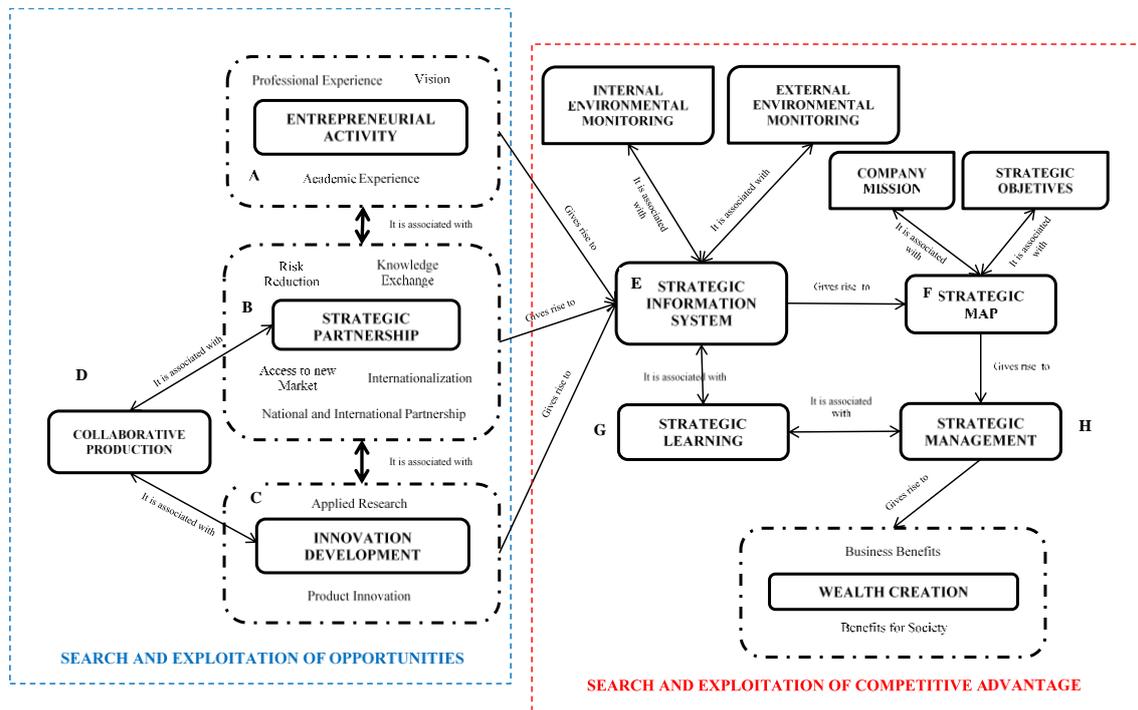


Figure 7: Graphic Representation of Mechtronix Company Strategic Entrepreneurship Process

The analysis of Figure 7 shows that the process of strategic entrepreneurship begins with seeking and seizing opportunity through entrepreneurial activity of owner-owners, national and international partnerships, and the development of product innovation.

Entrepreneurial activity, represented by the identifier “A”, was and is motivated by three elements: the vision of owner-managers; your professional and academic experiences. Regarding his professional and academic experience, Fernando Petruzzello, the company's president, is responsible for strategic planning and oversees technology management and engineering activities. Prior to founding Mechtronix, he worked at Concordia University as an electrical engineer and coordinated various projects at the Fluid Power Control & Research Laboratory. In 2006, he was awarded the “Entrepreneur of the Year” award by Ernst & Young. Petruzzello holds a degree in electrical engineering from Concordia University.

Joaquim Frazao, vice president, oversees each project developed by the mechanical engineering group and coordinates production resources to ensure quality work with respect to specifications and planning. In addition, she supports the after sales department of international clients. Prior to the



establishment of Mechtronix, Frazao was a supervisor at Concordia University's surface mechanics and tools laboratory. He is currently a professor in the department of applied sciences in the areas of machine dynamics and kinematics. Joaquim holds a bachelor's degree in mechanical engineering and a master's degree in applied science from Concordia University.

Thomas Allen, vice president of engineering and technology, is responsible for managing the technology used by Mechtronix. He coordinates all flight simulator projects and is primarily responsible for the economic contracts with Bombardier Aerospace and Transportation. Prior to joining Mechtronix, he participated in several research projects at Concordia University in the development of avionics system simulation software. Allen holds a degree in computer engineering from Concordia University.

Marco Petruzzello, production manager, is responsible for production management and supervision. Its responsibilities include developing manufacturing processes for individual jobs, coordinating all mechanical manufacturing and assembly of simulators, and allocating human resources and equipment and materials to achieve continuous and efficient production. Marco holds a Bachelor of Science degree and a master's degree in eco-toxicology from Concordia University.

Xavier-Henri Hervé holds a degree in mechanical engineering, a master's degree and a doctorate in applied science from Concordia University. Prior to founding Mechtronix, he was a project engineer at Bombardier Aerospace and CAE Electronics. He has now relocated from the company to take a strategic position at Concordia University and create the District3 Innovation Center.

Vision, one of the enablers of entrepreneurial activity, was paramount to the formation of the company and, above all, a driver for future opportunities, providing indicators for owner-owners to organize and develop activities. The excerpts from the following interview provide a brief explanation of the importance of vision for entrepreneurial activity and as a source of opportunity search for the creation of the company:

We are visionary entrepreneurs. When the opportunity arose to participate in the challenge launched by the National Research Council, and thinking about the promising market that was microprocessors, we decided to open the company.



One of the interviewees complements:

When the discussions on environmental sustainability began, we identified a golden opportunity. We realized that the world would need clean technology solutions. So, in 2006, we created Mechtronix Environment.

Another element of the search and seizing opportunity presented in Mechtronix's strategic entrepreneurship process is the strategic partnership, represented by the identifier "B", which is associated with entrepreneurial activity. From the collected data it was found that the causes of the partnerships were the risk reduction in the development of technological projects and the knowledge exchange between the companies. Access to new markets and internationalization of the company originated from both national and international partnerships. The interview excerpt provides a brief explanation of the importance of strategic partnerships for strategic entrepreneurship:

The partnerships we built over the years were essential to the company's competitiveness gain. I venture to say that without them, Mechtronix would not have achieved such success and dynamism. In my opinion, brand strengthening is the big reason I've been looking for new partners.

The main national partners are Concordia University, Center Québécois de Formation Aéronautique, University of Toronto and Ottawa Aviation Services. International partners are: Ben-Air Flight Academy, Belgium; IFAERO, in France; Oxford Aviation Academy, in the United Kingdom; University of China, China; Tecnam, in Italy; and Flight Training Adelaine, Australia.

The identifier "C" that is associated with the identifier "B", presented in Figure 7, is the innovation development. Based on the respondents' reports, this element consists of collaboration between the company and its partners, especially universities and training centers. Respondents also explain that the innovation development is a process that transforms opportunity into product.

In order to collaborate, share and build new knowledge, Mechtronix associates strategic partnerships and innovation development with collaborative production. For respondents, collaborative production plays a key role in the formation of new products, as information is transferred from agent to agent, ie, from the company to its partners and vice versa.



The cooperative model of organizations introduces an important change in the competitive paradigm, as it considers that competition in the market actually occurs at the level of the production chains and not just at the level of isolated business units (Canongia et al. 2001).

Based on this statement, one of the elements of seeking and harnessing the competitive advantages of the strategic entrepreneurship process is the strategic information system, represented by the identifier “E”. The analysis of Figure 7 points out that the identifiers “A”, “B” and “C” give rise to the identifier “E”.

Miranda (1999) defines strategic information system as a set of tools that allow, with the treatment of data collected by strategic monitoring, the transformation of data into information, and the aggregation of knowledge, in order to create inputs for strategic intelligence.

For respondents, the strategic information system helps overcome the challenges posed by the complex market that Mechtronix is inserted in and helps the company to organize, make available and analyze the information obtained in monitoring the internal and external environment.

Monitoring the internal environment, respondents explain, contributes to the improvement of information flow and greater integration of areas, providing a sharing and renewal environment. Already monitoring the external environment, contributes to the relationship of partnerships and the visualization of trends, market monitoring, technologies, skills and policies, identifying opportunities and pointing solutions for maintaining and creating competitive advantages.

In order to increase operating performance and financial results, Mechtronix uses the strategic information system to draw the strategic map, which is represented by the identifier “F”. Based on the data collected, the strategic map helps the company to build strategic management in a cohesive, integrated and systematic manner and is related to the mission and strategic objectives. It is noteworthy that the company's mission is to “go where innovation takes off”. The interviewees did not clarify what the strategic objectives are.



Strategic management, the last element in the pursuit and exploitation of competitive advantage, originates from the construction of a strategic map built from information that leads to creativity, originality and innovation. Respondents explain that strategic management allows the company to differentiate itself from competitors by taking a competitive advantage by offering exclusivity in offering a product or exploiting a new market segment.

It is noteworthy that strategic management and the strategic information system are associated with strategic learning. For respondents, strategic learning is an ongoing process that involves the acquisition and development of knowledge through the development of strategic information systems and thus strategic management.

Strategic management gives rise to Mechtronix's wealth creation. The data collected show that wealth creation refers to the benefits generated for the company, the financial results and society, the creation of new innovations and the generation of qualified jobs, thus creating competitive advantage.

4.5 Discussion of Results

This section presents the discussion of the research results considering the works of the authors that compose the theoretical basis of this article. Thus, the theoretical content presented is compared with the results obtained in the intracase and intercase analyzes, respectively.

Strategic entrepreneurship is defined as the pursuit of opportunity and competitive advantage (Ireland, Hitt & Sirmon, 2003). For the authors Ireland, Hitt and Sirmon (2003) and Kyrgidou and Hughes (2010), the search for a new opportunity begins with the analysis of the mentality, culture and entrepreneurial leadership of companies, which then manages strategic resources. and lastly, apply creativity so you can develop an innovation. These authors add that these three elements are intrinsically linked, as they promote and support the continuous pursuit of entrepreneurial opportunity, contributing to the development of competitive advantage.

In the intracase analyzes, it was found that the search for opportunity of both Brazilian and Canadian SMEs in the aeronautical sector, partially diverged



from the conception of the authors presented above. For the analyzed companies, the search for opportunity encompasses the entrepreneurial activities of owner-managers, strategic partnerships and the innovation development. Data analysis revealed that entrepreneurial activity is related to the creation of the company and the opening of new branches and aims to explore new opportunities. This idea reinforces the position of Hitt et al. (2002), as entrepreneurial activity is an activity by which the entrepreneur identifies and then seeks to exploit opportunities that have not yet been fully exploited by his competitors.

The strategic partnership, on the other hand, is an explicit agreement between the companies studied and the universities, research centers and companies in the aeronautical production chain, and it worked as a response to globalization and the growing uncertainty and complexity of the markets. It therefore implied knowledge exchange, risk reduction, access to new markets, access to new skills and internationalization of the companies analyzed, providing a better competitive position of the companies. This also reinforces the ideas of Hitt et al. (2011) since, for these authors, in dynamic environments, some companies use relationship networks to access the resources needed by some partners, and then use them to explore opportunities to gain competitive advantage and create wealth.

For Ireland, Hitt and Sirmon (2003), the innovation development aims to turn new ideas into opportunities and put them into practice. This understanding is in line with the innovation development process of the Brazilian and Canadian companies studied, since the innovation development is understood as a process, in which successively the idealization of innovation through research and customer demand takes place. , from the generation of ideas to applied research, and from that to product development and consequent production and marketing. Given this context, the innovation development was an essential tool for increasing productivity and competitiveness of the SMEs studied.

To emphasize the interactivity of the elements that make up the opportunity search, Kyrgidou and Hughes (2010) also considered the feedback and feedforward mechanism to help organizations improve the use of strategic



entrepreneurship and thus create wealth over time. For the authors, these mechanisms are composed of elements of learning theory that differ from those found in the research. The data show that the feedback and feedforward mechanisms of the companies studied are composed of three key factors:

(a) Exploration and harnessing competencies: exploiting and harnessing employees' skills, attitudes and knowledge from an innovative perspective.

(b) Entrepreneurial culture: It is the ability of employees to create their own opportunities, benefiting the company. This passage supports the claim of Ireland, Hitt and Sirmon (2003), as the authors argue that entrepreneurial culture is one in which creativity and new ideas are expected, risk acceptance is encouraged, failure is tolerated, Learning is promoted, innovations are defended, and continuous change is seen as a carrier of opportunity.

(c) Collaborative Production: The SMEs studied do not innovate on their own and generally innovate within a network of relationships with universities, research centers and different large and small and medium-sized companies participating in the chain. aeronautical production. Ketchen, Ireland and Snow (2007) reinforce these ideas by arguing that collaborative production through collaborative innovation underpins strategic entrepreneurship when large and small companies share ideas, knowledge, skills and opportunities.

For Hitt et al. (2011), the pursuit of competitive advantage is related to the orchestration of resources, which is characterized by obtaining competitive advantage in the decision making of the leaders of organizations and the control of valuable and rare resources. For the authors, resource orchestration is concerned with actions taken by entrepreneurs to facilitate efforts to effectively manage company resources.

Of the companies studied, the only company that creates a competitive advantage by managing strategic resources such as financial, human and technological capital is Aeronautics Enterprises. Other companies seek and leverage competitive advantage through the influence of strategic information; by the strategic information system; strategy formulation and strategic management. These elements are still little explored in the literature on



strategic entrepreneurship. Survey data showed that these elements underpinned the ability of the studied SMEs to create wealth over time.

Given this context, creating wealth over time, for Hitt et al. (2011), is associated with the creation of individual, organizational and social benefits. Thus, individual benefits are related to the entrepreneur's financial and socio-emotional wealth creation (Baron & Henry, 2010).

Organizational benefits, in turn, are associated with innovation and the creation of new technology that are considered valuable resources that contribute to competitive advantage (Hitt et al., 2011). For Woolley (2010), the organizational benefit is the creation of new knowledge that, in turn, provides new market opportunities, favoring the organization's competitive success, regardless of the sector in which it is inserted. Increasing entrepreneurs' wealth can produce social benefits by injecting more financial capital into the economy and thus promoting economic growth (Agarwal, Audretsch & Sarkar, 2007).

For the companies studied, wealth creation is associated with (i) organizational benefits, such as: increased financial revenues and profits, diversification of client portfolio, internal knowledge growth, individual and organizational learning development and competitiveness growth. ; and (ii) social benefits, such as: creation of skilled jobs, generation of new technologies and investments in the local economy, contributing to the regional identity in the aeronautical sector. Thus proving the link between the authors mentioned in the paragraph above and the results found.

5. Final Considerations

Based on the analysis and discussion of the data, it can be concluded that the analyzed companies, through the process of strategic entrepreneurship, obtained a competitive advantage, as they incorporated into the entrepreneurial activity strategic partnerships and the innovation development as activities to be developed in character. identifying the innovative elements of supply chains in which companies have seen greater earning potential and ultimately worked with customers to develop and improve processes and products. This has enabled Brazilian and Canadian SMEs to identify and exploit new opportunities



in view of the increased circulation of tacit and explicit knowledge in the production chain and the execution of joint R&D.

The contributions of this article were both in the academic and corporate context. In the academic context, the study contributed to advances in research conducted in Brazil in the areas of strategic management and entrepreneurship in technology-based SMEs on the theme of strategic entrepreneurship. In this way, this new approach will help to verify that strategic and entrepreneurial actions synthesize the intuition and creativity of the owner-managers of SMEs in a future vision of their business.

Another academic contribution was to relate the dimensions of strategic entrepreneurship with the particularities of the aeronautical SMEs, that is, the systematization of an analysis model was developed that contributed to a better understanding about the search and use of opportunity and competitive advantage and the wealth creation of these companies.

In the corporate context, the model presented will contribute to the improvement of the strategic and entrepreneurial management of the analyzed SMEs. That is, there is evidence that if these companies provide a favorable environment for creativity; create an entrepreneurial culture, stimulate collaborative production and develop strategic management focused on technology and learning; they will be able to improve their competitive environment by taking advantage of short-term competitive advantages while seeking new opportunities that revert to new sources of medium and long-term competitive advantage. Thus, generating wealth and financial and social returns above the average expected by the owner-managers.

Despite being a pioneering initiative, the study of the strategic entrepreneurship process in aeronautical SMEs and although the objective proposed in this article has been achieved, the research has limitations.

The noteworthy limiting factor is the accessibility of company information was restricted, as some owner-managers were not comfortable with disclosing data considered confidential, especially regarding strategy, innovation and financial matters. Another noteworthy limitation is the limited number of selected cases, with information that mostly reflects the point of view of owner-



managers, and includes companies from a single sector of the economy, the aeronautics sector.

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