

ENTREPRENEURIAL COMPETENCES AND THE MICROFOUNDATIONS OF DYNAMIC CAPACITIES: A PILOT CASE STUDY IN A UNIVERSITY STARTUP

Vivien Mariane Massaneiro Kaniak, Universidade Federal do Paraná – UFPR
vivikaniak@gmail.com

Olivia Prado Schiavon, Universidade Federal do Paraná – UFPR
olischiavon@gmail.com

Daniel de Souza Valotto, Universidade Federal do Paraná – UFPR
danielvaloto@gmail.com

Heitor Kato, Pontificia Universidade Católica do Paraná – PUCPR
heitor.kato@gmail.com

SUMMARY

Objective and Justification: Skills and competencies are fundamental for organizational development. Large or small companies, new or old, depend on these behavioral, strategic and operational aspects in the face of market contingencies and the specificities of the context. When seeking their development, companies characterized as startups demand special attention to the skills and competences to determine their actions and behaviors, enabling them to overcome the risks and barriers of the market that are inherent to their training stage. In this sense, the present research, through the analysis of a pilot case study conducted in a startup located in the state of Parana - Brazil, sought to answer the following question: How do the multiple dimensions of entrepreneurial skills interact with the microfoundations of dynamic capabilities in startups? **Method:** Through exploratory and qualitative research, the models proposed by Man and Lau (2000) and Teece (2007) were theoretically and empirically compared. **Results and Contributions:** The results indicate that the entrepreneurial skills of the startup founder influence the ability to develop activities, routines and dynamic processes that act on the necessary changes in the development of a new business model compatible with the market. In addition, we founded that there is theoretical adherence between the two models which is believed to be useful in future research involving entrepreneurial competencies and dynamic abilities.

Keywords: Entrepreneurship; dynamic skills; entrepreneurial skills

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1 INTRODUCTION

Dynamic capabilities operate in changing environments with the organizational capabilities of integrating, building and reconfiguring internal and external competencies (Teece, Pisano, & Shuen, 1997). Eisenhardt and Martin (2000) examined the nature of dynamic capabilities and stated that strategic and organizational routines integrate the capabilities for companies to achieve new resource configurations. Authors such as Zahra and George (2002) argue that dynamic resources should guide changes that implement a new configuration of the company's resource bases to meet market needs. For Teece, Pisano and Shuen, (1997) the combination of skills and resources strategically developed and chosen at each moment of the company are among the necessary capabilities in view of competitiveness and market changes.

Skills are considered as high-level characteristics of entrepreneurs, comprising varied personalities, skills and knowledge. Such competencies are influenced by the previous experience, training and history of entrepreneurs and can be observed in their behaviors (Man & Lau, 2000).

Kyndt and Baert (2015) point out that there are still few efforts to understand entrepreneurial skills, and indicate that studies should explore their interaction with the demands and resources available in the context of entrepreneurs. Among the studies that combined entrepreneurial skills with theoretical framework of dynamic capabilities we can highlight Nasuredin, Halipah, Shamsudin's (2016) that demonstrate the impact of entrepreneurial skills on the performance of Malaysian SMEs, empirically measuring the mediating effect of dynamic capacities between this relationship.

Up to now few studies have sought to analyze in depth the interactions between the dimensions of the two models. So, this qualitative study sought to study this relationship focusing on the context of academic startups. For the purposes of this research, the concept of startup used was companies typically based on knowledge, skills and ideas that their founders generated at the university (Shane, 2004). They typically receive infrastructure support for entrepreneurship such as incubators, development tools, and even interaction with successful entrepreneurs who act as mentors (Wright, Siegel, & Mustar, 2017).

This article deals with a pilot case study that aimed to plunge into the issues related to the competencies developed by a startup, incubated in a laboratory on the campus of a federal public university in Paraná, as well as to validate the choice of method and theoretical models to be used in the future in a more comprehensive study. Thus, this article aims to describe the case studied by presenting its analysis in the light of the literature on dynamic capacities and entrepreneurship as well as to discuss the adherence of the models used to correlate the two theoretical conceptions.

2 THEORETICAL REVIEW

2.1 STARTUPS

Ries (2011) defines startups as institutions that create products and services of an innovative nature in an environment of extreme uncertainty. In line, Pajares, Lopez-Paredes and Hernandez (2016) characterize startups by the uncertainty of the business model and the success of the proposed products and services. On the other hand, Porto (2013) and Damodaran (2012), use the term to name new companies or businesses that manifest an initial formulation stage of the product and business model, but are not yet marketing. Usually these stages are

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defined according to the acquisition of resources and capital contribution, in the case of startups the investment is called seed capital or seed capital (Porto, 2013).

This stage is also represented by a greater macroeconomic risk and failure, because startups as well as large companies already consolidated in the market, should seek to understand the environment around them and adapt their strategies to the conditions that are presented (Miller, 2004).

Thus, startups should focus on development of skills and capabilities in order to manage the business, work and organize their resources, market efforts, search for information and learning in addition to the continuity of their processes (Freeman & Engel, 2007; Bhalla & Terjesen, 2013). In addition, another prominent factor in the literature concerns the formation and development of a good network, which, as far as the university is concerned, can help in leveraging these young organizations (Breznitz *et al.* , 2018; Eveleens; Van Rijnsoever; Niesten, 2017; Fernández-Pérez *et al.* , 2015).

2.2 ENTREPRENEURIAL SKILLS: THE MODEL OF MAN AND LAU (2000)

The model of the researchers Man and Lau (2000) was developed from a previous work published by Snell and Lau (1994), in a study that brought together a set of knowledge, areas, skills or directions that, it was believed, could contribute to the effective action of a business.

Man and Lau (2000) worked on a model in which entrepreneurial skills could be considered high-level characteristics of entrepreneurs. Those abilities involved different forms of personality skills and knowledge. The authors attest that the competencies of entrepreneurs are in turn influenced by their previous experience, training and history, and can be demonstrated by observable behaviors.

In this way they designed a model that contain six distinct areas that characterize business behaviors such as: (1) skills of opportunity - recognition of opportunities in the market; (2) relationship skills - interactions with individuals and groups; (3) conceptual skills - entrepreneur behavior; (4) organizational skills - organization of internal and external business resources; (5) strategic competencies - establishment, evaluation and implementation of strategies; and (6) commitment skills - the ones that drive the entrepreneur to move forward (Man & Lau, 2000).

The model presented by the aforementioned authors refers to the competitive entrepreneurial action, which will be affected by the entrepreneur's ability to interpret the environmental condition to his surroundings, through opportunities identified by him. In addition, he must create contacts and connections, make decisions in relation to organizational direction, as well as maintain actions and business in the long term (Man & Lau, 2000).

In the following years studies that followed the efforts of these scholars sought to understand the behavior over the time of entrepreneurs and the impact on skills (Kyndt & Baert, 2015), as well as analyze the existing entrepreneurial skills from different perspectives and their application in multiple cases of microentrepreneurship, such as startups (Yeh & Chang, 2018). After some time, the studies improved the adequacy of the framework and searched to understand the development of competencies in the early stages of the business. The practical applicability of the model is also highlighted.

In the next topic we present the theoretical approach of Dynamic Capacities, which is also part of the conception of competencies, specifically addressed by Prahalad and Hamel (1990), and seek to understand the specific and essential competitive factors and business success, which can help in the advancement of studies.

2.3 DYNAMIC CAPABILITIES

The theoretical approach of dynamic capabilities originated from the resource-based theory that aimed to provide explanations about the competitive heterogeneity of companies (Barney, 1986; Penrose, 1959). At the end of the 20th century, faced with a scenario of rapid changes and uncertainties, some authors began to discuss what capabilities were necessary for organizations to innovate quickly and effectively in order to remain sustainable. In this context, seminal authors of the dynamic capabilities approach (Teece; Pisano; Shuen, 1997) conceptualize it as the company's ability to integrate, build and reconfigure internal and external skills to deal with rapidly changing environments.

Few years later Eisenhardt and Martin (2000) proposed that dynamic capabilities includes the organizational and strategic routines by which companies achieve new resource configurations as the market emerges, collides, divides, evolves and dies. These authors add that such companies do not need to be inserted only in very dynamic environments, but moderately dynamic.

Other authors such as Zahra and George (2002) claim that dynamic features are essentially change-oriented capabilities that help companies redeploy and reconfigure their resource base to meet growing customer demands and competitors' strategies. In the same year still, Zollo and Winter (2002) added that dynamic capabilities arise from learning patterns of collective activity, through which the organization systematically generates and modifies its operational routines in search of greater effectiveness.

With the development of literature in the area, Zahra, Sapienza and Davidsson (2006) argue that having dynamic capabilities refers to having the skills of reconfiguring organizational resources and routines in a predictable manner and that is considered appropriate by their decision makers. In the aforementioned article, the authors highlight the role of the entrepreneur or the company manager as one of the main components in the production and implementation of change in the organization.

In line with this understanding, Teece (2007) highlights the activity of the manager in the dynamic capacities of the company, since his ability to evaluate and prescribe changes is behind the alignment of resources and formation of new alliances with other organizations. In addition, it is up to the manager to orchestrate resources internally in addition to produce agility and strategy in times of constant risks and uncertainties (Teece, Peteraf, & Leih, 2016).

Teece (2007) also describes the microfoundations that figure in the dynamic capacities of monitoring (sensing), seizing and reconfiguring organizations highlighting the fundamental role of the manager or entrepreneur in this system. For the author, monitoring is a phase in which the organization seeks to detect new opportunities, through the exploration of new technologies, markets and competitors. It is at this stage that information is gathered and efforts are made to filter data (activity usually attributed to managers) in addition to understanding the consumer and creating propositions about how the market will respond to news (Teece, 2007). In the seizing phase managers will make decisions about which opportunities to invest and direct resources. At this stage can be created a new business model or restructure the current in order to meet the necessary innovations. Finally, in the reconfiguration phase, the redesign of the organization is implemented as well as the internal culture is managed to accept the changes necessary to absorb innovation. At this stage managers must even recombine assets in order to achieve implementation success (Teece, 2007).

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It is important to understand the microfoundations not only in large corporations as already addressed by Teece (2016), but also in different environments such as micro and small innovative companies and startups. In these companies it is possible to identify the development of entrepreneurial skills already in the initial stage, especially in startups that are operating in environments of high risk and uncertainty. In addition, it is possible to study dynamic capacity development needs (Teece, Peteraf, & Leih, 2016).

As pointed out in the literature, entrepreneurs and managers are the key agents of changes in organizations, since they make decisions regarding idle resources or recombine resources in an innovative way bringing new capabilities in new or existing scenarios (Zahra, Sapienza, & Davidsson, 2006). In this sense it is believed that the entrepreneurial skills of startups can be related to the internal resources of companies such as the capacities to be developed in order to overcome the challenges of competitiveness.

3 METHOD

This study uses the qualitative research approach that is the most indicated to answer research questions such as "how" or "why" and when the researcher goes to the field to analyze a real-life phenomenon (Yin, 2014). In relation to nature, this is an exploratory and descriptive research, because it seeks proximity to the reality of the object studied, besides probing the phenomenon (Cooper & Schindler, 2014).

Regarding the research strategy, a case study was used with sources of evidence such as direct observation, interviews and documentary analysis according to Yin's guidelines (2014). Data were collected between September 20th and 25th, 2019. A semi-structured interview was conducted with the startup's founding partner, lasting 38 minutes, and documents related to the company were collected in addition to the non-participant observation held in the laboratory of the university where the company is located. The questions of the interview were based on the theoretical model to be described in the next topic. The interview was recorded and later transcribed. After the transcription, the information was sent to the interviewee for validation.

The research data were stored in the NVivo software, which was used as a tool to facilitate the handling and analysis of the data. The analysis of the case was based on the procedures of content analysis proposed by Miles, Huberman and Saldaña (2014) in which the analysis takes place in a first and second cycles. The analysis process took into account the details narrated in the interview, documentary data and field observation data that were structured in codes in order to be compared and categorized according to the guidelines of Saldana (2013) and were later discussed in the light of the theory.

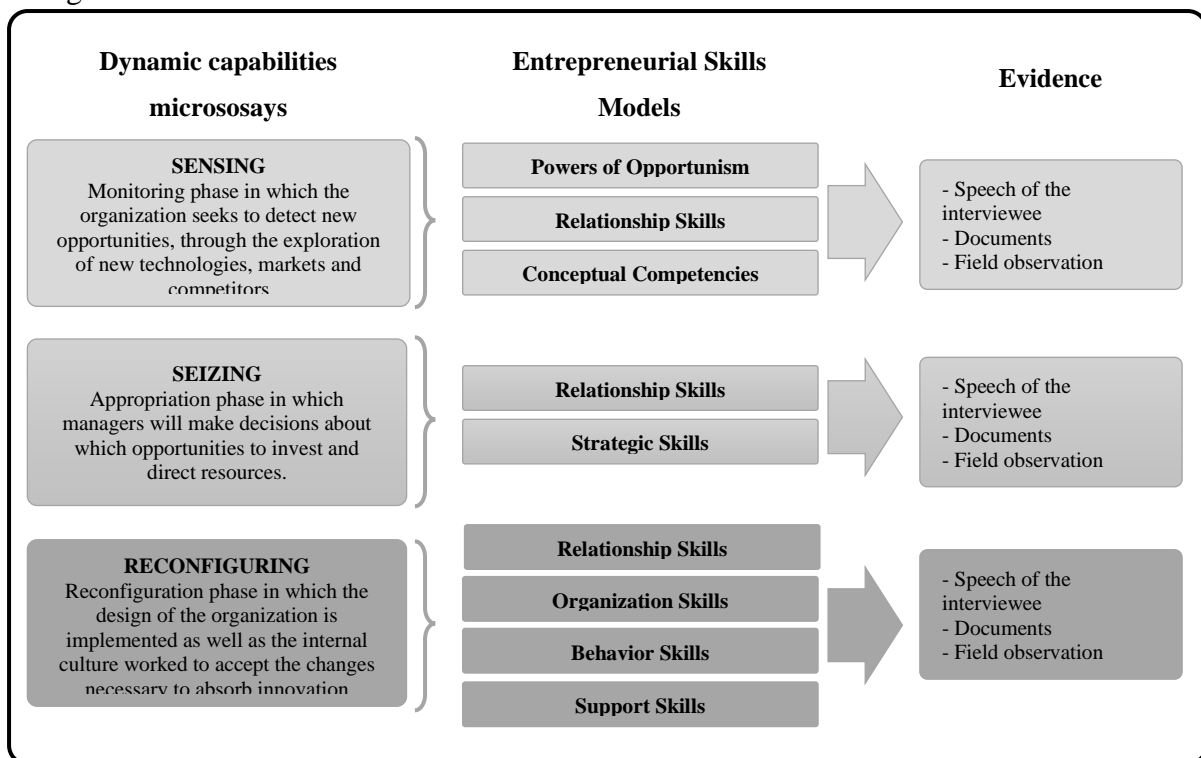
In order to guarantee the validity and reliability of the method to be used in a future broader study, at this stage of the research only the pilot case was carried out, which, according to Yin (2014), is indicated to test the viability of the instruments and the codification of the constructs. After this pilot stage, it is intended to conduct in the future a multi-case study that allows deepening the research question in addition to generating sufficient data and that can be added to the findings of this present study.

The choice of the Man and Lau model (2000) for this research was due to its consolidation in the area and its application in small and medium-sized companies, which is adherent to startups. Moreover, the choice of the microfoundation model of Teece's dynamic capacities (2007) is due to the fact that the author is considered one of the most influential and studied in the field today (Albort-Morant *et al.*, 2018).

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In order to build the theoretical model of the research, the dimensions of entrepreneurial skills of Man and Lau (2000) were associated with the dynamic capacities of sensing, seizing and reconfiguring of Teece (2007). This conception served as the basis for the construction of the theoretical model used in the present study, as can be seen in Figure 1:

Figure 1 - Theoretical Model



Source: developed by the authors (2020) from Teece (2007) and Man and Lau (2000).

According to the statements of Man and Lau (2000) the opportunity skills of an entrepreneur are related to the recognition of market opportunities through various means. Relationship skills are those related to interaction with person or individuals and groups. Conceptual skills, on the other hand, refer to the entrepreneur's intuitive thinking skills, innovating and taking risks. The organization skills are related to the skills and knowledge to manage the company, while strategic competencies are responsible for defining the long-term vision and goals that can be achieved. The commitment skills are the ones that lead the entrepreneur to advance the business. Finally, support skills are related to learning from past experiences, time management capacity and balance with personal life.

In the theoretical model developed by us, each group of competencies described by Man and Lau (2000) was associated with the foundations of dynamic capacities according to the definition offered by Teece (2007). Thus, it was observed that one of the competencies stands out among the others, as is the case of relationship competence that is present in all dimensions of dynamic capacities. This is because relationship competence is of fundamental importance both in the phases of search for opportunities (sensing) through the importance of the entrepreneur having and building relationship networks to seek potential clients and

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opportunities (Man & Lau, 2000) in addition to passing confidence in the negotiation of the choice of opportunities to invest (seizing) among the partners of the company as well as the importance of communication, negotiation and conflict management which are necessary in the reconfiguration phase (reconfiguring) when the entrepreneur needs to deal with the other team members in order to implement the necessary changes and manage the organization's climate.

In sum this research intended to associate the findings of the case study conducted with the multiple dimensions of entrepreneurial skills by analyzing their interaction with the dynamic capabilities of a startup in the biotechnology sector.

4 CASE DESCRIPTION

The startup GoGenetic is a company active in the biotechnology area, based in Curitiba-PR specialized in DNA sequence for microbiological and genetic analysis. The company operates to implement state-of-the-art technology in microbiological control and in the creation of new products for the agro, food, scientific, among other industries (Go Genetic, 2019). The company originated in October 2016, created in the Federal University of Paraná (UFPR) by three students who attended the course of Biological Sciences at the institution and became specialized at research in microbiology, genetic sequencing. The idea of creating a business was encouraged by advisors and UFPR itself, where the startup is currently incubated. The name originally assigned to the company was WEMSeq which meant the combination of the initial's letters of the founding partners names along with the complement Seq, which referred to genetic sequencing. After two years of operation the name changed to GoGenetic. (Go Genetic, 2019).

The company has clients from universities, research centers and private companies from various sectors of activity and operates mainly with the format of customization that adapts techniques and technologies for each client in a unique way. The team consists of six people, three of which are founding partners of the company. All partners have completed their PhD at UFPR and have post-doctorate train in renowned universities abroad. The age of the partners varies between 30-40 years old; one is a male and two are female.

The 32-year-old founding partner interviewed is a post-doctor in Molecular Biology and have a PhD and a master's degree in Biochemistry Science. He is also a training biologist and the executive director of the startup. He explained that in addition to academic training, he took several training courses in management before and during the company's opening process. Before the arising of the startup, he had experience inside the university, having acted as a researcher and substitute professor at UFPR.

5 ANALYSIS AND RESULTS

This section describes the analysis of the obtained data that was categorized according to Teece's (2007) classification of dynamic capacities in conjunction with the conception of entrepreneurial skills of Man and Lau (2000). The results will be presented categorized according to the microfoundations of sensing, seizing and reconfiguring.

5.1 SENSING - ATTRACTING OPPORTUNITIES

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GoGenetic began its activities when the partners were still PhD students at UFPR and were usually asked by other researchers from other universities to help. According to the founding partner interviewed the demand increased so much that they decided to turn the service into a company.

In order to capture market opportunities, members spend much of their time attending events and interacting with current and potential clients. According to the interviewee, the key to recognize opportunities is the network in the area that include the technicians of the quality departments of companies or area managers. Another detection activity used by the company is the search for information and needs of companies before even making the business approach. Thus, when the direct approach is made the startup already presents a proposal of solution for every need that the customer may have. In addition, GoGenetic recently began to offer sales through the site as another alternative to attract customers and new projects.

It is observed that the relationship skills with the clients are the central point of action in the company studied. They are currently investing in hiring a professional specialized in the area of communication, since the three partners have technical training in the area of biotechnology. They hope to address possible communication deficiencies between the startup and customers in order to convey a clear and more objective language. The interviewee's effort to explain in an understandable way to a layperson, such this researcher, the complex work that is performed in the company was even highlighted in the field observation notes. It was observed that he tries in some way to translate academic language into a more common language, caring on making himself understood. Similarly, the company's website also shows a certain care in presenting a language accessible to the public unaccustomed to the technical language of the area (Go Genetic, 2019).

We argue that the competences of relationship and communication can be related to the growth that the business has been having in the last years because according to the model of Man and Lau (2002) the performance of the firm is directly related to the entrepreneurial skills of the manager and the link he develops with his customers, employees, as well as exposure to the media and use of networks to foster contacts. Other authors claim that the establishment of a good networks among university startups facilitate access to knowledge and resources, which drive the success of the company (Breznitz *et al.* , 2018; Eveleens; Van Rijnssoever; Niesten, 2017; Fernández-Pérez *et al.* , 2015).

In relation to conceptual competencies, there are examples of intuitive thinking and the ability to innovate and take risks. The interviewee reports that despite having started the company with the majority of clients coming from universities and research centers, they decided wage on the corporate market and months later it was proved that this was a wise decision. This analysis is based on the interviewee's speech:

"We still serve the academy, but today most of the clients are corporate. And now with the change in public policy that has restricted funding for research in universities, we believe we made the change at the right time. It was a great change in just one year of existence of the company." (INTERVIEWED GOGENETIC).

The movement made in the startup is in accordance with what Man and Lau (2002) attest as the ability of the entrepreneur to see things from different angles, so that they can find new niches of action and market entry. This ability is the result of the experience and ability of observation of the entrepreneur and his ability to generate value producing something new (Silva *et al.*, 2018; Kindt & Baert, 2015).

In addition to the change in direction, the interviewee said that most services are produced tailored to each client, which requires a great capacity for innovation in terms of

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methods and use of technology. This makes each solution for each client unique, requiring professionals to always be looking for alternatives for each case. Several authors also highlight the need for companies to create solutions and improvise to deal with changing demands, which can lead them to competitive advantages (Silva *et al.* , 2018; Teece, 2012; Zahra *et al.* , 2006)

5.2 SEIZING - CAPTURING OPPORTUNITIES

The entrepreneurial relationship skills as described by Man and Lau (2000) have now been found again in the seizing dimension in terms of negotiation with business partners, conflict management and consensus building. The interviewee explains that each business opportunity previously captured in the sensing dimension is then discussed among the partners in order to generate consensus on the efforts to be made to capture the opportunity. From the signature of the contract, the other team members are formally and informally communicated and involved in the various activities related to the project.

At this point, strategic competencies such as the company's long-term vision and entry into specific networks can play a major role in the decision. This is because the reputation of the startup depends heavily on the evaluation of active customers who, if satisfied, generate new customers, as explained by the founding partner: "When we do a good job and we have a company as a client they will indicate to others". Another finding that draws attention in relation to GoGenetic's strategic decisions is that the partners do not want openness to external investors at this time. The interviewee reported that:

"So far we have not had any investments of development or private investors, not because we could not, but because we did not want to. We don't think it's strategic. It is possible for us to grow the company so that its value increases a lot, so we prefer to keep it in our hands." (INTERVIEWED GOGENETIC).

This demonstrates that the partners have well-defined purposes and objectives to be systematically achieved over time. When asked about the future he wants for the company he responds with a metaphor regarding its economic potential as well as an idealizing vision:

"We joke that we want a marble floor in the company, (laughs) but also we have the desire of applying all the knowledge that we have, each of us partners, has 13, 14 years in the academic world, we want to transfer this knowledge to a practical area that will improve food security and agricultural or animal production." (INTERVIEWED GOGENETIC).

5.3 RECONFIGURING - RECONFIGURING INTERNALLY

One more time, in the dimension of reconfiguring was found the competence of relationship with regard to the direction and communication between the team members. According to Teece (2007) once the opportunity is captured in the seizing phase it should be put into practice immediately so that the company's internal resources are reconfigured to include the project already sold. At this point, all team members are heard about the best solution to the customer.

The organizational skill was evident in the case studied, once the interviewee is in the executive direction and in the coordination of the laboratory. When the demand gets in, it is divided in the team according to the skills of each one and the necessary resources are allocated. The interviewee declares that the delegation of the tasks is something new that he has been dealing with lately, since hiring employees is something recent in the startup. But he reports

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that the team increase was positive and now he can actually perform his official role in the company. He says that at first it was more difficult because he was accumulating functions:

"At first I did almost all the functions because my partners were in the USA, she was in charge of the financial area, but we also have an accountant who perform good part of the work. But now that we hire more people, we are able to better separate the functions and I really can focus on the executive part and solve internal problems." (INTERVIEWED GOGENETIC).

His speech also reveals the competence of commitment once it demonstrates his effort to maintain the business in the initial period even accumulating the functions of his partners. According to Man and Lau (2000) early-stage entrepreneurs devote most of their time to the business and demonstrate a desire to achieve their long-term goals, even at the expense of short-term gains. The interviewee faced difficulties in the initial period, but remained committed to the business and with his dream of leveraging the company and its ideal of applying the knowledge obtained at the university to generate new technologies.

Regarding what Man and Lau (2000) refer to as 'support skills', it was observed that the interviewee makes continuous self-evaluation and reports that his greatest weakness is knowledge in the area of management. He is constantly seeking to learn. He points out that:

"The biggest difficulty is that I do not have the proper training in management (...) I did a training program at Sebrae (...) but I am continuously learning as I solve everyday problems." (INTERVIEWED GOGENETIC).

About his performance in the company he says that, as executive director, he does not exercise much of the knowledge departing from his original training area because he spends most of his time working as a manager, which for him is a challenge, because he does not have the specific training. At this point he cites the importance of the support given by the university innovation agency that is constantly open to respond the problem that arise from incubated companies. He says that the agency launched a program recently to do a monthly follow-up with the startups and gave support precisely in the area of management that is the most demanded by the incubated.

6 FINAL CONSIDERATIONS

The findings of the theoretical-empirical confrontation between the models proposed by Man and Lau (2000) and Teece (2007) in the startup studied suggest that the company operates in the three microfoundations described by Teece (2007): sensing, seizing, reconfiguring, and usually performs it simultaneously. The capture of opportunities (sensing) is based in the relationship with customers and is the central point of the operation of the startup. Negotiation with business partners, conflict management and consensus building (seizing) and directing and communicating among team members (reconfiguring) also highlight the adherence of the skills developed in the company to Teece's (2007) micro fundamentals.

In addition, the entrepreneurial skills described by Man and Lau (2000) were also detected in the founding partner interviewed, mainly observed by intuitive thinking, ability to innovate and take risks in startup (conceptual skills), long-term vision (strategic competence) and the division of tasks according to skills and delegation (organization competence).

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In this context we consider that this study answered the initial research question demonstrating that the varied dimensions of entrepreneurial skills interact with the dimensions of dynamic capacities of sensing, seizing, and reconfiguring in the case studied.

The theoretical findings of this study also contribute to the convergence between the models of entrepreneurship and dynamic capacities. From the practical implication, the understanding of the entrepreneurial skills of the person responsible for the company's strategy showed the influence on the ability to develop activities, routines and dynamic processes that act on the necessary changes in the development of a new business model compatible with the market.

Moreover, we believe this research was successful in ascertaining how the multiple dimensions of entrepreneurial skills interact with the microfoundations of dynamic capabilities in a startup. The investigation was developed from the analysis of a single case in order to analyze the adherence of the theoretical models discussed above. Being aware of the possibility of different results, it is intended to apply the same research methodology in a future study involving several startups in order to compare similarities and divergences and develop possible theoretical generalizations.

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