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DOCTORAL THESIS

ENTREPRENEURIAL ORIENTATION AND FIRM PEFORMANCE: AN ANALISYS OF BRAZILIAN START-UPS

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Zaragoza, a 16 de mayo de 2022

"A menos que cambiemos nuestra forma de pensar, no podremos resolver los problemas causados por la forma en que nos hemos acostumbrado a ver el mundo".

Albert Einstein

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CAPÍTULO 1

INTRODUCCIÓN[1]

[1] Esta es una traducción del primer capítulo de la tesis *Chapter 1. Introduction*.

1 INTRODUCCIÓN

La actual crisis económica que atraviesa Brasil nos hace reflexionar sobre las posibles alternativas que pueden fomentar el desarrollo social, económico y lidiar con las altas tasas de desempleo que asolan el país. Considerando que, en Brasil, sólo un 5,7% de las empresas establecidas tienen desarrollado un producto, servicio o proceso novedoso (IBGE, 2013), la discusión sobre el papel del emprendedor y la creación de nuevas empresas gana más importancia, ya que el emprendimiento se presenta como una opción para hacer frente a esta situación de recesión (Estrin et al., 2013).

Todavía hay un gran potencial para la generación de nuevas empresas en Brasil, ya que más de la mitad (55.5%) de su población considera que la creación de una nueva empresa en la región dónde vive es una buena idea (GEM, 2016) y tener una empresa es uno de los mayores sueños de los brasileños (GEM, 2020). Sin embargo, pocas son las empresas que consiguen llevar al mercado productos y servicios innovadores. Por ello, no basta tener una idea o invención, es necesario crear mecanismos y adoptar una dirección estratégica hacia la innovación, llevando a las personas, los procesos, las actividades a buscar comportamientos necesarios para conseguir un desempeño superior (Gatignon y Xuereb, 1997).

Miller (1983) identificó tres características de las empresas de alto desempeño: innovación, toma de riesgo y proactividad, que a su vez muestran la orientación emprendedora que poseen. La innovación se refiere a desarrollar nuevas ideas y romper con prácticas o tecnologías establecidas, la proactividad trata de anticipar necesidades y

deseos futuros, y la tolerancia al riesgo hace referencia a la voluntad de comprometerse y de llevar a cabo proyectos arriesgados. Las empresas con una fuerte orientación emprendedora asumen un comportamiento innovador para atender a las necesidades de los clientes, son proactivas para comprometerse con las oportunidades y tolerantes a la asunción de riesgos (Covin y Slevin, 1989).

Aunque en los últimos años haya surgido un amplio consenso entre académicos e investigadores acerca de que la elección de una orientación emprendedora clara puede ser un factor determinantemente crucial para que la empresa obtenga un desempeño superior (Hughes y Morgan, 2007; Kumar et al., 2011), los resultados empíricos todavía siguen siendo contradictorios. Mientras muchos estudios muestran un efecto positivo de la orientación emprendedora en el desempeño empresarial, otros no han tenido éxito al intentar encontrar una relación positiva (Hitt et al., 2001; Ireland et al., 2003; Rauch et al., 2009). Así, estos resultados contradictorios sugieren que la adopción de una orientación emprendedora por sí sola no es suficiente para que las empresas alcancen un desempeño superior (Zhou et al., 2005).

Diversos autores corroboran la importancia de analizar factores que mejoran o limitan el impacto de la orientación emprendedora sobre el desempeño empresarial (Kumar et al., 2011; Matsuno et al., 2002; Wiklund y Shepherd, 2005). Factores internos como la capacidad de innovación, tipos de conocimiento, personalidad de los ejecutivos o calidad de los trabajadores pueden mediar o moderar la relación entre la orientación emprendedora y el desempeño empresarial (Augusto y Coelho, 2009; Kim et al., 2013; Menguc et al., 2016; Theodosiou et al., 2012).

El ambiente externo a la empresa también puede influenciar la toma de decisiones estratégicas y ser un importante factor moderador de la relación entre la orientación emprendedora y el desempeño empresarial (Kahndwala, 1972). Así, por ejemplo, las acciones de la competencia y las preferencias de los clientes suelen impactar las condiciones de mercado (Penrose, 1959). Por un lado, la intensidad de la competencia puede hacer que la empresa sufra con la guerra de precios (Hall, 1980) y, por otro, los cambios en las preferencias de los clientes pueden dificultar la previsión de sus necesidades y expectativas, aumentando la incertidumbre del ambiente (Milliken, 1987). En el mercado, la hostilidad y la incertidumbre conviven conjuntamente (Jaworski and Kohli, 1993), lo que puede dificultar la interpretación de los efectos de estas variables ambientales y la toma de decisiones estratégicas. Sin embargo, la literatura disponible evalúa aisladamente los efectos directos o moderadores de la hostilidad e incertidumbre en el desempeño empresarial. En base a todo lo anterior, esta tesis tiene como objetivo principal avanzar en la investigación acerca de los efectos directos, mediadores y moderadores de la orientación emprendedora en el desempeño empresarial.

2 ESTRUCTURA DE LA TESIS

La presente tesis está compuesta de cinco capítulos. El Capítulo 1 tiene por título **“Introducción”** y explica el principal objetivo y contribución de esta tesis, posicionándola en la literatura sobre emprendimiento. El capítulo introductorio se ocupa,

además, de presentar el contexto empírico, justificando la adecuación de las start-ups brasileñas al objetivo de la tesis doctoral.

El capítulo 2 se titula "**¿Importa la medida de desempeño? Orientación emprendedora y desempeño de Start-ups**". En él se analiza si la orientación emprendedora posee efectos diferentes sobre las medidas de desempeño financieras y no financieras. Este capítulo posee dos contribuciones principales. En primer lugar, aunque nuestras hipótesis sugieren una relación curvilínea entre la orientación emprendedora y el desempeño financiero de las empresas, los resultados muestran que este efecto es linear y positivo, rechazando también los estudios que no han encontrado una relación significativa entre la orientación emprendedora y el desempeño empresarial (Baker y Sinkula, 2009; Morgan y Strong 2003; Walter et al., 2006). En segundo lugar, nuestro trabajo identifica una relación curvilínea, en forma de una U invertida, en la relación entre la orientación emprendedora y el desempeño no-financiero.

El Capítulo 3 se titula "**Orientación emprendedora y desempeño de Start-ups: un enfoque configuracional**" e investiga los efectos de la orientación emprendedora en el desempeño empresarial, utilizando una perspectiva externa a la empresa. La literatura disponible evalúa los efectos directos y moderadores de la hostilidad e incertidumbre en la relación entre orientación emprendedora y el desempeño empresarial, pero este estudio avanza al analizar cómo estas variables del entorno afectan simultáneamente esta relación. La hostilidad e incertidumbre conviven conjuntamente en el mercado (Jaworski y Kohli, 1993), lo que refuerza la relevancia de este estudio. Así, este capítulo usa las Teorías de Capacidades y Recursos, Contingencia y Configuracional para entender la

naturaleza de la relación entre la orientación emprendedora y el desempeño empresarial, investigando cómo la hostilidad e incertidumbre moderan conjuntamente esta relación. Las contribuciones de este estudio son dos. En primer lugar, identifica que la hostilidad e incertidumbre pueden influenciar la elección de la orientación emprendedora más adecuada a cada entorno empresarial. En segundo lugar, muestra que una orientación más emprendedora no es la mejor opción en todos los contextos.

En el Capítulo 4, titulado "**Pasión por inventar e innovación radical: el efecto mediador de la orientación emprendedora**", nos apoyamos en la Teoría del Escalón Superior para verificar cómo características individuales del emprendedor, concretamente, la pasión por inventar, pueden influir en el comportamiento estratégico y en el desempeño de las empresas (Carpenter et al., 2004; Hambrick y Mason, 1984). Estudios recientes demuestran un efecto positivo de la pasión por inventar en la innovación radical (Strese et al., 2018), pero con esta investigación contribuimos con un abordaje más completo, dónde evaluamos la inserción de la orientación emprendedora como un recurso necesario para transformar las invenciones propuestas por los emprendedores en innovaciones que llegan al mercado y ayudan a las empresas a obtener un mejor desempeño.

El capítulo 5 actúa a modo de "Resumen y Conclusiones" y hace un repaso general de los argumentos y resultados que se obtienen en la tesis doctoral. Asimismo, el Capítulo 5 plantea las conclusiones e implicaciones prácticas que se derivan de la tesis, acercando los resultados obtenidos al público profesional.

3 LAS START-UPS EN BRASIL

El término start-ups surgió en los Estados Unidos, con la burbuja de internet, en la década de 90, y se refiere a los empresarios que están involucrados en la construcción de empresas que actúan en entornos de extrema incertidumbre, desarrollando un modelo de negocio innovador (Ries, 2011). Las start-ups son empresas recién creadas o en constitución, que poseen un enfoque en I+D, bajos costes de mantenimiento y con potencial para un rápido crecimiento y generación de ganancias (ABS, 2016). A menudo son empresas de base tecnológica, nacen con ideas novedosas y buscan por la definición de un modelo comercial escalable y repetible, que les permita llegar a un gran número de clientes y generar importantes beneficios. Meyer (2012) agrega que las start-ups comienzan pequeñas, pero piensan grande debido a su gran potencial de crecimiento rápido y son impulsadas por su vocación innovadora.

Un factor importante para evaluar el potencial de crecimiento de una start-up es la etapa de desarrollo. Según la ABS (2016), las start-ups poseen cuatro etapas de desarrollo: curiosidad, idea, operación y tracción. En la primera etapa los empresarios no tienen una idea o un negocio, pero les gusta comprender mejor lo que es crear y administrar una start-up. La idea surge cuando el emprendedor tiene un concepto claro, busca conocer los detalles de su mercado e inicia su negocio. Cuando el emprendedor formaliza la empresa, encuentra socios y se dedica al nuevo negocio, la start-up llega a la etapa operativa y la última etapa, la tracción, ocurre cuando el emprendedor ya sabe cuál es su producto, cuánto cuesta la adquisición de cada cliente y consigue inversiones para hacerla crecer con rapidez. Para la realización de esta tesis, hemos utilizado una muestra

que considera empresas en operación y tracción porque son los estados de desarrollo dónde las start-ups ya se encuentran formalizadas.

En todas las etapas es importante no olvidar que la actividad principal de una start-up es transformar ideas en productos innovadores, verificar cómo reaccionan los clientes con estos productos y aprender cómo funciona este ciclo. Estas start-ups son un ejemplo de empresas con altos niveles de orientación emprendedora, ya que nacen en un ambiente de extrema incertidumbre, sus emprendedores y empleados tienden a ser altamente innovadores y suelen entrar en mercados todavía inexplorados.

En Brasil, de acuerdo con el Ranking Global de los Ecosistemas de Start-ups, São Paulo es una de las ciudades con mejor ecosistema para crear y financiar start-ups. Para evaluar los ecosistemas Hermann et al. (2016) han utilizado datos primarios y secundarios sobre el desempeño y crecimiento, demográficos, de financiación, humanos, alcance de mercado, experiencia con Start-ups y soporte y política. En el ranking de 2015 se consideraron las 20 ciudades más propicias para las start-ups (excluyendo China, Japón, Taiwán y Corea del Sur) y la ciudad de São Paulo apareció en la posición doceava, delante de ciudades como Moscú, Austin, Bangalore, Sidney, Toronto, Vancouver, Ámsterdam y Montreal.

El entorno emprendedor vive un momento especial en Brasil, impulsado fundamentalmente por los programas y políticas de fomento a las start-ups en diversas ciudades brasileñas. La Asociación Brasileña de Start-ups (ABS) posee 4.180 empresas registradas, destacando São Paulo con un 31% del total de empresas, Minas Gerais con

un 9%, Rio de Janeiro con un 8%, Rio Grande do Sul e Paraná con un 5% cada y Santa Catarina con un 4% de las start-ups de Brasil, mostrando una mayor concentración en las regiones Sudeste y Sur (ABS, 2016).

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CHAPTER 1

INTRODUCTION

1 INTRODUCTION

The current economic crisis that Brazil is going through makes us reflect on the possible alternatives that can promote social and economic development and deal with the high unemployment rates that plague the country. Considering that, in Brazil, only 5.7% of established companies have developed a new product, service or process (IBGE, 2013), the discussion about the role of the entrepreneur and the creation of new firms gains more importance, since entrepreneurship is presented as an option to face this recessionary situation (Estrin et al., 2013).

There is still great potential for the generation of new firms in Brazil, since more than half (55.5%) of its population considers that the creation of a new business in the region where they live is a good idea (GEM, 2016) and having a company is one of the biggest dreams of Brazilians (GEM, 2020). However, few companies can bring innovative products and services to the market. For this reason, it is not enough to have an idea or invention, it is necessary to create mechanisms and adopt a strategic direction towards innovation, leading people, processes, and activities to seek behaviors necessary to achieve superior performance (Gatignon and Xuereb, 1997).

Miller (1983) identified three characteristics of high-performance firms: innovation, risk taking and proactivity, which in turn show the entrepreneurial orientation they possess. Innovation refers to developing new ideas and breaking away from established practices or technologies, proactivity refers to anticipating future needs and desires, and risk tolerance refers to the willingness to commit and undertake risky

projects. Firms with a strong entrepreneurial orientation engage in innovative behavior to meet customer needs, are proactive in engaging with opportunities, and tolerant of risk-taking (Covin and Slevin, 1989).

Although in recent years a broad consensus has emerged among academics and researchers that the choice of a clear entrepreneurial orientation can be a crucial determining factor for the firms to obtain a superior performance (Hughes and Morgan, 2007; Kumar et al., 2011), the empirical results are still contradictory. While many studies show a positive effect of entrepreneurial orientation on business performance, others have been unsuccessful in trying to find a positive relationship (Hitt et al., 2001; Ireland et al., 2003; Rauch et al., 2009). Thus, these contradictory results suggest that the adoption of an entrepreneurial orientation alone is not enough for firms to achieve superior performance (Zhou et al., 2005). Various authors corroborate the importance of analyzing the factors that improve or limit the impact of entrepreneurial orientation on firm's performance (Kumar et al., 2011; Matsuno et al., 2002; Wiklund and Shepherd, 2005). Internal factors such as the capacity for innovation, the types of knowledge, the personality of the executives or the quality of the workers can mediate or moderate the relationship between entrepreneurial orientation and firm's performance (Augusto and Coelho, 2009; Kim et al., 2013; Menguc et al., 2016; Theodosiou et al., 2012).

The external environment of the company can also influence strategic decision-making and be an important moderating factor in the relationship between entrepreneurial orientation and firm's performance (Kahndwala, 1972). Thus, for example, the actions of the competition and customer preferences often impact market conditions (Penrose,

1959). On the one hand, the intensity of competition can cause the firm to suffer from the price war (Hall, 1980) and, on the other hand, changes in customer preferences can make it difficult to anticipate their needs and expectations, increasing the uncertainty of the environment (Milliken, 1987). In the market, hostility and uncertainty coexist together (Jaworski and Kohli, 1993), which can make it difficult to interpret the effects of these environmental variables and strategic decisions making. However, the available literature evaluates in isolation the direct or moderating effects of hostility and uncertainty on firm's performance. Based on all above, this thesis's main objective is to advance research on the direct, mediating, and moderating effects of entrepreneurial orientation on firm's performance.

2 STRUCTURE OF THE THESIS

This thesis is composed of five chapters. Chapter 1 is entitled "Introduction" and explains the main objective and contribution of this investigation, positioning it within the literature on entrepreneurship. The introductory chapter also deals with presenting the empirical context, justifying the adequacy of Brazilian start-ups to the objective of the doctoral thesis.

Chapter 2 is titled "**Does Performance Measure Matter? Entrepreneurial orientation and performance of Start-ups**". It examines whether entrepreneurial orientation has different effects on financial and non-financial performance measures. This chapter has two main contributions. In the first place, although our hypotheses

suggest a curvilinear relationship between entrepreneurial orientation and the financial performance, the results show that this effect is linear and positive, also rejecting studies that have not found a significant relationship between entrepreneurial orientation and financial performance (Baker and Sinkula, 2009; Morgan and Strong, 2003; Walter et al., 2006). Second, our work identifies a curvilinear relationship, in the form of an inverted U, in the relationship between entrepreneurial orientation and non-financial performance.

Chapter 3 is titled "**Entrepreneurial Orientation and Performance of Start-ups: A Configurational Approach**" and investigates the effects of entrepreneurial orientation on performance, using an outside firm perspective. The available literature evaluates the direct and moderating effects of hostility and uncertainty in the relationship between entrepreneurial orientation and firm's performance, but this study advances by analyzing how these environmental variables simultaneously affect this relationship. Hostility and uncertainty coexist together in the market (Jaworski and Kohli, 1993), which reinforces the relevance of this study. Thus, this chapter uses Capabilities and Resources Theory, Contingency Theory, and Configurational Theory to understand the nature of the relationship between entrepreneurial orientation and business performance, investigating how hostility and uncertainty jointly moderate this relationship. The contributions of this study are two. In the first place, it identifies that hostility and uncertainty can influence the choice of the most appropriate entrepreneurial orientation for each firm's environment. Second, it shows that a more entrepreneurial orientation is not the best option in all contexts.

In Chapter 4, entitled "**Passion to invent and radical innovation: the mediating effect of entrepreneurial orientation**", we rely on the Upper Echelon Theory to verify how individual characteristics of the entrepreneur, specifically, the passion for inventing, can influence the strategic behavior and performance of firms (Carpenter et al., 2004; Hambrick and Mason, 1984). Recent studies show a positive effect of the passion for inventing on radical innovation (Strese et al., 2018), but with this research we contribute with a more complete approach, where we evaluate the insertion of the entrepreneurial orientation as a necessary resource to transform the inventions proposed by entrepreneurs in innovations that reach the market and help firms to obtain a better performance.

Chapter 5 acts as an "**Abstract and Conclusions**" and makes a general review of the arguments and results obtained in this doctoral thesis. Likewise, Chapter 5 presents the conclusions and practical implications derived from the thesis, bringing the results obtained closer to the professional public.

3 START-UPS IN BRAZIL

The term start-ups emerged in the United States, with the internet bubble, in the 90s, and refers to entrepreneurs who are involved in building firms that act in environments of extreme uncertainty, developing an innovative business model (Rivers, 2011). Start-ups are newly created or newly established firms with a focus on R&D, low maintenance costs and the potential for rapid growth and profit generation (ABS, 2016). They are often technology-based firms, born with new ideas and seeking to define a

scalable and repeatable business model that allows them to reach many customers and generate significant profits. Meyer (2012) adds that start-ups start small but think big due to their great potential for rapid growth and are driven by their innovative vocation.

An important factor in evaluating a start-up's growth potential is its current stage of development. According to ABS (2016), start-ups have four stages of development: curiosity, idea, operation, and traction. In the first stage, entrepreneurs do not have an idea or a business, but they want to better understand what it is to create and manage a start-up. The idea arises when the entrepreneur has a clear concept, seeks to know the details of his market, and starts his business. When the entrepreneur formalizes the firm, finds partners and dedicates himself to the new business, the start-up reaches the operational stage and the last stage, traction, occurs when the entrepreneur already knows what his product is, how much it costs to acquire each client and obtain investments to make it grow rapidly. To carry out this thesis, we have used a sample that considers firms in operation and traction because they are the stages of development where start-ups are already formalized. These start-ups are an example of firms with high levels of entrepreneurial orientation, since they are born in an environment of extreme uncertainty, their entrepreneurs and employees tend to be highly innovative, and they often enter still unexplored markets.

In Brazil, according to the Global Ranking of Start-up Ecosystems, São Paulo is one of the cities with the best ecosystem to create and finance start-ups. To assess ecosystems Hermann et al. (2016) have used primary and secondary data on performance and growth, demographics, funding, people, market reach, start-up experience, and

support and policy. In the 2015 ranking, the 20 most favorable cities for start-ups were considered (excluding China, Japan, Taiwan, and South Korea) and the city of São Paulo appeared in the twelfth position, ahead of cities such as Moscow, Austin, Bangalore, Sidney, Toronto, Vancouver, Amsterdam, and Montreal.

The entrepreneurial environment is experiencing a special moment in Brazil, fundamentally driven by programs and policies to promote start-ups in various Brazilian cities. The Brazilian Association of Start-ups (ABS) has 4,180 registered firms, highlighting São Paulo with 31% of all companies, Minas Gerais with 9%, Rio de Janeiro with 8%, Rio Grande do Sul and Paraná with 5%. each and Santa Catarina with 4% of Brazilian start-ups, showing a greater concentration in the Southeast and South regions (ABS, 2016).

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CHAPTER 2

DOES THE PERFORMANCE MEASURE MATTER? ENTREPRENEURIAL ORIENTATION AND START-UP PERFORMANCE

1 INTRODUCTION

Research about the determinants and effects of adopting a more entrepreneurial strategic business stance (entrepreneurial orientation) has grown rapidly since the 1980s (Zur, 2013), becoming one of the most researched topics in strategic management and entrepreneurship. One of the pioneering works, Miller (1983), suggests that there are three types of entrepreneurial enterprises (simple, planning, and organic) and these firms can be classified according to their innovative capacity (Schumpeter, 1934; Cole, 1973), their tolerance for risk (Collins and Moore, 1970; Miller and Friesen, 1978; Kets de Vries, 1971) and their proactivity (Miller and Friesen, 1984; Mintzberg, 1973). Academics mention that firms with these three characteristics are those who have an Entrepreneurial Orientation – EO (Covin and Slevin, 1989; Covin and Wales, 2019). In the other way, a non-entrepreneurial firm is one that hardly innovates, risk averse, and imitates what other firms are doing.

The effect of entrepreneurial orientation on firm performance – FP have garnered a great deal of attention, becoming one of the most researched topic in this knowledge field (Saeed et al., 2014), and various studies support a positive relationship (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Soares and Perin, 2020; Wiklund, 1999; Wiklund and Shepherd, 2003, 2005; Zahra, 1991; Zahra and Covin 1995; Zur, 2013). However, there is still no consensus about the positive relationship between entrepreneurial orientation and firm performance because there is evidence that a high level of entrepreneurial orientation

can be prejudicial for firm performance, showing a negative or insignificant relationship (Baker and Sinkula, 2009; Morgan and Strong, 2003; Renko et al., 2009; Slater and Narver, 2000; Walter et al., 2006), and stating that this relationship is curvilinear with a shaped-U form (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012).

To better understand these divergences, we need first to analyze the concept of performance. Extant literature suggests a common distinction between financial and non-financial measures of performance (Combs et al., 2005; Venkatraman and Ramanujan, 1986). Financial performance usually considers factors such as sales growth and return on investments, and non-financial performance focuses on goals like customers satisfaction and firm's image and reputation (Moorman and Rust, 1999). These distinctions are relevant because the relationship between entrepreneurial orientation and performance is often measured through financial aspects (Rauch et al., 2009), using the main argument that firms with a high level of entrepreneurial orientation can create premium market niches, without competitors, and therefore charge a higher price (Zahra and Covin, 1995). However, customers demonstrate interest in innovations only when they offer a new way to solve their problems (Sakamoto, 2019; Wang, 2019) and satisfied customers foster superior financial performance, but many firms fail to implement a strategy focused on them (Meyer and Schawager, 2007). It may occur when firms start to prioritize the entrepreneurial agenda focusing on obtain a high level of entrepreneurial orientation, becoming more technology-driven rather than market-driven. We believe that these

firms trust more in their internal innovative competence than in market intelligence (Bhuian et al., 2005), moving away from the real needs of customers. Without a close relationship with customers, innovations do not always succeed and can negatively affect the performance and even customer satisfaction of those firms. For these reasons, Soares and Perin (2020) and Zahra and Wright (2011) point to the necessity to deepening into the knowledge about the effects of the relationship between the entrepreneurial orientation and non-financial measures of performance.

To explore these motivations, the objective of this research is to evaluate if entrepreneurial orientation influences on the same way financial and non-financial performance of Brazilian start-ups. To reach this objective, the following structure is proposed. Section two reviews the literature on entrepreneurial orientation, while section 3 presents our research hypotheses. Section four explains the methodology we will use, including the statistical techniques applied to measure the reliability of the scales raised, the intensity of the relations and the contrast of the hypotheses. In section five, the main results that derive from our analysis are presented, followed by the discussions and theoretical and practical implications, as well as the conclusions, limitations, and recommendations for future work.

2 LITERATURE REVIEW: ENTREPRENEURIAL ORIENTATION

The first works on entrepreneurial orientation aimed to identify those firms that presented a more entrepreneurial strategic position, through dimensions such as

innovation, risk taking and proactivity (Miller, 1983; Miller and Friesen, 1982; Morris and Paul, 1987). Innovation can be conceptualized as the predisposition to innovate, to introduce changes or new characteristics in products and services, as well as new processes or business models (Lumpkin and Dess, 1996; Schumpeter, 1934; Wales et al., 2020). A more innovative strategic position allows the firm to perceive the superiority of moving first to niches and taking advantage of the opportunities of these markets (Wiklund, 1999).

To develop innovations, firms need to take risks by investing resources to venture into new and unfamiliar markets or even borrowing to carry it out (Lumpkin and Dess, 1996). Therefore, it seeks to capture whether decisions that involve the application of resources tend to have a greater or lesser degree of risk and if it follows patterns at the firm level (Venkatraman, 1989).

The third dimension, proactivity, focuses on identifying how the firm seeks opportunities and to what extent it can introduce new products and services into the market to exploit the opportunities encountered (Lumpkin and Dess, 1996). It is characterized by the action of anticipating future demands and putting into action the demands captured from its environment (Miller and Friesen, 1978). It is usually accompanied by innovative activities, products or services or the development of new businesses and impacts on how the firm must be structured to achieve the desired performance (Govindarajan, 1988).

According to institutional theory, firms with a high-level of entrepreneurial orientation are more likely to change their environment by imposing new rules, routines, and innovative processes in the market (Battilana et al., 2009), as they maintain their competitive advantages by occupying distinctive market positions and generate new business practices that impact stakeholder values (Maguire et al., 2004). In addition, entrepreneurial orientation builds on the efforts of the firm to continually scan and monitor its environment to find new business opportunities (Keh et al., 2007) and new ways of influencing its stakeholders.

3 HYPOTHESES

3.1 Entrepreneurial orientation and firm performance

Several studies point out that the relationship between entrepreneurial orientation and firm performance is positive (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Wiklund, 1999; Wiklund and Shepherd, 2003, 2005; Zahra, 1991; Zahra and Covin 1995; Zur, 2013). Nevertheless, not all researchers corroborate these results. There are studies that have not found significant differences and believe that this relationship does not exist (Baker and Sinkula, 2009; Morgan and Strong 2003; Stam and Elfring, 2008; Walter et al., 2006) as well as those who claim that it is not linear and has a form of an inverted U (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012).

Researchers who defend the positive relationship suggest that firms with a high level of entrepreneurial orientation get better performance by having the benefit of being the first entrants, taking advantage of emerging opportunities and their attitude towards innovation, risk taking and proactivity (Miller, 1983; Wiklund, 1999). Zahra and Covin (1995) add that firms with a high level of entrepreneurial orientation can choose the best market segments and set higher prices by offering novel products. In a meta-analysis, Zur (2013) concludes that the current evidence corroborates the assumption that entrepreneurial orientation leads to a higher performance and its strength changes according to the moderating effects. For Martins et al. (2012) SMEs with a higher entrepreneurial orientation can operate in hostile environments as well as in favorable environments, being more profitable than the most conservative firms in hostile environments. This is because in a strongly competitive environment the capacity to innovate is necessary to have a proactive behavior and to act in a more risk-prone manner. However, Engelen et al. (2014) argue that the relationship between entrepreneurial orientation and firm performance is only significant when firms operate in uncertain and turbulent markets.

Another possible explanation to justify these theoretical divergences between entrepreneurial orientation and firm performance is that the relationship may not be linear, taking the form of an inverted U (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012). Furthermore, a high-level of entrepreneurial orientation may not be sufficient to reach a higher performance (Alegre and Chiva, 2013), due to the

contingent effect of the economic context where firms compete (Tang et al., 2008; Tang and Tang, 2012) and how they develop their marketing orientation (Deutscher et al., 2016). The curvilinear relationship between entrepreneurial orientation and firm performance is consistent with contingency theory (Bhuian et al., 2005; Tang et al., 2008), since a high entrepreneurial level may not be desirable under certain market conditions (Slevin and Covin, 1990). For example, it is possible that a firm has too much of an attitude towards innovation that to move away from customer needs, beyond the saturation point where an entrepreneurial orientation would bring a better firm performance (Bhuian et al., 2005).

For these reasons, we propose a model considering that the low and high levels of entrepreneurial orientation should have an insignificant or negative impact on firm performance and that this relationship has a form of an inverted U, being higher for firms with a moderate level of entrepreneurial orientation. To understand this assumption, we need to pay attention on marginal costs and benefits associated with adopting an entrepreneurial strategy, because firm performance can become negative when the marginal costs grow faster than the benefits of taking on a high entrepreneurial orientation (Brent, 1996). Regarding the marginal benefits of adopting a more entrepreneurial strategy, we can mention the improvement of the ability to identify new market opportunities (Lumpkin and Dess, 1996), as well as in the speed of exploring these opportunities (Wiklund and Shepherd, 2003). The combination of these benefits helps firms to identify market needs that can be converted into new products and services (Covin and Slevin, 1989), allowing firms

to obtain a more favorable strategic position for growth (Ireland, Covin and Kuratko, 2009). However, assuming a strategy focused on developing a high entrepreneurial orientation can potentiate the emergence of marginal costs, such as the high commitment of limited resources (Covin and Slevin, 1991), necessary to explore new opportunities (Wiklund and Shepherd, 2005) and to develop new products and services (Covin and Slevin, 1989). So, the main question that guides our first hypothesis is whether the marginal costs needed to develop products and explore new market opportunities outweigh their marginal benefits.

Firms with a low level of entrepreneurial orientation are those who are risk averse and have a low level of proactiveness and innovation (Miller, 1983), and they probably will not be the first to exploit market opportunities (Slater and Narver, 1995). Therefore, a low level of entrepreneurial orientation will not commit firm's limited resources to develop new products and services, since the entrepreneurial level is too weak to allow the identification of new opportunities. As the entrepreneurial orientation increases to the moderate level, firms will take calculated risks, being moderately proactive and innovative, being more prone to enter new markets (Lumpkin and Dess, 1996) because they will make progresses about the process of identifying and selecting new entry opportunities (Helfat et al., 2007). Even if a moderate level of entrepreneurial orientation does not fully generate the possibilities of new entries, they will occur in a more organized, focused way and consuming less scarce resources, justifying why firms with a moderate entrepreneurial orientation achieve a better financial performance.

Finally, entrepreneurial firms tend to share existing resources to experimenting new products and services (Hughes et al., 2021), committing too many resources to develop innovations (Yin et al., 2021). In this case, the marginal costs can exceed marginal benefits when firms invest simultaneously in several innovations aiming to reach a high entrepreneurial orientation, especially in small firms, where resources (financial, human, and technological) are scarce and limit the effectiveness of a bolder strategy (Cooper, 1995; Mintzberg, 1973). Likewise, when seeking leadership through innovation (high entrepreneurial orientation), firms will need to invest more resources to launch new disruptive products and services (instead of incremental and lower risk projects), which can become a managerial challenge due to the short time horizon and the specificities of this type of investment. Thus, we expect that:

Hypothesis 1: ***The relationship between Entrepreneurial Orientation and Financial Performance has the form of an inverted U.***

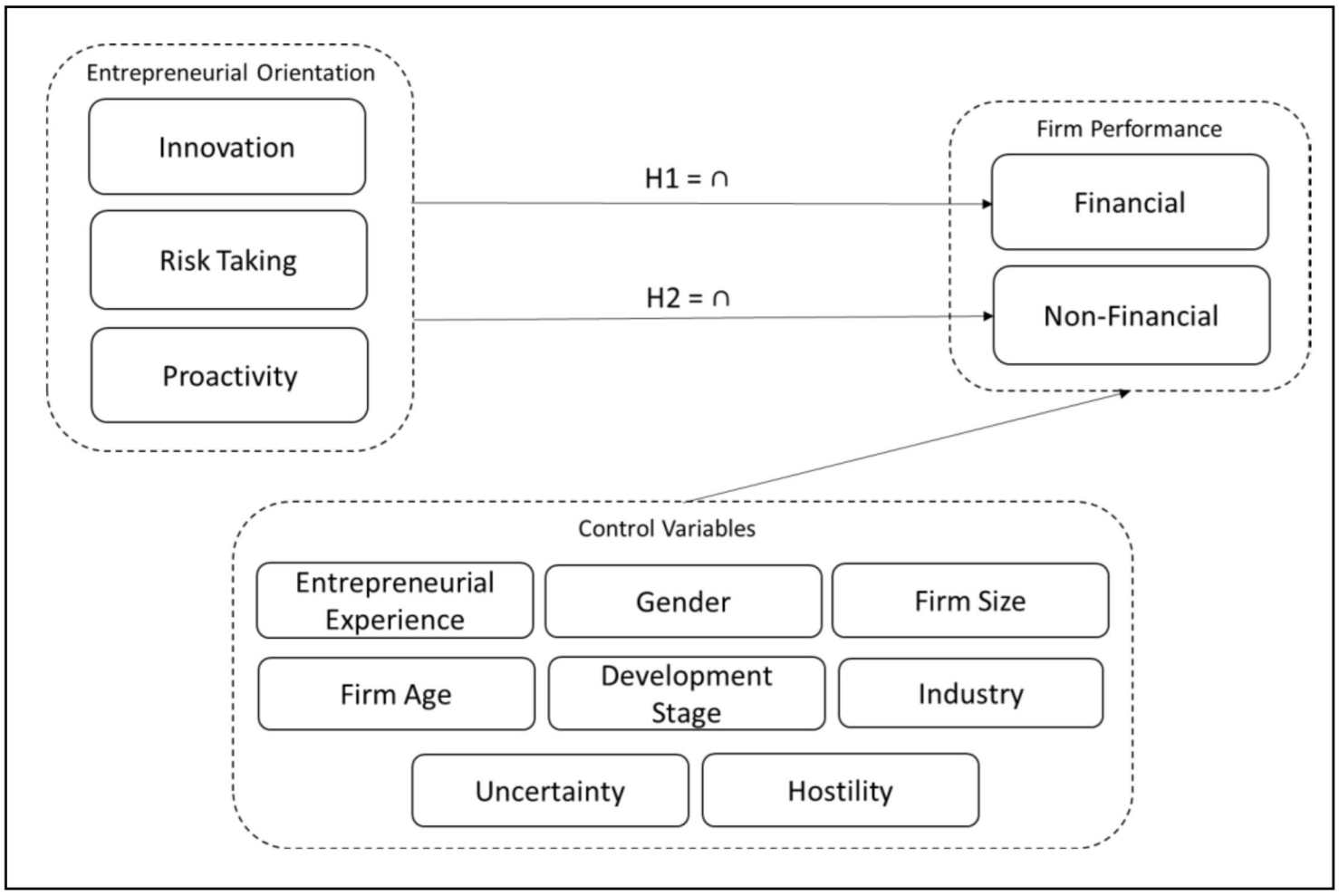
On the other hand, we have non-financial measures for firm performance (customer satisfaction and firm image and reputation). In this case, firms with a low level of entrepreneurial orientation will compete for customers that seek lower prices, which can negatively affect customer satisfaction and firm reputation, particularly in more fierce markets. Firms with a moderate level of entrepreneurial orientation are more prone to use their intelligence-gathering efforts to suggest new products and services more suited to the real needs of the market (Bhuian et al., 2005) because

they have a moderate level of risk-taking, proactivity, and innovation. Atuahene-Gima and Ko (2001) classify them as market-driven firms, and we believe that they will demonstrate greater non-financial performance. Contrarily, when activities start to be guided by the entrepreneurial agenda (high level of entrepreneurial orientation), firms became more technology-driven rather than market-driven. In this situation, firms may believe that technological superiority is enough to be successful in launching new products and services (Atuahene-Gima and Ko, 2001), trusting more in their internal innovative competence than in market intelligence (Bhuian et al., 2005), moving away from the real needs of customers. As a consequence, it will decrease customers satisfactions and negatively affect firm's reputations. For these reasons we argue that:

Hypothesis 2: ***The relationship between Entrepreneurial Orientation and Non-Financial Performance has the form of an inverted U.***

Based on the concepts of the entrepreneurial orientation and their relationships with firm performance, we propose a model designed in Figure 1, which teaches the theoretical framework and the hypotheses of this research.

Figure 1 – Framework and hypotheses.



Source: Prepared by the authors.

To test the hypotheses, we use multiple regression techniques, considering the firm performance as a dependent variable, the entrepreneurial orientation as independent variable and different control variables (entrepreneurial experience, gender, firm size, firm age, development stage, industry, uncertainty, and hostility), through SPSS software.

4 METHODOLOGY

4.1 Sample

For this research, a sample of the Brazilian Start-ups Association's (ABS) database was compiled, composed of 1,072 firms in the stages of operation and traction, which are the ones where the start-ups are already formalized. The choice of a sample of start-ups occurred because they are more prone to arise from entrepreneurs who envision an opportunity, stimulating innovation (Choi and Phan, 2006), which is a prominent dimension in entrepreneurial orientation, arises to address the market expectations and there are still gaps that need to be better exploited about these stage of firms (Lonberg et al., 2016).

Respondents were their chief executives, because their experience and understanding about the operation of the start-ups contribute to a better knowledge about the processes and performance of firms. Since executives have the power to make decisions, it is not necessary to involve managers in the process of collecting data (Rauch et al., 2009). The data collection was initiated on May 30, 2016, with the sending of the surveys to a random selection of 20 start-ups and the questions were improved following the suggestions and difficulties presented by the respondents.

The adjusted survey was then sent by e-mail, in two waves (on June 13 and July 4), along with a cover letter and description of the intended objectives with this research. In the first wave, 110 forms were returned and in the second wave we received 33 further questionnaires, totaling 143 forms. To reinforce the validity of

the collected data, only those that were fully answered by the executives were included. For this reason, three forms submitted were incomplete, determining a final sample of 140 responding start-ups and an effective response rate of 13%. The sample size and response rate may be considered adequate when compared to similar studies (Chen et al., 2012; Grühn et al., 2016; Sciascia et al., 2014; Vega-Vazques et al., 2016).

4.2 Measures

4.2.1 Dependent variables

Financial Performance (FP): Adapted from Moorman and Rust (1999), is a unidimensional construct made up of subjective measures of ROI and sales growth, derived from a comparison with competitors (*Likert* scale from 1 -much worse than the competitors- to 7 -much better than the competitors) and firm plan expectations (1 -much worse than planned- to 7 -much better than planned).

Non-Financial Performance (NFP): Adapted from Moorman and Rust (1999), is a unidimensional construct made up of subjective measures that collect the perception of executives in relation to the customer satisfaction and firm image and reputation (*Likert* scale, 1 -much worse than the competitors to 7 -much better than the competitors).

4.2.2 Independent variable

Entrepreneurial Orientation (EO): Adapted from a scale proposed by Covin and Slevin (1989), entrepreneurial orientation is proxied through nine items and three dimensions (innovation, risk-taking and proactivity), using a *Likert* scale from 1 (totally disagree) to 7 (totally agree).

4.2.3 Control variables

Entrepreneurial Experience (EE): We control for this variable because we understand that experience would be helpful to the achievement of the entrepreneurial goals (Singer, 1995). We use a dummy variable where 0 = without previous experience and 1 = with experience.

Gender (GD): Gender entrepreneurial characteristics may influence firm performance. According to Cohoon et al. (2010), women are more likely than men to get early funding, have more need of an entrepreneurial mentor and attribute their success to prior experience. For these reasons, we employ a dummy variable where 0 = female and 1 = male.

Firms Size (FS): Measured through the number of employees. By having a more flexible structure, usually associated with a lower size, SMEs can adapt more quickly to changes in the external environment, allowing them to take advantage of new opportunities (Zur, 2013).

Firms Age (FA): Some authors claim that the effect of entrepreneurial orientation on firm performance tends to increase in the long term (Madsen, 2007; Wiklund, 1999; Zahra and Covin, 1995). For this reason, following Chen et al. (2012), we proxy age through the difference between the year of the data collection and the year of firm creation.

Development Stage (DS): According to ABS (2016), start-ups have four stages of development: curiosity, idea, operation, and traction. In the first stage, entrepreneurs do not have an idea or a business, but they like to understand better what it is to create and they like managing a start-up. The idea arises when the entrepreneur has a clear concept, begins to know the details of its market, and launch the business. When the entrepreneur formalizes the firm, finds partners and manages the new business, the start-up reaches the operation stage. The last stage, traction, occurs when the entrepreneur knows what the product is, how much the acquisition of each customer costs and has made the investments to make the company grow. Our sample includes firms in the operation and traction stages, and we use a dummy variable where 0=operation and 1=traction stages.

Industry (ID): We controlled industry effects to reduce threats from unobserved heterogeneity, including four dummy variables to industry, trend, agrobusiness and services (0 = other sectors and 1 = selected sector).

Hostility (HT): Adapted from Pelham and Wilson (1996), hostility is measured by three items that approach the intensity of key competitive market elements, namely,

price, quality, and frequency of launching new products. We also used a *Likert* scale that ranges from 1 (totally disagree) to 7 (totally agree).

Uncertainty (UT): Adapted from Pelham and Wilson (1996), uncertainty focuses on customer preferences, changes and the emergence of new products and technologies. This variable is measured through four items, using *Likert* scales from 1 (very stable) to 7 (very dynamic).

4.3 Analytical procedures

The scales used by other authors were selected to measure control variables, entrepreneurial orientation, and firm performance, with the intention to show potential conflicts between the results found (Zur, 2013). These original scales were in English and were translated into Portuguese with care through a reverse translation process (Brislin, 1980).

Non-response bias was assessed based on the outline of Armstrong and Overton (1977). The various variables were compared using a t-test and no significant differences were found between early and late respondents (the first 25 percent of respondents vs. the last 25 percent). The results of the descriptive statistics (mean and standard deviation) are presented in Table 1, as well as the correlations between the variables and the coefficient of reliability of the proposed scales (*cronbach's alpha*).

Table 1 – Descriptive statistics.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. FP	**1**												
2. NFP	.473**	**1**											
3. EE	.128	.175*	**1**										
4. GD	.006	-.023	-.150	**1**									
5. DE	.218**	.125	.006	-.077	**1**								
6. FS	.129	.162	-.122	.016	.233**	**1**							
7. FA	-.055	-.061	-.174*	.062	.154	.104	**1**						
8. ID	.153	.074	.109	-.045	-.012	.007	.078	**1**					
9. AG	.074	-.006	.109	-.045	-.114	-.062	-.097	-.022	**1**				
10. SE	.030	.017	-.147	-.057	.050	.079	.048	-.317**	-.317**	**1**			
11. UT	.241**	.161	.093	.057	.001	.135	.029	-.107	.051	-.136	**1**		
12. HT	-.064	-.029	.081	.019	-.108	-.132	.043	.101	.089	-.188*	.354	**1**	
13. EO	.392**	.312**	.266**	-.225*	.247**	.154	.060	.080	.035	.024	.217	.094	**1**
SD	1.255	1.238	.478	.281	.485	6.539	2.227	.145	.145	.384	1.173	1.343	.855
ALPHA	.842	.772	-	-	-	-	-	-	-	-	.830	.770	.639
MEAN	4.289	5.386	.065	.857	.374	4.970	2.568	.214	.214	.821	4.679	4.086	4.987

Source: elaborated by the authors.

The correlations between independent variable and control variables are modest, with a range between r = .024 and .266. Besides, the variance inflation factor (VIF) has values lower than 5, which means that there are no problems of multicollinearity (Hair et al., 2017). Finally, we use hierarchical regressions of two successive steps (Stepwise) to contrast the hypotheses, as recommended by Arnold (1982). In the first step were added the control variables and in the second the independent variable.

5 RESULTS

Table 2 shows the results of multiple regressions using financial and non-financial measure as the dependent variable, seeking to assess whether there are significant differences in the sample under analysis. For Rauch et al. (2009), there

are no differences between financial and non-financial measures. For this reason, three models were evaluated for each dependent variable. The first one was considering just the control variables. The second one includes the independent variable and the third, the full model, we add entrepreneurial orientation squared to evaluate the curvilinear effect suggested in our hypotheses.

Table 2 – Multiple regression predicting FP and NFP.

Variable	Financial			Non-Financial		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Step 1: Control						
EE	.207	-.005	-.008	.354	.175	.184
	(.218)	(.214)	(.215)	(.246)	(.248)	(246)
GD	.253	.515	.506	-.167	.054	.082
	(.359)	(.348)	(.349)	(.405)	(.403)	(.400)
DS	.595***	.425**	.440**	.169	.025	-.024
	(.214)	(.208)	(.210)	(.242)	(.241)	(.241)
FS	.043	.003	-.004	.137	.100	.113
	(.117)	(.112)	(.112)	(.132)	(.129)	(.128)
FA	-.180	-.213	-.225	-.152	-.180	-.141
	(.145)	(.139)	(.140)	(.164)	(.161)	(.161)
ID	2.332***	2.065***	2.081***	1.024	.799	.746
	(.745)	(.712)	(.714)	(.842)	(.825)	(.818)
AG	1.276*	1.112	1.097	-.215	-.354	-.307
	(.729)	(.695)	(.697)	(.824)	(.805)	(.798)
SE	.585**	.459	.477*	.169	.062	.002
	(.296)	(.284)	(.286)	(.335)	(.329)	(.328)
UT	.353***	.286***	.289***	.186*	.130	.122
	(.095)	(.092)	(.092)	(.107)	(.106)	(.106)
HT	-.149*	-.164**	-.165**	.037	.024	.025
	(.082)	(.078)	(.078)	.093	(.090)	(.090)
Step 2: Independent						
EO		.482***	-.248		.407***	2.784**
		(.127)	(1.160)		(.147)	(1.329)
EO^2			.075			-.244*
			(.118)			(.135)
Adjustment Indices						
Constant	2.124***	.193	1.911	4.164***	2.533**	-3.065*
R^2	.218	.299	.301	.294	.373	.401
Aj. R^2	.159	.237	.234	0.87	.139	.161
ΔR^2	-	.078	-.003	-	.052	0.23
F	3,538***	4,877***	4,482***	1,205	1,853*	1.999**

* p < .10; ** p < .05; *** p < .01

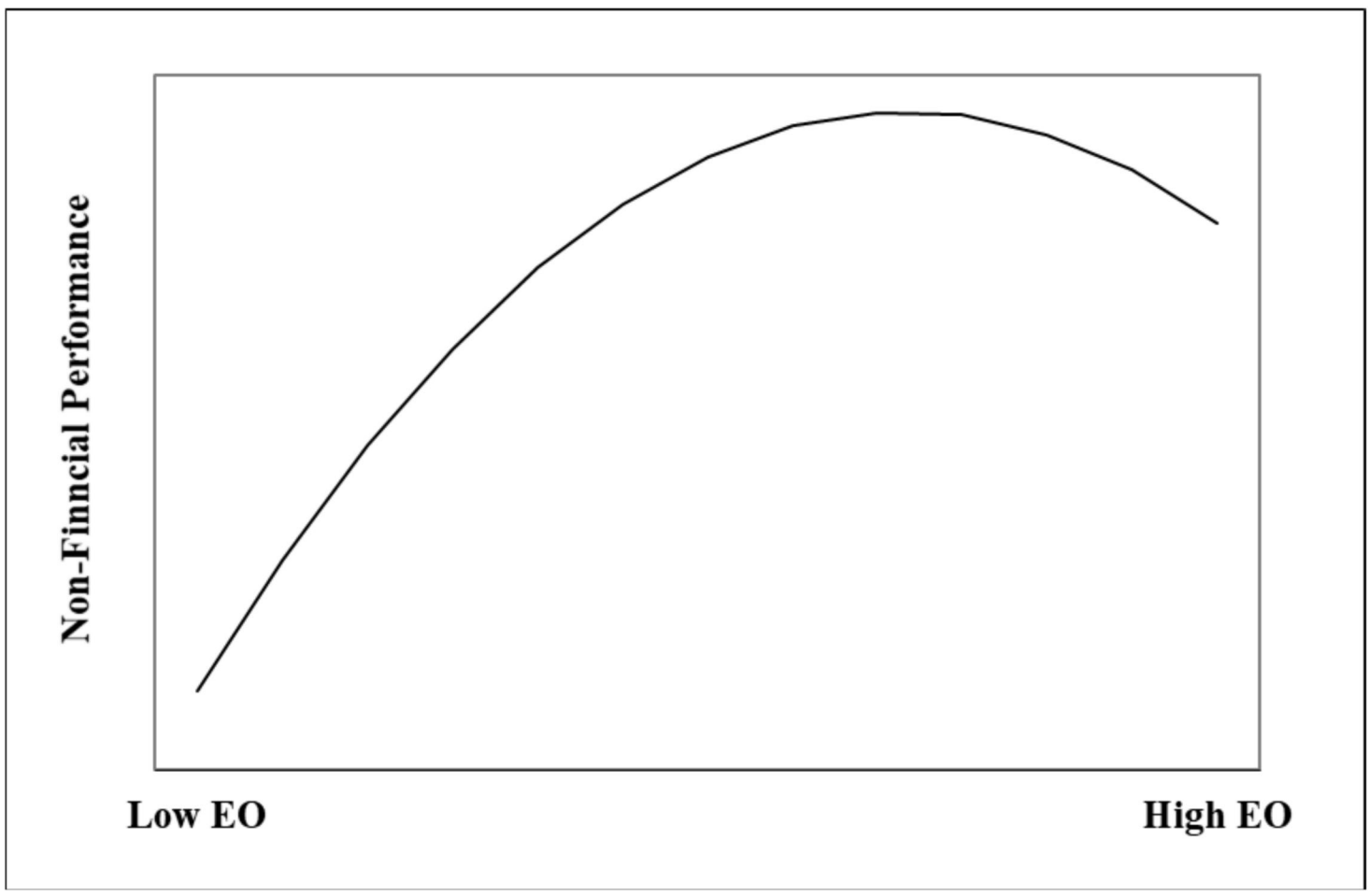
Observation: The entries in Table 2 are the no standard coefficients (βs). Numbers in parentheses are typical error.

For the financial measure, the results of Model 1 present an adjusted explanatory power of 15.9% (F = 3,538, p <.01) with the inclusion of the variables of control and only variables development stage, industry, agrobusiness, service, uncertainty, and hostility show a significant relationship. Model 2 presented the best fit with an adjusted explanatory power of 23.7% (F = 4,877, p <.01). In this model were added the control variables and the independent variable. Among the control variables, development stage, industry, and uncertainty presented a positive and significant relationship with the financial measure and the variable hostility a negative and significant relationship. The independent variable entrepreneurial orientation presented a positive and significant coefficient (.482, p < 0.01), showing that the start-ups with a higher level of entrepreneurial orientation are those that reach a better financial performance. In model 3 we test the curvilinear relationship between entrepreneurial orientation and financial performance, following the proposed in the hypothesis 1. However, the variables entrepreneurial orientation and entrepreneurial orientation squared did not present significant coefficients, confirming the linear relationship between entrepreneurial orientation and financial performance, rejecting the hypothesis 1.

Table 2 also shows the relationships between the control and independent variables with the non-financial measure of performance (image and reputation and customer satisfaction). In model 1, only the control variables were added, with an adjusted explanatory power of 8.7% (F = 1,205, p > .1). The control variable uncertainty was the only one with a significant coefficient. Model 2 show an adjusted

explanatory power of 13.9% (F = 1,853, p < .1) with the addition of the independent variable. In this model EO presents a positive and significant coefficient (.407, p < 0.01). The multiple regression of model 3 shows an adjusted explanatory power of 16.1% (F = 1,999, p < .05), a positive and significant coefficient to the independent variable entrepreneurial orientation (2.784, p < .05) and a negative and significant coefficient to the variable entrepreneurial orientation squared (-.0244, p < .1) finding a curvilinear relationship between entrepreneurial orientation and non-financial performance, confirming hypothesis 2. To show the quadratic relationship, we plot the Figure 2 with low and high levels of entrepreneurial orientation and non-financial performance, using mean ± 1 SD (Aiken and West, 1991).

Figure 2 – Curvilinear relationship between EO and NFP.



Source: Elaborated by the authors.

It shows that start-ups with a medium level of entrepreneurial orientation reach a better non-financial performance. In contrast, low and high level of entrepreneurial orientation appear to demonstrate a less effective impact on non-financial issues such as image and reputation and customer satisfaction.

6 DISCUSSION

This study aimed to evaluate the relationship between entrepreneurial orientation and start-up's performance. Analyzing a sample of 140 firms, our results show different effects in the relationship between the entrepreneurial orientation and financial and non-financial measures of performance. The main implications that derive from these results, both from a theoretical and a managerial point of view, are described below.

6.1 Theoretical implications

To the literature, we contribute in two ways. First, we identify different effects of entrepreneurial orientation on financial and non-financial measures of firm's performance, corroborating the assumption that there is a positive relationship between entrepreneurial orientation and financial performance (Covin and Slevin, 1990; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Shepherd, 2003; Soares and Perin, 2020; Wiklund, 1999; Zahra, 1991; Zahra and Covin, 1995). Second, we propose and validate a non-linear relationship in the shape of an inverted U-shaped between entrepreneurial orientation and non-financial measures.

For our sample, firms with a moderate entrepreneurial strategic stance are those that reach the best non-financial performance. This finding is contrary to the results obtained by Rauch et al. (2009) and Soares and Perin (2020), who assert that there is no difference in the relationship between entrepreneurial orientation and financial and non-financial measures of firm performance. We believe that this occurs because entrepreneurial firms tend to grow faster, generating higher profitability. However, this growth can make that firm's direct their focus on R&D processes, committing scarce resources (Bhuian et al., 2005), what represents new challenges for entrepreneurs, such as managing a larger and growing portfolio of customers, hiring employees, training, and motivating them, expanding their physical structure and information technology, which often does not happen at the same speed as the increase in sales, affecting the quality perceived by its customers and, consequently, the satisfaction and image of the firm.

Two variables that deserve a special attention are uncertainty and hostility. Hostility shows a negative relationship with financial performance, corroborating the findings of Slater and Narver (1994), but it contradicts the results found by Pelham and Wilson (1996), who did not find significant differences between uncertainty and hostility and firm's growth of sales and profitability. They also reject the assumption that entrepreneurial orientation is only significant for firms operating in uncertain and turbulent markets (Engelen et al., 2014). It is also emphasized that the significant relationships of uncertainty and hostility were not confirmed in the analysis of the non-financial performance of the Brazilian start-ups.

6.2 Managerial implications

The empirical results of this study show relevant considerations to entrepreneurs of the investigated start-ups. Firstly, the adoption of a more entrepreneurial strategic position needs to be very well planned, based on the desired objectives. If the entrepreneur focuses on an improvement in financial performance, it would be desirable for him to adopt a strategy that favors innovation, risk taking and proactivity, since there is a positive relationship between entrepreneurial orientation and financial performance. By contrast, if the entrepreneur seeks to improve the satisfaction of his customers and the image and reputation of the start-up, the suggestion is to maintain a moderate entrepreneurial stance, given that the relationship between entrepreneurial orientation and non-financial performance was shown to be curvilinear or, if they choose to preserve the entrepreneurial approach, to do so by paying more attention to the customers' needs and satisfaction.

Special attention should be given to firm's environment. A more entrepreneurial stance seems to favor start-ups that operate in a more dynamic environment. Therefore, it is important to consider the need for an evaluation of the target market, looking at its dynamics, seeking information such as the speed of changes in products, services and customer needs, the launch of new products and changes in the strategy of competitors. Even in relation to competitors, issues such as pricing, quality and novelty of products and services also deserve special attention,

once start-ups that operate in a fiercer environment show a lower financial performance.

7 LIMITATIONS AND FUTURE INVESTIGATIONS

Despite advances in the understanding of the complex relationship between entrepreneurial orientation and firm performance, it is important to emphasize that there are limitations in this research that should be considered for a better understanding of the results achieved.

Firstly, one aspect to be considered is that this study was carried out with a specific sample of firms indexed by the Brazilian Association of Start-ups - ABS. Although ABS is the national representative of start-ups in Brazil, the results can vary if analyzed in other contexts or sectors. One recommendation would be to replicate this study in different contexts, for example, in a sample comprising the top 20 ecosystems for start-ups identified by Hermann et al. (2016).

Furthermore, our data is limited to a cross-section analysis, which may limit the validity of the results obtained. Longitudinal studies may strengthen the interest of the study to the extent that they can take the dynamic nature of the phenomenon under study into account. Future research could also consider the use of alternative methodologies, such us structural equation models.

8 CONCLUSION

The study of the entrepreneurial orientation has been the object of more than 30 years of theoretical and empirical research, with a focus on the search for a better understanding of its impact in firm performance. It is believed that this study may offer new references for future research, mainly regarding the context of start-ups and the impact of entrepreneurial orientation on financial and non-financial measures of performance.

According to our results, we can conclude that a greater entrepreneurial strategy usually leads to a better financial start-up performance (profitability and sales growth). More importantly, an intermediate level of entrepreneurial orientation leads to a greater non-financial performance (customer satisfaction and image and reputation), compared to low or high levels of entrepreneurial orientation.

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CHAPTER 3

ENTREPRENEURIAL ORIENTATION AND START-UP PERFORMANCE: A CONFIGURACIONAL APPROACH

1 INTRODUCTION

Research about the effects of adopting a more entrepreneurial stance toward business creation has grown rapidly since the 1980s (Zur, 2013) and has become one of the most researched topics in strategic management and entrepreneurship. To identify an entrepreneurial firm, Miller (1983) proposed an approach, called entrepreneurial orientation (EO), that classified firms according to their innovative capacity (Cole, 1946; Schumpeter, 1934), their tolerance for risk (Collins and Moore, 1970; Kets de Vries, 1971; Miller and Friesen, 1978), and their proactivity (Miller and Friesen, 1984; Mintzberg, 1973). Under this definition a non-entrepreneurial company is one that hardly innovates, does not take risks, and imitates what other companies are doing.

The traditional research view asserts that entrepreneurial orientation enhances the firm's performance (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Wiklund, 1999; Zahra, 1991; Zur, 2013). However, the empirical evidence is not conclusive, and knowledge gaps remain about this relationship, particularly in the context of small businesses (Wales et al., 2011). For example, some studies have not found a significant relationship between entrepreneurial orientation and firm performance (FP) (Baker and Sinkula, 2009; Morgan and Strong, 2003; Walter et al., 2006), while others claim that the relationship is not linear and presents an inverted U-shape (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012). This lack of consensus suggests that additional research is necessary.

Most of the entrepreneurship literature has drawn on the resource-based view (RBV) to explore the contribution of entrepreneurship to organizational performance (Alvarez and Busenitz, 2001; Anderson and Eshima, 2013; Kellermanns et al., 2016; Lisboa et al., 2016; Wiklund and Shepherd, 2003). According to this theory, firms gain competitive advantages by deploying unique productive resources (Penrose, 1959) or capabilities (Newbert, 2007). From this perspective, EO can become a source of competitive advantage when firms are able to combine resources like innovation, risk-taking, and proactivity, so as to make it difficult for competitors to imitate or duplicate their strategies (Lonial and Carter, 2015). Similarly, research such as that of Ferreira and Azevedo (2007) focused on entrepreneurial orientation as a main capability for the growth of small firms.

The contingency framework has also been used to investigate the relationship between entrepreneurial orientation and firm performance (Lumpking and Dess, 2001; Pratono and Mahmood, 2015; Saeed et al., 2014). Within this contingency context, the external environment has often been considered as a factor that moderates the EO–FP relationship (Becherer and Maurer, 1997; Covin and Slevin, 1989; Tang et al., 2008; Wiklund and Shepherd, 2005). However, it seems that a further analysis of contingent environmental factors to gain a deeper understanding of the EO–performance relationship is required (Rauch et al., 2009). The external environment affects firms' opportunities and innovation (Tidd, 2001) and may influence FP. The influence of environmental factors reinforces the idea that there is no single way to select resources, organize them, and adopt a strategy which can be applied to any firm (Chandler, 1962; Galbraith, 1973) and that the relationship

between entrepreneurial orientation and firm performance is contingent on the context in which the firms compete (Andersén, 2010; Stinchcombe, 1965). In particular, two of the more important environmental dimensions that have attracted the interest of scholars have been hostility and uncertainty (Khandwalla, 1977, Kreiser et al., 2020, Rauch et al., 2009). A hostile environment is one with intense competition and a deteriorated business climate which produces few opportunities to be exploited. Hall (1980) points out that firms acting in hostile environments often suffer price wars and minimal customer loyalty, which constitutes a threat to the viability and performance of small firms (Covin and Slevin, 1989). An uncertain environment can be defined as one where changes arise unexpectedly (Milliken, 1987). Customer preferences change over time, increasing unpredictability about production processes, consumer demands, and the acceptance of new products. The most common and severe type of uncertainty is related to new ventures demand (Davis, 1993) because it is increasingly difficult for firms to predict it in terms of volume and product mix (Tachizawa and Thomsen, 2007). For these reasons, uncertainty is also expected to moderate the relationship between entrepreneurial orientation and firm performance.

Nevertheless, our argument here is that neither the main-effects-only model nor the contingent one (two-way interaction) is sufficient to explain the complex interaction between entrepreneurial orientation and firm performance. While previous research has insisted on the need to adopt a contingent approach, our contention is that greater insights might be gained by implementing an integrative

mechanism that ensures complementarity among a firm's different aspects (Wiklund and Shepherd, 2005). As a consequence of the above-mentioned arguments, this research will adopt a configurational approach, which jointly considers different dimensions of the environment (hostility and uncertainty), together with a firm's entrepreneurial orientation as the determinants of firm performance. The configurational theory argues that a firm's strategy, processes, structure, and environment need to cluster to form configurations (Meyer et al., 1993). To reach a better performance, firms need to configure with consistency their structure, strategy, and contextual factors, which implies that they must have an internal consistence and an external fit with multiple contextual dimensions (Ketchen et al., 1993). The use of this configurational approach might contribute to extend our understanding of the complex relationship between entrepreneurial orientation and firm performance (Wiklund and Shepherd, 2005).

Regarding the external context, entrepreneurial orientation has been widely studied in developed economies (North American and European countries) but, except for China, it remains relatively underexamined in developing and emerging market contexts (Wales et al., 2011). By way of example, of the 177 studies belonging to 41 countries considered in the meta-analysis performed by Saeed et al. (2014), only three focus on African economies and only one on a Latin-American economy (Mexico). In these countries, uncertainty becomes critical because firms should face political, economic, and institutional changes that are accompanied by relatively underdeveloped factor and product markets (Wright et al., 2005). Thus, our

analysis will take place in Brazil, a country where uncertainty is especially relevant: the circumstances of a president's impeachment, successive corruption scandals, and the imprisonment of executives and politicians constitute additional elements to be added to the challenges faced by start-ups to exploit and explore new technologies. Hostility is also salient in the Brazilian market because the deterioration in the business climate reduces business opportunities to be exploited.

To sum up, this paper adopts a configurational approach that takes into consideration that resources and environmental dimensions simultaneously interact to investigate how the relationship between entrepreneurial orientation and firm performance is configurational to the effect of hostility and uncertainty (three-way interaction). We will test our hypotheses using a sample of 140 Brazilian start-ups. We believe this type of company is particularly appropriate for our goals because a start-up usually faces a complex ecosystem where competition is usually high. These firms often arise in conditions of high risk and uncertainty; thus, they require a more prominent entrepreneurial orientation (Carvalho and Sugano, 2016) to obtain a more reliable and consistent business direction (Kee and Rahman, 2018). Additionally, start-ups may have limited access to investments, competences, knowledge, legitimacy, and reputation (Freeman and Engel, 2007), and these factors can generate divergent results from start-ups when compared with established firms. In this situation, the dimensions of entrepreneurial orientation, innovation, risk tolerance, and proactivity can be the best practices that firms need to overcome such drawback (Hogenhuis et al., 2016; Starr and MacMillan, 1990). Our contribution in this paper

is threefold. First, we contribute to the entrepreneurial orientation literature by trying to deepen the relationship between entrepreneurial orientation and firm performance. It is true that there are many works that have tried to analyze this link, but previous literature has obtained mixed results. Our findings confirm that an entrepreneurial orientation improves firm performance, but only when hostility is high (with low and high uncertainty) or when hostility and uncertainty are low. Second, we extend the analysis of entrepreneurial orientation performance by considering internal and external variables (Covin and Slevin, 1991; Miller, 1983). Thus, to fully uncover the complex relationship between EO and performance we apply a taxonomical approach grounded in the RBV, contingency, and configurational approach. Finally, we assess our hypothesis in a different geographical setting. Most previous research analyzes the abovementioned relationship within the context of developed countries, and research in emerging markets is advancing slowly (Arshad et al., 2014; Gupta and Batra, 2016; Shirokova et al., 2016; Tang and Tang, 2012; Wales et al., 2016). Thus, it seems that further research should be conducted in emerging economies, where institutions operate differently than those in developed countries (Tang et al., 2008).

In order to reach our objectives, the paper is articulated as follows. The next section highlights the main elements of the RBV, contingency, configurational, and entrepreneurial orientation theories that will be useful to develop our theoretical model in the following section. Then we present the methodology that will be used in the analysis, including the statistical techniques applied to measure the reliability of the scales, the intensity of the relations, and the hypotheses testing. This is

followed by a presentation of the main results of the analysis. The research concludes with a discussion about the theoretical and practical implications, along with its main limitations and recommendations for future work.

2 LITERATURE REVIEW

2.1 Entrepreneurial Orientation

Entrepreneurial orientation refers to the strategy-making practices that are used to identify new business opportunities that emphasize dimensions such as innovation, risk-taking, and proactivity (Dess and Lumpkin, 2005; Miller, 1983). An innovative firm is a company that incorporates new characteristics into its products and services or that introduces new processes or business models (Lumpkin and Dess, 1996; Schumpeter, 1934). A more innovative strategic position allows the firm to identify attractive market niches earlier, thus taking advantage of the opportunities of these markets (Wiklund, 1999).

Risk-taking refers to the propensity of the firm to start high-risk projects to achieve its goals. Venturing into new and unfamiliar markets or contracting loans and financing to develop new products and services are examples of risk-taking behaviors (Lumpkin and Dess, 1996). Therefore, risk-taking seeks to capture whether decisions that involve the application of resources tend to have a greater or lesser degree of risk and whether they follow patterns at the firm level (Venkatraman, 1989).

The third dimension, proactivity, focuses on identifying how the firm seeks opportunities and to what extent it can introduce new products and services into the market to exploit new opportunities (Dost et al., 2018; Lumpkin and Dess, 1996). Usually, proactivity needs innovative activities, products, and services, and it affects the structure that firms use to achieve the desired performance (Govindarajan, 1988). A proactive stance may be more necessary for entrepreneurial firms because they are built on efforts to continually scan and monitor their environment to find new business opportunities (Covin and Wales, 2011; Dost et al., 2018; Keh et al., 2007).

2.2 RBV, Contingency and Configurational Theories

The classical RBV theory proposes that the capacity resulting from increased operational efficiency contributes to improving firm performance (Penrose, 1959). To achieve operational efficiency, firms need to exploit valuable, rare, and difficult-to-imitate resources to transform the firm into something unique and inimitable (Barney, 1991). Among these resources, a given entrepreneurial orientation is an intangible capacity (Lim and Kim, 2019) embedded in organizational routines, methods, and practices and dispersed among organization members. The firm-specific combinations of resources, which involve innovation, risk-taking, and proactivity, are difficult to imitate or duplicate by competitors, making entrepreneurial orientation a possible source of competitive advantage (Li et al., 2018; Lonial and Carter, 2015).

However, one limitation of the RBV is that it only focuses on analyzing the internal resources of the firm, disregarding the pressures of the external environment. There is growing recognition that entrepreneurial behavior needs to be interpreted in the institutional environment in which it occurs (Su, 2020; Urbano et al., 2019; Zhai et al., 2019). This environment has a clear influence on the nature and extent of entrepreneurship as well as the way entrepreneurs behave, and this is particularly apparent in institutional environments characterized by high levels of ambiguity, uncertainty, and turbulence (Welter and Smallbone, 2011), as is the case of developing countries. In accordance with these arguments, we complement our evaluation with an analysis based on contingency theory, because there is no single firm structure or strategic orientation that provides an optimal firm performance whatever the circumstances. Accordingly, we focus our contingent analysis on two of the more important environmental dimensions that influence venture formation: hostility and uncertainty (Tsai et al., 1991). The optimal choice depends on the contextual situation (Chandler, 1962), and an appropriate strategic alignment with the environment is especially important for start-ups (Yeoh and Jeong, 1995). Consequently, start-ups need to choose a suitable combination of innovation, risk-taking, and proactivity to obtain an optimal performance when competing in environments of high uncertainty (Ries, 2011).

The contingency approach argues that a firm needs to organize its structure, resources, and strategy according to its environment (Chandler, 1962; Yamada and Eshima, 2009). These arguments corroborate the assumption of Khandwalla (1972),

who suggests that, to measure firm performance, it is necessary to take into account the structure, strategy, and management style because the impact of the external environment will influence these variables. Adverse environmental conditions may affect the ability of firms to identify market signals and understand customer needs (Sundqvist et al., 2012), which are necessary elements for the growth of a start-up to reach the traction stage.

Nevertheless, contingency models provide mixed and inconsistent results in previous empirical research. For example, in relation to the environmental variables that we use, several studies found a positive moderator effect of hostility on the relationship between entrepreneurial orientation and firm performance (Covin and Slevin, 1989; Lee et al., 2019; Martins and Rialp, 2013) while others found an insignificant effect (Covin et al., 2006; Rosenbusch et al., 2013). There is also a controversy in the literature as to whether hostility has a positive (Covin and Slevin ,1991; Miller, 1983), a negative (Miller and Friesen, 1984; Wiklund et al., 2009), or an inverse U-shaped effect (Kreiser et al., 2020) on entrepreneurial orientation. The above argument seems to indicate that previous research, based on the estimation of a direct or a two-way moderating effect, will not show the real impact of these environmental variables. To fill this gap, this paper proposes a configurational approach to contend that the moderating effect of hostility on the relationship between entrepreneurial orientation and firm performance depends on the level of uncertainty present in the environment. We also argue that both should be considered at the same time because hostility and uncertainty often exist side by side in an

industry and may act jointly (Jaworski and Kohli, 1993). A similar position is taken by Shirokova et al. (2016), whose results show that the link between entrepreneurial orientation and firm performance is dependent on a complex relationship between some elements of the external environment such as hostility and market growth.

The configurational approach works with the assumption that firms depend on the capacity to align specific organizational characteristics with environmental attributes to achieve high performance and outperform other firms (Ketchen et al., 1993; Linton and Kask, 2017). However, when firms are not able to align these features, their performance diminishes (Wicklund and Shepherd, 2005). In this sense, the key premise of this paper is that a firm's ability to align the adequate level of entrepreneurial orientation to face challenges of uncertainty and hostility will enable a start-up to achieve competitive advantages, enhancing its performance.

3 HYPOTHESES

3.1 Entrepreneurial Orientation and Firm Performance

A growing stream of research examines the concept of entrepreneurial orientation and its relationship with firm performance (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Wiklund, 1999; Zahra, 1991; Zur, 2013). However, the magnitude of this relationship varies across investigations. While some studies report that firms with a high level of entrepreneurial orientation obtain better performance than companies that do not adopt it (Hult et al., 2003; Wiklund and

Shepherd, 2003), others do not find significant differences and argue that this relationship does not exist (Baker and Sinkula, 2009; Morgan and Strong, 2003; Walter et al., 2006) or that it depends on the contexts where the firms are established (Andersén, 2010).

Our logic here is that entrepreneurial orientation constitutes a valuable, rare, and difficult-to-imitate resource (Barney, 1991) that may result in competitive advantages. One of the main outcomes that derives from adopting an entrepreneurial orientation is that firms will enter the market earlier (Lieberman and Montgomery, 1988), thus taking advantage of emerging opportunities and benefiting from their attitude toward innovation, risk-taking, and proactivity (Miller, 1983; Wiklund, 1999). Early entry usually contributes to the development of sales (Simon et al., 2011) and growth (Moreno and Casillas, 2008), with a subsequent effect on firm performance (Rauch et al., 2009).

Zahra and Covin (1995) add that firms with a high level of entrepreneurial orientation can choose the best market segments and ask for higher prices by offering novel products. Furthermore, firms with a high level of entrepreneurial orientation use innovation to develop a market niche with a differentiated new product or service, creating value for customers (Wiklund and Shepherd, 2005). These firms use their proactivity to anticipate the demand for new products and services (Ireland et al., 2003) and to compete aggressively with other firms (Lumpkin and Dess, 1996), thus strengthening their performance. According to these arguments, our first hypothesis states that:

Hypothesis 1: ***Entrepreneurial Orientation has a positive effect on start-up performance.***

3.2 The moderating effect of hostility on the relationship between EO and FP

Environmental hostility is usually seen as an important contingency factor in the EO–FP relationship (Khandwalla, 1977). According to this literature, hostility moderates the relationship between entrepreneurial orientation and performance, because the entrepreneurial strategy changes when the environment is hostile or benign (Covin and Slevin, 1989).

Hostile environments may benefit firms with an entrepreneurial strategic stance (Martins and Rialp, 2013) because they will be better prepared to face challenges such as competition for price, low customer loyalty, introduction of new products in the market, or difficulties in accessing inputs and qualified labor (McGee et al., 2012), since hostile conditions encourage more innovative, proactive, and risky behaviors (McCarthy et al., 2018; Miller and Friesen, 1982). When firms compete in markets with fierce rivalry, they should differentiate themselves from rivals through the introduction of new products or processes (Vij and Bedi, 2012; Zahra, 1993) and respond faster to competitors by being more proactive and taking higher risks, which may confer first-mover advantages (De Clercq et al., 2010). Furthermore, hostile environments provide little opportunity for organic growth and, to improve their market position, firms need to gain market share mainly from other rivals (Kreiser et

al., 2020). It can be argued that entrepreneurial firms will find it easier to create competitive advantages from resources and capabilities like innovation, risk-taking, and proactivity than more conservative firms, thus leading to high business performance in hostile environments (Neneh, 2016). Contrarily, conservative firms are more likely to lose market share when attacked by competition (Casillas et al., 2010; Kreiser et al., 2020), but they are benefited when they operate in benign environments, where the market will not be able so easily to absorb the innovation and risk-taking of entrepreneurial firms (Covin and Slevin, 1989; Martins and Rialp, 2013). Consequently, we expect that firms will benefit more from entrepreneurial behavior in hostile business environments (Shirokova et al., 2016; Tajeddini and Mueller, 2019), and to usually be more profitable than more conservative companies (Martins et al., 2012).

Hypothesis 2: ***Hostility positively moderates the relationship between Entrepreneurial Orientation and start-up performance.***

3.3 The moderating effect of uncertainty on the relationship between EO and FP

Uncertainty is also expected to influence the relationship between entrepreneurial orientation and firm performance. Firms that operate in more uncertain industries need to be more proactive, a characteristic that is especially salient in entrepreneurial initiatives (Rauch et al., 2009). An environment with high uncertainty can encourage the adoption of an entrepreneurial attitude and a greater

tendency to a learning orientation (Covin and Wales, 2019), implying higher innovation and risk-taking (Dost et al., 2018; Robertson and Chetty, 2000, Roper and Tapinos, 2016). Similarly, Mishra (2017) argues that traditional organizations try to act safely, while entrepreneurial organizations, that excel at risk management, welcome uncertainty, and try to exploit it in their favor. Engelen et al. (2014) corroborate these assumptions and find that the relationship between entrepreneurial orientation and firm performance is only significant when firms operate in uncertain and turbulent markets. During periods of intense uncertainty, firms need to assume higher risk, allocate more resources, and adopt new technologies (Li et al., 2008), stimulating entrepreneurial behavior. Further, firms with proactive behavior seek to be more aligned with the environment by improving internal resources and adopting the most appropriate strategy for their business environment (Parker et al., 2010). Similarly, Rauch et al. (2009) find that entrepreneurial orientation is more beneficial to firms that compete in high-tech and more uncertain industries. In contrast, further challenges are presented to firms that act in uncertain environments; as a consequence, they need to be prepared to process more information or to change current plans when they become obsolete or do not work properly (Yu et al., 2018).

Moreover, a high level of entrepreneurial orientation ensures that decision makers focus on the processes and technological changes in their industry and on customer demand (Lumpkin et al., 2009), making possible the adoption of an exploratory strategy (Chang et al., 2011). Entrepreneurial firms, like start-ups, will be better prepared to quickly adapt their structure to meet customer preferences,

leading to higher firm performance (Devezer et al., 2014). When the environment is less dynamic, an exploitation strategy is critical (Ward et al., 1996). For this reason, start-ups just need to follow the plan, test the product's acceptance, listen to the customers, and accelerate this loop. Under these conditions, customer needs and competitor strategies are more predictable, allowing the adoption of a more conservative strategy. Following these arguments, we expect that:

Hypothesis 3: ***Uncertainty positively moderates the relationship between Entrepreneurial Orientation and a start-up's performance.***

3.4 The interaction among hostility, uncertainty, and firm performance.

We have argued that hostility and uncertainty positively moderate the relationship between entrepreneurial orientation and firm performance in such a way that this association is strengthened in environments with higher levels of hostility or uncertainty. However, we understand that this relationship is more complex and that these two dimensions interact in a way that uncertainty also influences the moderating effect of hostility on the EO–FP relationship.

The literature on hostility argues that fierce market conditions contribute to lower predictability (Auh and Menguc, 2005), with a subsequent increase in uncertainty. This occurs because tight competition makes competitor strategies more aggressive and changeable, thus leading to a more unstable business environment. Based on these insights, we discuss how uncertainty is related to the moderation of

hostility on the relationship between entrepreneurial orientation and start-up performance.

According to Hypothesis 2, hostility positively moderates the relationship between entrepreneurial orientation and start-up performance, and an entrepreneurial strategy appears to be even more important when the environment is more unstable. In these uncertain environments, competitor actions and consumer preferences change constantly, forcing firms to adopt a more innovative approach and assume more risks (Li et al., 2008). Furthermore, uncertain environments also require firms to act proactively to adapt their structure, processes, and products to satisfy consumer needs because competitors will react to the firm's actions and customer preferences will change again based on prior experience (Engelen et al., 2014).

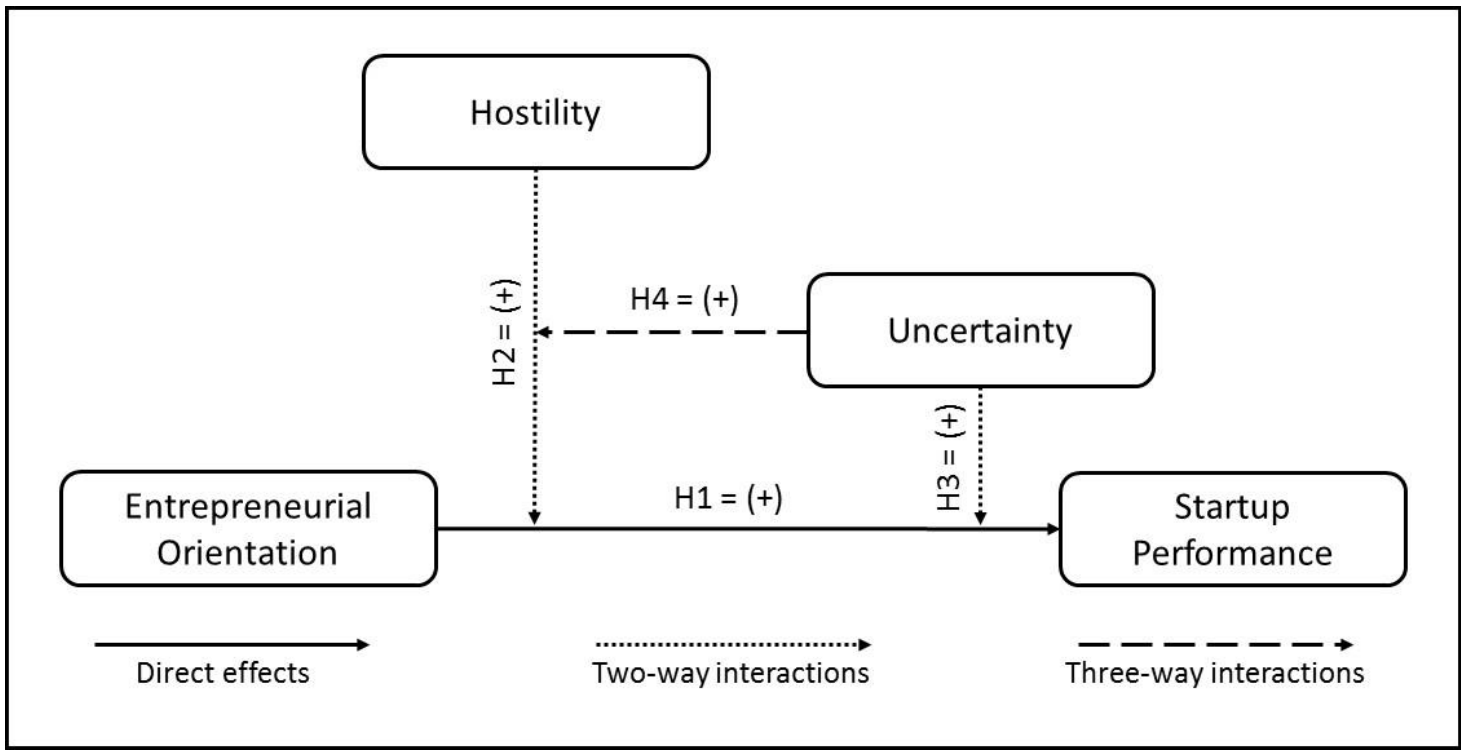
When firms act in more stable environments, complexity and information asymmetries are reduced and entrepreneurial firms have fewer difficulties to select opportunities and align their strategy to market conditions (Zahra et al., 2006) even in hostile environments. However, firms that act in well-established industries may also have their performance affected by the interactions among competitors, especially in declining economies. In this kind of environment, a more conservative stance can benefit firms that avoid developing innovations that the market is not yet prepared to absorb (Covin and Slevin, 1989). As a consequence, our Hypothesis 4 states that:

Hypothesis 4: ***Uncertainty moderates the impact of hostility on the relationship between Entrepreneurial Orientation and start-up***

performance in such a way that the positive effect of hostility is expected to increase in more uncertain environments.

Figure 3 presents the model that illustrates our theoretical development.

Figure 3 – Framework and hypotheses.



Source: Elaborated by the authors.

4 METHODOLOGY

4.1 Sample

Start-ups arose with the United States Internet bubble in the 1990s. At this point, entrepreneurs were involved in building firms in environments of extreme uncertainty, which led them to develop an innovative business model (Ries, 2011). These firms were often technology based, born with innovative ideas, and looking

for scalable and repeatable business models, which give them the possibility of reaching a large number of customers with the aim of generating significant profits. Their main characteristics were flexibility, agility, and willingness to take risks and pursue high and sustainable growth (Weiblen and Chesbrough, 2015). Their organizational structures and process were often subject to change to adapt to market growth and were not totally stable (Freeman and Engel, 2007). Furthermore, they sought to develop and test innovative ideas (Hora et al., 2018) and were to explore new technological spaces (Hogenhuis et al., 2016).

Our empirical analysis uses a sample from the Brazilian Association of Start-ups (ABS). Although the relationship between entrepreneurial orientation and firm performance has been widely studied, entrepreneurial orientation remains virtually unexamined in several strategically important emerging countries such as Brazil, India, and Russia (Wales et al., 2011). Brazil is in the top 20 economies based on their GDP (World Bank, 2019), and its ecosystem has developed a favorable environment for start-ups, becoming a reference in South America (Startup Genome, 2021). Therefore, this country constitutes an ideal framework to test our hypotheses.

The database we will use is composed of 1,072 start-ups in the stages of operation and traction (i.e., formalized firms). The data collection was initiated on May 30, 2016, with the sending of a survey to a random selection of 20 start-ups. After that, the questionnaire was improved following the suggestions and difficulties observed in the pretest. The respondents were the chief executives of the companies because their experience and understanding of the operation of the start-ups

contribute to a better knowledge of the processes and performance of these firms. Since executives have the power to make decisions, it is not necessary to involve managers in the process of collecting data (Rauch et al., 2009).

The revised survey, along with a cover letter that described the objectives of the research, was sent by email in two waves (June 13 and July 4). In the first wave, 110 forms were returned; in the second, we received a further 33 forms, making a total of 143 returned questionnaires. To reinforce the validity of the collected data, only complete questionnaires were included, which led us to discard three incomplete forms. This left a final sample of 140 start-ups, with an effective response rate of 13%. The sample size and response rate may be considered adequate when compared to similar studies (Chen et al., 2012; Grühn et al., 2016; Sciascia et al., 2014; Vega-Vazques et al., 2016).

To minimize possible bias in our data, we compared early (i.e., those firms that returned the questionnaire before being contacted a second time) and late respondents (i.e., firms that returned the questionnaire only after having been asked a second time). This revealed no differences ($p > .10$) in terms of age, number of employees, or any of the research variables assessed in this study. To alleviate concerns about common method bias, similarly to other studies (Deb and Wiklund, 2017; Hernández-Linares et al., 2018), we protected respondent anonymity to reduce evaluation apprehension and conducted the Harman's single factor test, following the procedures suggested by Podsakoff et al. (2003), inserting all variables into an exploratory factor analysis, and the first factor captured only 21.92% of the variance

in the data. Finally, we assessed dimensionality and validity, and results show a KMO statistic of 0.79 and Bartlett's test ($p < .01$), supporting the validity of the factorial analysis implementation and allowing us to check whether there were significant correlations between variables. Table 3 shows the frequency and percentage of respondents, as well as some preliminary information about the sample.

Table 3 – Respondents' demographic variables.

Variable	Category	Frequency	Percentage
FIRM AGE	Less than 1 year	6	4%
	From 1 to 3 years	85	61%
	More than 3 years	49	35%
FIRM SIZE	Fewer than 9 employees	120	86%
	From 10 to 19	15	11%
	More than 20 employees	5	3%
DEVELOPMENT STAGE	Operation	88	63%
	Traction	52	37%
ENTREPRENEUR EXPERIENCE	Yes	91	65%
	No	49	35%
GENDER	Male	128	91%
	Female	12	9%
FIRM INDUSTRY	Industry	3	2%
	Trade	19	14%
	Agrobusiness	3	2%
	Service	115	82%
REGION	South	33	24%
	Midwest	6	4%
	Northeast	18	13%
	North	6	4%
	Southeast	77	55%

Source: Elaborated by the authors.

4.2 Measures

4.2.1 Dependent Variable

Firm Performance (FP): Adapted from Moorman and Rust (1999), FP is a unidimensional construct made up of subjective measures of ROI and sales growth,

derived from a comparison with competitors (Likert scale from 1, much worse than the competitors, to 7, much better than the competitors) and firm plan expectations (1, much worse than planned, to 7, much better than planned). Nonfinancial subjective measures were included to collect the perception of executives in relation to customer satisfaction and firm image and reputation (Likert scale from 1, much worse than the competitors, to 7, much better than the competitors).

4.2.2 Independent Variables

Entrepreneurial Orientation (EO): Adapted from a scale proposed by Covin and Slevin (1989), EO is proxied through nine items and three dimensions (innovation, risk-taking, and proactivity), using a Likert scale from 1 (totally disagree) to 7 (totally agree).

Hostility (HT): Adapted from Pelham and Wilson (1996), hostility is measured by three items that approach the intensity of key competitive market elements, namely, price, quality, and frequency of launching new products. We also used a Likert scale ranging from 1 (totally disagree) to 7 (totally agree).

Uncertainty (UT): Adapted from Pelham and Wilson (1996), uncertainty focuses on customer preferences, changes, and the emergence of new products and technologies. This variable is measured through four items, using a Likert scale from 1 (very stable) to 7 (very dynamic).

4.2.3 Control Variables

Our model includes several control variables to take into account some different organizational and environmental characteristics that may influence performance and have been previously used in the literature.

Firms Size (FS): This is measured through the number of employees. By having a more flexible structure, usually associated with a lower size, SMEs can adapt more quickly to changes in the external environment, allowing them to take advantage of new opportunities (Zur, 2013).

Firms Age (FA): Following Chen et al. (2012), we proxy age through the difference between 2016 (the year of collection of data) and the year of firm creation. There is still no consensus on the effect of the temporal perspective, as some authors claim that the effect of EO on FP tends to increase in the long term (Madsen, 2007; Wiklund, 1999; Zahra and Covin, 1995).

Development Stage (DS): According to ABS (2016), start-ups have four stages of development: curiosity, idea, operation, and traction. In the first stage, entrepreneurs do not have an idea or a business, but they like to understand better what it is to create, and they like managing a start-up. The idea arises when the entrepreneur has a clear concept, begins to know the details of its market, and launches the business. When the entrepreneur formalizes the firm, finds partners, and manages the new business, the start-up reaches the operation stage. The last stage, traction, occurs when the entrepreneur knows what the product is and how much the acquisition of

each customer costs, and has made the investments to make the company grow. Our sample includes firms in the operation and traction stages, and we use a dummy variable where 0 equals the operation and 1 equals the traction stage.

Entrepreneurial Experience (EE): We control for this variable because we understand that experience would be helpful for the achievement of the entrepreneurial goals (Singer, 1995). We use a dummy variable where 0 equals no previous experience and 1 equals experience.

Gender (GD): Gender entrepreneurial characteristics may influence firm performance. According to Cohoon et al. (2010), women are more likely than men to get early funding, have more need of an entrepreneurial mentor, and attribute their success to prior experience. For these reasons, we employ a dummy variable where 0 equals female and 1 equals male.

Industry (ID): To reduce unobserved heterogeneity, we include several dummy variables that control for sector effects (industry, trade, agrobusiness, and services).

Region (RG): Brazil is a large country whose regional development is very unequal, which influences its human, technological, and financial resources. We control for this impact using five territorial dummy variables, one for each region: South, Southeast, Northwest, North, and Midwest.

5 RESULTS

To test the hypotheses, we estimated a multiple regression model using SPSS. Our hypotheses suggest that the relationship between entrepreneurial orientation and firm performance is contingent on the level of environmental hostility and uncertainty. For these reasons, we estimated five models: (1) only control variables, (2) RBV model, (3) two-way interaction model with a moderating effect of hostility, (4) two-way interaction model with a moderating effect of uncertainty, and (5) the full configurational model. Prior to calculating the interaction terms, the variables entrepreneurial orientation, hostility, and uncertainty were mean-centered to reduce multicollinearity (Aiken and West, 1991).

Descriptive statistics as well as the correlations between the variables are shown in Table 4. The correlations between the dependent variable (FP), independent variables (EO, hostility, and uncertainty) and control variables are modest, with a range between r = -0.165 and r = 0.418. The variance inflation factor (VIF) has values lower than 5 (between 0.175 and 2.478), which means that there are no problems of multicollinearity (Roldán and Sánchez-Franco, 2012).

Table 4 – Descriptive statistics.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Firm performance	1																	
2	Entrepreneurial orientation	.434**	1																
3	Hostility	-0.06	0.106	1															
4	Uncertainty	.245**	.236**	.354**	1														
5	Firm age	-0.099	0.065	0.093	0.038	1													
6	Firm size	0.128	0.079	-0.117	0.134	-0.005	1												
7	Development Stage	.214*	.272**	-0.108	0	0.116	0.139	1											
8	Entrepreneurial Experience	0.164	.244**	0.081	0.093	-.184*	-0.093	0.006	1										
9	Gender	-0.004	-.246**	0.019	0.057	0.008	-0.022	-0.077	-0.15	1									
10	Industry	0.145	0.043	0.101	-0.107	0.029	-0.03	-0.012	0.109	-0.045	1								
11	Trade	-0.117	-0.14	0.13	.176*	-0.064	-0.085	-0.002	0.072	0.102	-0.059	1							
12	Agrobusiness	0.054	0.056	0.089	0.051	-0.082	-0.052	-0.114	0.109	-0.045	-0.022	-0.059	1						
13	Service	0.029	0.087	-.188*	-0.136	0.077	0.107	0.05	-0.147	-0.057	-.317**	-.850**	-.317**	1					
14	South	-0.081	-0.165	0.023	-0.096	-0.015	-0.088	0.026	-0.122	0.07	0.034	0.075	0.034	-0.093	1				
15	Midwest	-0.165	-0.121	-0.093	-0.07	-0.022	-0.064	-0.09	-0.067	0.061	-0.031	0.122	-0.031	-0.086	-0.118	1			
16	Northeast	0.007	-0.067	0.034	0.11	-0.041	-0.1	-.207*	0.103	0.035	0.091	-0.09	-0.057	0.068	-.213*	-0.081	1		
17	North	0.164	0.127	-0.084	-0.085	0.025	-0.08	0.129	-0.067	0.061	.212*	0.019	-0.031	-0.086	-0.118	-0.045	-0.081	1	
18	Southeast	0.065	.183*	0.029	0.071	0.039	.201*	0.101	0.089	-0.133	-0.164	-0.061	0.035	0.103	-.614**	-.234**	-.425**	-.234**	1
	Mean	4.655	5.259	4.086	4.679	2.567	4.97	0.371	0.65	1.086	0.021	0.138	0.021	0.821	0.236	0.043	0.129	0.043	0.55
	SD	1.094	1.082	1.343	1.173	2.227	6.539	0.485	0.479	0.281	0.145	0.344	0.145	0.384	0.426	0.203	0.336	0.203	0.499

Source: Elaborated by the authors.

*** p < .05; ** p < .01**

Table 5 displays the results of the linear hierarchical regression analysis. Looking at the control variables in Model 1, we identify that start-ups in the traction stage and those started by entrepreneurs with previous experience have a significantly better performance. However, variables such as firm age, firm size, and the gender of the entrepreneurs do not show statistically significant differences in performance. Regarding firm age and firm size, the characteristics of our sample, start-up companies that have been recently created (2.5 years ago on average, with a standard deviation of 2.2 years) and that have a small size (4.9 workers on average with a standard deviation of 6.5 workers) may explain the no significance of these variables due to the relative homogeneity of our sample regarding age and size. Similarly, there are no differences across sectors or geographical regions within the country.

Model 2 includes entrepreneurial orientation as an intangible resource following RBV theory and the environmental variables hostility and uncertainty. The model shows an increase in F compared to Model 1 ($F = 3.818^{***}$; $\Delta F = 1.637$). Our results indicate that entrepreneurial orientation (0.326; $p < .01$) has a significantly positive influence on start-up performance, supporting Hypothesis 1. Hostility shows a negative and direct effect on start-up performance (-.169; $p < .01$), and uncertainty has a positive and direct effect on start-up performance (0.254; $p < 0.05$). Model 3 includes the interaction between entrepreneurial orientation and hostility. This variable, although positive, is not statistically significant (0.290; $p > .10$). Something similar can be seen regarding the interaction between entrepreneurial orientation and uncertainty (Model 4), which presents a positive but nonsignificant sign (0.334; $p > .10$).

Table 5 – Multiple regressions predicting firm performance.

Variables	Model 1 Variables	Model 2 RBV	Model 3 Contingency	Model 4 Contingency	Model 5 Configurational
Control Variables					
FIRM AGE	-.109	-.125	-.117	-.138*	-.109
	(.041)	(.121)	(.039)	(.038)	(.037)
FIRM SIZE	.133	.041	.080	.056	.023
	(.104)	(.100)	(.100)	(.097)	(.097)
DEVELOPMENT STAGE	.183**	.123	.099	.126	.095
	(.197)	(.186)	(.189)	(.186)	(.181)
ENTREPRENEURIAL EXPERIENCE	.150*	.043	.063	.058	.046
	(.199)	(.190)	(.193)	(.190)	(.184)
GENDER	.051	.106	.133*	.112*	.110
	(.324)	(.306)	(.310)	(.311)	(.301)
Firm Industry					
INDUSTRY	.100	.151	.129**	.134*	.190**
	(.640)	(.603)	(.605)	(.596)	(.588)
TRADE	-.105	-.106	-.025	-.093	-.052
	(.266)	(.252)	(.259)	(.258)	(.252)
AGROBUSINESS	.060	.047	.045	.021	.008
	(.623)	(.576)	(.585)	(.579)	(.565)
Firm Region					
SOUTH	-.060	.003	-.004	.003	.010
	(.224)	(.211)	(.212)	(.209)	(.203)
MIDWEST	-.112	-.107	-.101	-.078	-.127
	(.454)	(.422)	(.428)	(.420)	(.413)
NORTHEAST	.011	-.011	.039	.019	-.014
	(.285)	(.270)	(.267)	(.269)	(.264)
NORTH	.134	.081	.081	.107	.093
	(.469)	(.442)	(.449)	(.439)	(.429)
Independent Variables					
ENTREPRENEURIAL ORIENTATION (EO)		.326***	.127	.004	1.769**
		(.114)	(.224)	(.314)	(.841)
HOSTILITY (HT)		-.169**	-.105		-.675**
		(.069)	(.066)		(.256)
UNCERTAINTY (UT)		.254***		.191**	-.064
		(.081)		(.077)	(.233)
Two Interactions Variables					
EO x HT			.290		-1.467*
			(.052)		(.190)
EO x UT				.334	-1.861**
				(.066)	(.199)
HT x UT					.663
					(.053)
Three Interactions Variables					
EO x HT x UT					2.029**
					(.040)
Adjustment Indices					
Constant	4.063***	4.094***	3.569***	3.230***	5.150***
R^2	.171	.325	.295	.313	.382
Adjusted R^2	.093	.242	.210	.230	.284
F	2.181**	3.818***	3.460***	3.772***	3.901***

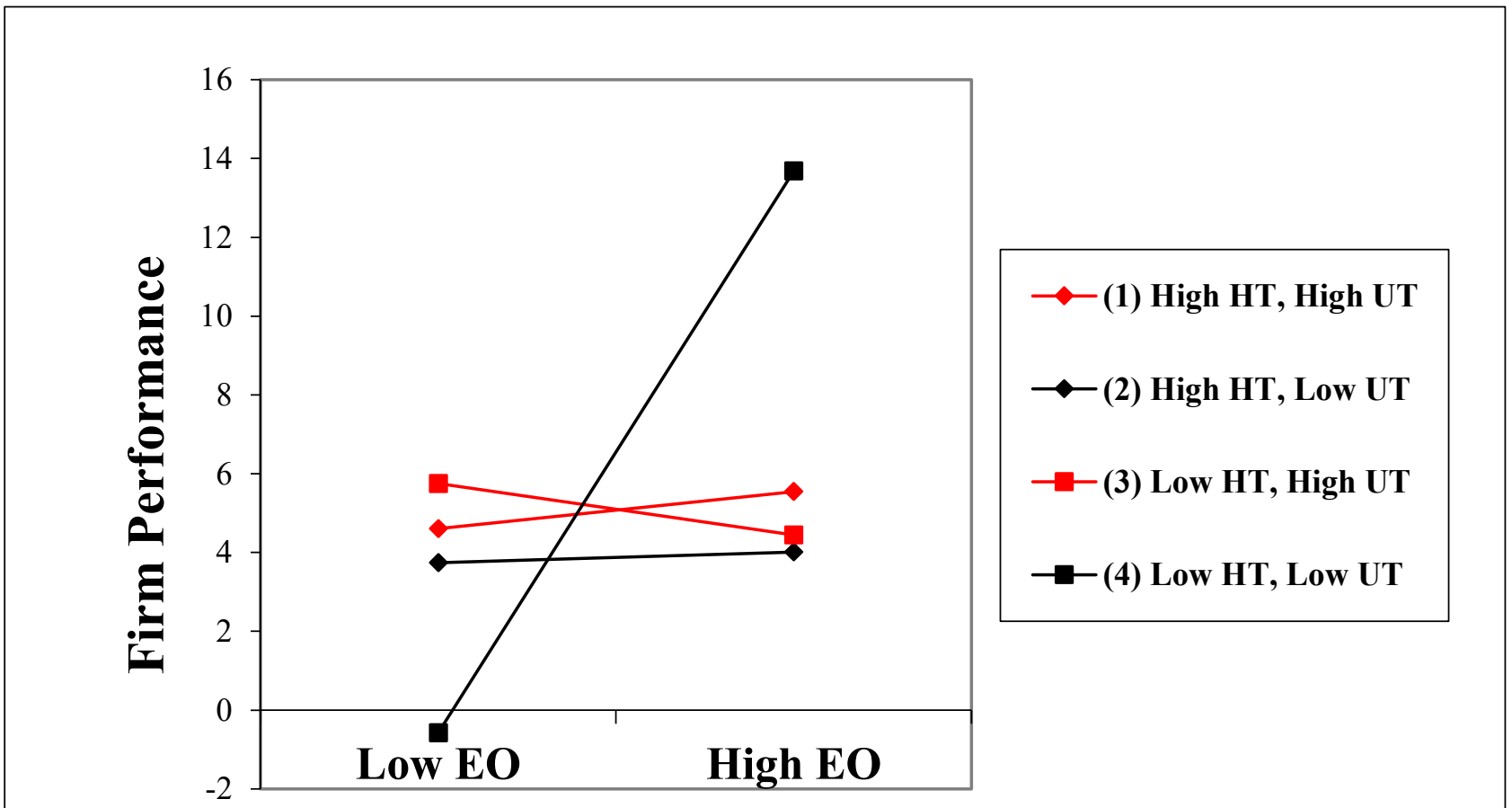
* p < .10; ** p < .05; *** p < .01

Observation: The entries in Table 5 are the standard coefficients (βs). Numbers in parentheses are typical errors.

Finally, and with the aim of considering the full configurational model, our last estimation includes two- and three-way interactions between entrepreneurial orientation and the environment variables. This model adds a marginal increase in F (F = 3.901***; ΔF = .083) compared to Model 2, and the hostility (-1.467; $p < .10$) and uncertainty (-1.861; $p < .05$) seem to negatively moderate the relationship between entrepreneurial orientation and firm performance, suggesting the rejection of Hypotheses 2 and 3.

Additionally, the three-way interaction term has a significant positive effect on start-up performance (2.029; $p < .05$), providing support for Hypothesis 4 and corroborating the configurational effect of environment variables evaluated in this study. Nevertheless, the effects of the two- and three-way interaction effects are more complex than can be inferred from the direct observation of the signs of the corresponding variables in Model 5, and it is not enough to interpret the interaction term effects (Jaccard and Turrisi, 2003). For this reason, we adopt a three-way interaction plot (Figure 4) with low and high levels of independent and moderating variables, using mean ± one SD and FP as dependent variable, following Aiken and West (1991).

Figure 4 – Plot of the three-way interaction.



Slope difference tests:

Pair of slopes	t-value for slope difference	p-value for slope difference
(1) and (2)	0,485	0,629
(1) and (3)	1,777	0,078
(1) and (4)	-11,766	0,000
(2) and (3)	0,804	0,423
(2) and (4)	-8,240	0,000
(3) and (4)	-13,753	0,000

Source: elaborated by authors.

To examine the form of the three-way interaction, we plot four slopes to illustrate the effects of the four categories of hostility and uncertainty on the EO–performance relationship (Figure 4). We can observe that the best performance for firms with a low level of entrepreneurial orientation is obtained when they act in an environment with a low level of hostility and a high level of uncertainty (slope 3). In

the case of firms with a high level of entrepreneurial orientation, the best performance is obtained when firms compete in low-hostility and non-turbulent environments (slope 4). However, in both cases when the uncertainty is high (slopes 1 and 3), the interaction shows how the relationship between the entrepreneurial orientation and the performance is more positive when the hostility is also high (slope 1) and the test of differences to slopes 1 and 3 are significant ($p < 0.1$), which supports our Hypothesis 4. Figure 4 also demonstrates that the relationship between entrepreneurial orientation and firm performance was strongest among more entrepreneurial ventures that operate in environments with high uncertainty and high hostility relative to their peers with low entrepreneurial orientation.

6 DISCUSSION

This study aimed to evaluate the complex relationships among entrepreneurial orientation, hostility, and uncertainty when we try to explain start-up performance. We tested our assumptions on a sample of 140 Brazilian companies, and our results corroborate the effect of RBV, contingency, and configurational theories on performance. Entrepreneurial orientation is an intangible resource with a positive significant effect on start-up performance. However, this effect is contingent on the environment where the firms compete and cannot be analyzed in isolation, but only considering the context. For example, adopting an entrepreneurial orientation configuration is not always the best choice because issues such as environment uncertainty and hostility influence its effect on firm performance (Wales et al., 2011).

The results obtained in this study allow us to shed light on the relationship between entrepreneurial orientation and start-up performance. They corroborate the findings of previous research that points to a positive relationship between these two variables (Covin and Slevin, 1989; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Shepherd, 2003; Wiklund, 1999; Zahra, 1991; Zahra and Covin, 1995). Nevertheless, it is important to highlight that the positive moderating effect of environmental uncertainty and hostility on the relationship between entrepreneurial orientation and firm performance is not so clear and is configurational on the interaction between these two variables.

Following contingency theory, two-way interactions were used to check the moderating effects of hostility and uncertainty on the relationship between entrepreneurial orientation and firm performance. Our results do not support the assertion that the more entrepreneurial firms reach better outcomes when they work in environments of greater hostility and that the more conservative firms achieve higher performance in more benign environments (Covin and Slevin, 1989; Lee et al., 2019; Martins et al., 2012). This negative moderating effect can be found because the fierce competition for resources and market opportunities, associated with a hostile environment, limits strategic options, and can decrease profit margins (Miller and Friesen, 1984). Additionally, firms may have difficulty in finding customers willing to pay a premium price for innovative products under conditions of intense price-based competition (Zahra and Bogner, 2000).

The moderating effect of environmental uncertainty on the relationship between entrepreneurial orientation and firm performance has also been tested, and

the result refutes the assertion that firms with a more entrepreneurial strategy only perform better when they operate in uncertainty and in turbulent markets (Engelen et al., 2014). We believe that rapidly changing environments require firms to increase their decision-making speed to respond to the environmental changes (Jovanovic, 2015), forcing managers to act based on fragmented information. When firms fail in adopting risky behaviors under uncertain environments, they tend to lose market share (Gathungu, 2014), reflecting negatively on firm performance. However, our model adds a configurational three-way interaction effect that shows that an entrepreneurial stance may not lead the start-up to the best performance in all situations, helping to explain why some studies have not found a significant relationship between entrepreneurial orientation and firm performance (Baker and Sinkula, 2009; Morgan and Strong, 2003; Walter et al., 2006).

Start-ups that have a more innovative, risky, and proactive stance to differentiate themselves from their competitors seem to gain and maintain a competitive advantage when operating in environments where there is less competitive intensity among competitors and low uncertainty. In these environmental conditions, the companies that attain the most benefits are start-ups that take risks of allocating more resources, seek to innovate in processes and products, and use proactivity to get ahead and improve their strategy according to market requirements. However, the least entrepreneurial companies obtain the best performance when they act in environments with a low level of hostility and a high level of uncertainty. Finally, the results show that in environments characterized by high levels of

hostility, the relationship between entrepreneurial orientation and performance is more positive when the uncertainty is also high.

7 CONCLUSIONS, LIMITATIONS AND FUTURE INVESTIGATIONS

The empirical results of this study provide important considerations to entrepreneurs that manage recently founded companies. First, the adoption of a more entrepreneurial strategic position needs to be very well planned and should consider the environmental context of the start-up as well as the competitive environment. Start-ups that follow a strategy based on a high level of entrepreneurial orientation and act in an unpredictable and competitive sector are not adopting the best strategic posture because they are refuting existing theoretical assumptions. For start-ups with a high level of entrepreneurial orientation, acting in less competitive and more predictable environments will result in better performance. However, start-ups with a low level of entrepreneurial orientation perform better when they are established in more unpredictable and less competitive environments.

Our findings show that these start-ups may not be able to take full advantage of an entrepreneurial stance toward innovation, risk-taking, and proactivity when they are exploiting uncertain market opportunities. These firms seem to charge better prices and have greater product novelty and quality fit because they outperform the more conservative firms, but they seem to suffer when competition is fiercer.

We understand that these findings may provide new empirical evidence, mainly regarding the context of start-ups and the joint moderating effect of

uncertainty and hostility on the relationship between entrepreneurial orientation and firm performance. Based on the results, it can be concluded that for the start-ups investigated, hostility and uncertainty play a significant role in the decision to adopt the best strategic orientation. A greater entrepreneurial orientation seems to have a better fit to start-ups established in less competitive and predictable sectors, while a conservative orientation achieves a better performance for start-ups in less competitive and more uncertain sectors. Finally, for a start-up that follows a strategy based on a high level of entrepreneurial orientation, it is important to pay attention to the environmental conditions.

Despite its advances in the understanding of the complex relationship between entrepreneurial orientation and firm performance, it is important to emphasize that there are some limitations of this research that need to be addressed. First, this study was carried out with a specific sample of firms indexed by the ABS. Although the ABS is nationally representative of companies in Brazil, our results may vary if other contexts or sectors are analyzed. One recommendation would be to replicate this study in different contexts, for example, in a sample comprising the top 20 ecosystems for start-ups identified by Herrmann et al. (2016). Additionally, our data collecting was limited to a cross-sectional sample, which may condition our results and may be affected by the availability of resources or by the circumstances of each start-up, or even by the political and economic situation experienced in Brazil since 2015. Longitudinal studies would be an alternative for researchers seeking to mitigate this limitation in future studies. Future research might also verify whether the results found in this study are maintained when other methodologies are used,

such as, for example, structural equation models. A final possible limitation may come from the variables available. Our model includes several control variables that may influence performance and that have been previously used in the literature; however, the database does not provide us with certain variables such as the level of international activity of the firms included in the sample or the origin of the founder of the start-up, whose inclusion would strengthen our results.

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APPENDIX

Construct	Factor loading	Alpha	VIF
Entrepreneurial Orientation: (1= totally disagree, 7 = totally agree)		**0.770**	**1.726**
Has market many new lines of products or services in the last 5 years (or since its establishment)	0.450		
Has a strong emphasis on R&D, technological leadership, and innovations	0.767		
Changes in product or service lines have usually been quite dramatic	0.478		
Has a strong proclivity for high-risk projects (with changes of very high returns)	0.778		
Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm´s objectives	0.540		
Typically adopts a bold, aggressive posture to maximize the probability of exploiting potential opportunities		Discarded	
Is very often the first business to introduce new products/services, administrative techniques, operating technologies.	0.533		
Typically initiates actions to which competitors then respond	0.659		
Typically adopts a very competitive, “undo-the competitors” posture		Discarded	
Hostility: (1 = not threatening, 7 = very threatening)		**0.770**	**1.352**
Tough price competition threatening	0.520		
The business environment as threatening the survival of your firm	0.459		
Competitors’ product quality or novelty	0.483		
Uncertainty: (1 = never change, 7 change very frequently)		**0.830**	**1.385**
Production technique/process or service changes	0.622		
Changes in customers’ needs	0.650		
Rate at which products/services became obsolete	0.743		
Nature of competitors’ strategies and actions		Discarded	
Firm Performance: (1 = worse than competitor/planned, 7 = better than competitor/planned)		**0.842**	**-**
When compared to your main competitor, your firm´s profitability is	0.538		
When compared to planned, your firm´s profitability is	0.693		
When compared to your main competitor, your firm´s sales growth is	0.824		
When compared to planned, your firm´s sales growth is	0.849		
When compared to your main competitor, your firm´s sales image and reputation is	0.631		
When compared to your main competitor, your firm´s customer satisfaction	0.854		

1S

CHAPTER 4

PASSION FOR INVENTING AND RADICAL INNOVATION: THE MEDIATING ROLE OF ENTREPRENEURIAL ORIENTATION

1 INTRODUCTION

The Upper Echelon Theory emphasizes that individual traits as cognitions, values, experience, and perceptions of leaders can drive the firm´s strategic behavior and performance (Hambrick and Mason, 1984; Carpenter et al., 2004). To understand why firms make some choices we need to consider the biases and feelings of their most powerful actors, who are their executives (Hambrick, 2007) because they are responsible for identifying opportunities in the environment and preparing the firm to respond strategically to face the challenges that will arise (Daft and Weick, 1984). However, how these strategies are chosen, through psychological and social perspectives, remains largely a mystery (Hambrick, 2007). From a psychological point of view, passion is an intense positive feeling for activities relevant to an entrepreneur's self-identity (Cardon et al., 2009), and passion is a key driver of entrepreneurial action, becoming the heart of entrepreneurship (Cardon et al., 2005, 2013; Murnieks et al., 2014).

Cardon et al. (2009) cite three different domains of entrepreneurship: founding, developing, and inventing. Founders are passionate about creating a new business (Aldrich and Zimmer, 1986) and have positive feelings when they engage in activities like seeking financial, social, and human resources. Developers are passionate about growing the firm, enjoying activities like attract new customers, exploring new markets, or promoting the firm's expansion to stakeholders (Cardon et al., 2009; Baum and Locke, 2004). And inventors are passionate about activities involved with new ideas development, scanning the market for new opportunities, and promoting disruptive products and services (Cardon et al., 2009). Recently, the

Upper Echelon Theory was used to explain "how deep-level psychological traits are related to firm outcomes" (Strese et al., 2018, p. 435), showing the relationship between CEO's passions for inventing and radical innovation. However, they invoke the positive relationship between the CEO's passion for inventing and radical innovation to assume that the CEO's passion for inventing can be a driver of firm performance, but this relationship was not empirically tested. Furthermore, the relationship between the passion for inventing on other antecedents of radical innovation, such as entrepreneurial orientation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012), remains unknown, which is a significant lapse because firms with a high level of entrepreneurial orientation demonstrate a greater ability to develop radical innovations (Schindehutte et al., 2008).

To fill these gaps, this paper investigates the path taken by inventors to increase their firm performance and the mediating effect of entrepreneurial orientation on the relationship between CEO's passion for inventing and radical innovation. We select a set of Brazilian start-ups to test our hypotheses because they usually create products and services which they wish to revolutionize the market (Morino et al., 2015), they have a more prominent entrepreneurial behavior (Carvalho and Sugano, 2016) and in early stages, entrepreneurial activities are typically linked to an inventor identity, that are fundamental characteristics for our study to be able to advance scientifically. This study has two main contributions: (1) our model incorporate the mediating effect of entrepreneurial orientation, a relevant antecedent of radical innovation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012) that creates a business environment fruitful to convert inventions into new

technologies, products, and services (Christensen, 1997; Hamel, 2000; Abetti, 2000); and (2) we use subjective financial and non-financial measures (Moorman and Rust, 1999) to demonstrate the path used for CEO's passionate for inventing to improve firm's performance using partial least squares structural equation modeling (PLS-SEM), that has a predictive nature (Hair et al., 2019) and is commonly used to determine the different causal relationship (Astrachan et al., 2014).

To achieve this objective, the paper is articulated as follows. Section two integrates the Upper Echelon Theory, CEO's passion for inventing, entrepreneurial orientation, and radical innovation to explain why some firms show a better performance. In Section three we show the hypotheses foreseen in this study and our theoretical model and section four presents the methodology that will be used in the analysis, including the statistical techniques applied to measure and validate the model and to test our hypotheses. Section five presents the main results that derive from the analysis and finally, the research concludes with a discussion about the theoretical and practical implications, as well as the main limitations and recommendations for future work.

2 LITERATURE REVIEW

To Upper Echelons Theory, organizations reflect their leaders (Hambrick and Mason, 1984). Given a certain situation, the decision and choices of CEOs will be determined by their experiences, values, and personal traits (Hambrick 2007). The effect of these individual traits has been investigated, especially regarding their

correlations with firm's performance, strategy, and growth. For example, CEO's narcissism demonstrates correlation with acquisitions (Chatterjee and Hambrick, 2007), flexibility, need for achievement, and locus of control are associated with strategy (Miller and Toulouse, 1986), and CEO tenure is correlated with firm performance (Henderson et al., 2006). Finkelstein and Hambrick (1996) cite that CEOs with finance, accounting, administration, and legal experience tend to focus on improving management firm efficiency, while CEOs with marketing or research and development experience choose to take strategies to emphasizing the firm's growth through the development of new products, services, and markets.

Upper Echelon Theory also suggests that psychological traits, like CEO's passion, impact on a firm's radical innovation development (Strese et al., 2018). Passion was introduced in the entrepreneurial context as "consciously accessible intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur" (Cardon et al., 2009, p. 517). They use three aspects to measure entrepreneur passion: if the CEO experienced intense positive feelings; if these feelings were experienced in activities that reinforce the CEO self-identity; and if these feelings are oriented to three entrepreneur's domains: founding, developing, and inventing (Cardon et al., 2009).

As we have pointed out in the introduction, Cardon et al. (2009) identified three domains of entrepreneurship: founding, developing and inventing. The main desire of CEOs passionate for founding is to create a new business (Aldrich and Zimmer, 1986). Founders are willing to assemble the necessary financial, human,

and social resources necessary to do so (Cardon et al., 2009) and they focus on the venture creation process, leaving to the managers the daily operational tasks (Cardon et al., 2012). Some of these entrepreneurs are so fascinated to create and launch new firms that are called sequential (or serial) entrepreneurs (Ronstadt, 1988), delegating their firms to managers, or selling then to third parties and start to work on their next business.

CEOs who are passionate about developing prefer to engage in activities that involve growing the firm. Developers do not need to be the firm's founder (Cardon et al., 2013; Cliff, 1998) but they can create a business to achieve their goals. They seek the firm's growth by expanding customer bases, exploring new markets, hiring employees, and identifying investors to find financial support (Cardon et al., 2009). One developer's personal characteristic is that he exhibits different communication and management styles than founders (Gundry and Welsch, 2001; Smith and Miner, 1983), being a promoter of the firm's expansion to the key stakeholders (Baum and Locke, 2004). Finally, a personal trait that differentiates CEO's passion for developing is that they like to grow their firms through winning new customers, expansion of stores, distribution centers, and hiring new employees, rather than through offering new products and services (Cardon et al., 2013; Cardon et al., 2017).

Passion for inventing involves activities related to new ideas, like scanning the environment for new market opportunities, developing innovative solutions, new products, or services, and working with new prototypes (Cardon et al., 2009). They see themselves as an inventor and feel confident when working on identification, design, and prototyping to explore market-disruptive opportunities. Inventors search

for innovative ideas, although some entrepreneurs will do it more deeply and often than others (Katila and Ahuja, 2002) and a striking characteristic of them is foster market-disruptive ideas (Cardon et al., 2009). Entrepreneurs experiencing passion for inventing often work hard with new products and services to solve relevant social needs and problems and to explore their commercial application. They prefer to focus on activities related to the development of inventions, delegating other tasks (Burke and Reitzes, 1991).

These three entrepreneur activities, founding, developing, and inventing, highlight some personal characteristics and preferences particularly important during the venture creation process. However, the way the entrepreneurs get involved in each of these activities can vary according to the firm's development stage and to the previous entrepreneur's experience in similar situations (Cardon et al., 2013), impacting the firm's strategy, market position, and innovation capability. Therefore, we assume that these passions may influence the way that CEOs configure their firm's entrepreneurial orientation, creating and adapting processes to identify and exploit new business opportunities that emphasize dimensions such as innovation, risk-taking, and proactivity (Covin and Wales, 2019; Miller, 1983; Dess and Lumpkin, 2005).

Innovation is the predisposition to innovate, to introduce changes or new characteristics in products and services, as well as new processes or business models (Lumpkin and Dess, 1996; Schumpeter, 1934). A more innovative strategic position allows the firm to perceive the advantages of moving first to niches and taking advantage of these market opportunities (Wiklund, 1999), helping the CEO to

transform their inventions into innovations. To bring innovations to new and unfamiliar markets, firms need to make uncertain investments (Lumpkin and Dess, 1996) which imply that the entrepreneur should take a given level of risk. Therefore, risk-taking seeks to capture if decisions that involve the application of resources tend to have a greater or lesser degree of risk and if it follows patterns at the firm level (Venkatraman, 1989). Finally, proactivity, focuses on identifying how the firm seeks opportunities and to what extent it can introduce new products and services into the market to exploit the opportunities encountered (Lumpkin and Dess, 1996). It is characterized by the action of anticipating future needs and putting into action the demands captured from its environment (Miller and Friesen, 1978). It is usually accompanied by innovative activities, products, or services or the development of new businesses and impacts on how the firm must be structured to achieve the desired performance (Govindarajan, 1988).

Different levels of entrepreneurial orientation are associated with different levels of innovation. Low entrepreneurial orientation is associated with incremental innovation, while high entrepreneurial orientation is related to radical innovation (Schindehutte et al., 2008). Entrepreneurship literature further suggests that entrepreneurial orientation is an antecedent of radical innovation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012), creating a business environment conducive to the development of future technologies, products, services, and industries, which is the basis of radical innovation (Christensen, 1997; Hamel, 2000; Abetti, 2000). According to Christensen (1997), radical innovation is a revolutionary or discontinuous innovation that defines new standards while transforming or

displacing established markets, being made tangible by disruptive changes in products, services, or technologies (Song and Thieme, 2008).

Radical innovation causes a rupture in traditional market practices, encourages the emergence of new approaches, and generates changes in the technologies used by companies that seek to meet the latent needs of emerging customers. As a consequence, it led to new products or services that constitute a novelty that may provide with substantial advantages for the company (Tellis et al., 2009), becoming an important mean for firm's success (Rubera and Kirca, 2012). In general, radical innovation has two basic characteristics: the use of new technologies that need to be essentially different from the current ones, and the meet of customers' needs in a much better way than existing products and services (Chandy and Tellis, 1998).

3 HYPOTHESES

This section aims to demonstrate the theoretical relationships between CEO's passion for inventing, entrepreneurial orientation, and radical innovation, culminating in the proposed hypotheses that shape the assumptions that support the conceptual model of this study.

3.1 Passion for inventing and entrepreneurial orientation

Passion is a “heart motivation” that empowers people that feel it to pursue excellence and reach the organizational performance (Makino et al., 2020). CEO passionate for inventing is an entrepreneur that consciously experiences an intense positive feeling when is engaging in activities associated with inventing and tends to identify himself as an inventor (Cardon et al., 2009). His dominant trait is to recognize opportunities and he seeks to creatively solve problems to reach his objectives, indicating that this type of entrepreneur engages effectively in invention-related activities (Burke and Reitzes 1991; Cardon et al., 2009) which is critical for firms to develop their innovation capability.

If CEO personality traits drive firm’s strategy and organizational structure (Boeker, 1997; Miller and Toulouse, 1986), is more probable that CEOs with passion about inventing will implement a corporate strategy, fit their organizational structure, and allocate resources to convert inventions into explorable innovations. Furthermore, entrepreneurs usually prioritize assets to develop strategic activities (Birkinshaw and Lingblad, 2005), which can help the CEO with a passion for inventing to prioritize all necessary assets (tangible and intangible) to make his firm able to develop the innovations that he deems relevant to the market. These arguments corroborate our assumption that firms conducted by CEOs with passion for inventing will show strategy and orientation fit consistent with their beliefs.

Moreover, CEOs with a passion for inventing will contaminate the feelings and behaviors of their employees with their vision of the future (Brundin et al., 2008),

providing explicit information about the mission and the vision of the firm. These CEOs are more prone to hire and motivate key employees successfully and employees are more committed to firms managed by CEOs with passion for inventing (Breugst et al., 2012). Additionally, firms with a high level of shared vision are more prone to have collective goals and values (Strese et al., 2018) and consequently translate into the organizational culture (Tellis et al., 2009). In addition, employees that follow CEO's passionate for inventing will act as an inventor, boosting the firm's ability to generate innovations (Fleming, 2007; Lettl et al., 2009). More relevant than how much passion the entrepreneur has is the types of passion he has (Makino et al., 2020), reinforcing that CEO's passion for inventing is important to firms generate innovation.

The influence of the entrepreneurs on a firm's behavior, culture, and structure is stronger in their early stages because they are highly dependent on the entrepreneur's vision, goals, motivations, and actions (Baum et al., 2001; Baum and Locke, 2004). In this perspective, passion can be indispensable to ensure that the entrepreneurs will persist until achieving their goals, even when faced with challenges and difficulties (Cardon and Kirk, 2015; Cardon et al., 2005; Drnovsek et al., 2016; Gielnik et al., 2015; Murnieks et al., 2014). If an entrepreneur passionate for inventing has a goal as commercially apply his inventions (transforming it in innovations), he will need to create a strategy orientation focused on firm's innovation, proactivity and risk-taking (Baron and Tang, 2011; Foo, 2011; Hatak et al., 2020; Hughes et al., 2018; Podoynitsyna et al., 2012; Türk et al., 2020), that are

the three entrepreneurial orientation dimensions, because CEO's passion may influence the way that firm's carry out its activities (Kiani et al., 2021).

Some studies suggest that entrepreneurs can use their passion to hire and encourage employees to take risks and act proactively to generate innovation (Brettel et al., 2015; Engelen et al., 2014), disseminating the entrepreneurial orientation culture within the organization, and when investors perceive this passion the firm's evaluation for potential funding raise (Chen et al., 2009; Mitteness et al., 2012). Finally, entrepreneurial passion contributes to the recognition and exploitation of promising opportunities and to the development of new ideas (Baron and Ward, 2004; Biraglia and Kadile, 2017; Kiani et al., 2021), generating innovative products, services, and processes that can improve the firm's performance (Ho and Pollack, 2014; Iyortsuun et al., 2019). To summarize, the CEO's passion for inventing shows a significant correlation with the firm's innovation (Kiani et al., 2019; Strese et al., 2018) because it allows entrepreneurs to recognize opportunities and use their creativity to solve customer's problems (Burke and Reitzes 1991; Cardon et al., 2009) and we believe that these entrepreneurs will share their beliefs with the team and allocate resources to guarantee strategy implementation, organizational structure, and employees fit necessary to achieve their goals. Therefore, we hypothesize that:

Hypothesis 1: ***CEO Passions for Inventing leads to greater Entrepreneurial Orientation.***

3.2 Entrepreneurial orientation and radical innovation

Radical innovations seek to meet the customer's latent needs, making emerge new market segments through offering new products, services, or distribution channels (Danneels, 2002; Jansen et al., 2006). To favor their development, firms need to acquire new knowledge to improve internal processes, discover new materials, explore new technologies or even reformulate the business model (Benner and Tushman, 2003; McGrath, 2001). Usually, firms capable of generating radical innovations reap benefits such as a better market position and expanded new market opportunities (Aboulnasr et al., 2008) because they can develop products and services with rare attributes that generate higher value than those offered by current products and services on the market.

Radical innovations require different organizational and management capacities. For example, to introduce radical innovations, firm's need to take more risks to develop novel products, services and processes that use new technologies and change the way that they operate (Bessant et al., 2004; Sorescu and Spanjol, 2008). However, when firm's successfully launches a new disruptive product or service, the result can compensate the risks assumed and the resources invested, since they will be able to operate in a market without competitors, destructing competition (Menguc and Auh, 2010) or changing competition rules (Hurmelinna-Laukkanen et al., 2008). In addition, firms with greater capacity to develop radical innovation are expected to act more proactively, as they seek to detect future trends in the business landscape, to anticipate changes that may impact consumer needs (Hughes and Morgan, 2007).

As mentioned above, to develop new disruptive products and services, firms need to take risks and act more proactively, that is, take on characteristics present in firms with a high level of entrepreneurial orientation. According to Schindeduette et al. (2008), radical innovation seems to be present in firms with a higher degree of entrepreneurial orientation. Related to that, the literature suggests that entrepreneurial firm's attributes are antecedents of radical innovation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012). For example, Zhou et al. (2005) point out a positive effect of entrepreneurial orientation on radical innovation and Lassen et al. (2006) identify that proactivity and risk-taking perspectives encourage the development of radical innovation.

In this sense the main characteristic of entrepreneurial orientated firm's is the ability to create or combine resources in new ways that allow the development of new products, services, and processes that make possible to move first into new markets or attend the necessities of new customers segment (Ireland et al., 2001), improving firm's ability to generate radical innovation. Following these arguments, we expect that:

Hypothesis 2: ***Entrepreneurial Orientation predicts greater Radical Innovation.***

3.3 Mediating role of entrepreneurial orientation between passion for inventing and radical innovation

The mediating effect of entrepreneurial orientation on the relationship between passion for inventing and radical innovation is based on the premise that inventions arise from the combination of knowledge to solving problems (Ahuja et al., 2008; Katila and Ahuja, 2002) and that innovation is the commercial application of inventions, where learning is converted into products and services resulting from the development of new ideas (Ahuja and Lampert, 2001; Levinthal and March, 1993). Consequently, CEOs who are passionate for inventing need to develop within their firms a culture, or strategic posture, that enables the commercial application of their inventions.

Strese et al. (2018) found a positive and significant relationship between passion for inventing and radical innovation, identifying that this relationship is even stronger when CEOs communicate their intentions and involve everyone to achieve their goals (shared vision). To do this, they need to create mechanisms that allow everyone to take risks and act proactively to transform their inventions into innovations, helping the firms to become the first to entry in the market with new products, services, processes, production methods and business models, characteristics present in entrepreneurship-oriented firms.

Entrepreneurial orientation is an antecedent of radical innovation (Alegre and Chiva, 2013; Lassen et al., 2006; Zhou et al., 2005; Zortea-Johnston et al., 2012) that appears to arise from firms with a high level of entrepreneurial orientation

(Schindehutte et al., 2008). Therefore, the passion for inventing will have more impact on the development of radical innovation when firms have a high level of entrepreneurial orientation because they will be more prepared to take risks and act more proactively to address latent customer's need (Hughes and Morgan, 2007). For these reasons we believe that EO mediate the relationship between the passion for inventing and radical innovation, allowing the creation of a proactive culture that take risks to converts inventions into innovations. For these reasons we stablish the hypothesis that:

Hypothesis 3: ***Entrepreneurial Orientation mediates the relationship between CEO's Passions for Inventing and Radical Innovation.***

3.4 Radical innovation and firm performance

There is no consensus about the effect of different types of innovation on firm's performance (Gatingnon et al., 2002). Rogers (1995) point that the relationship between innovation and firm's performance follows an S-shaped curve, been dependent on the way that early adopters can affect the decision of how later adopters will use the innovations. However, some studies have found a positive effect of innovation on firm's performance (Brown and Eisenhard, 1995; Schulz and Jobe, 2001; Zhou et al., 2005).

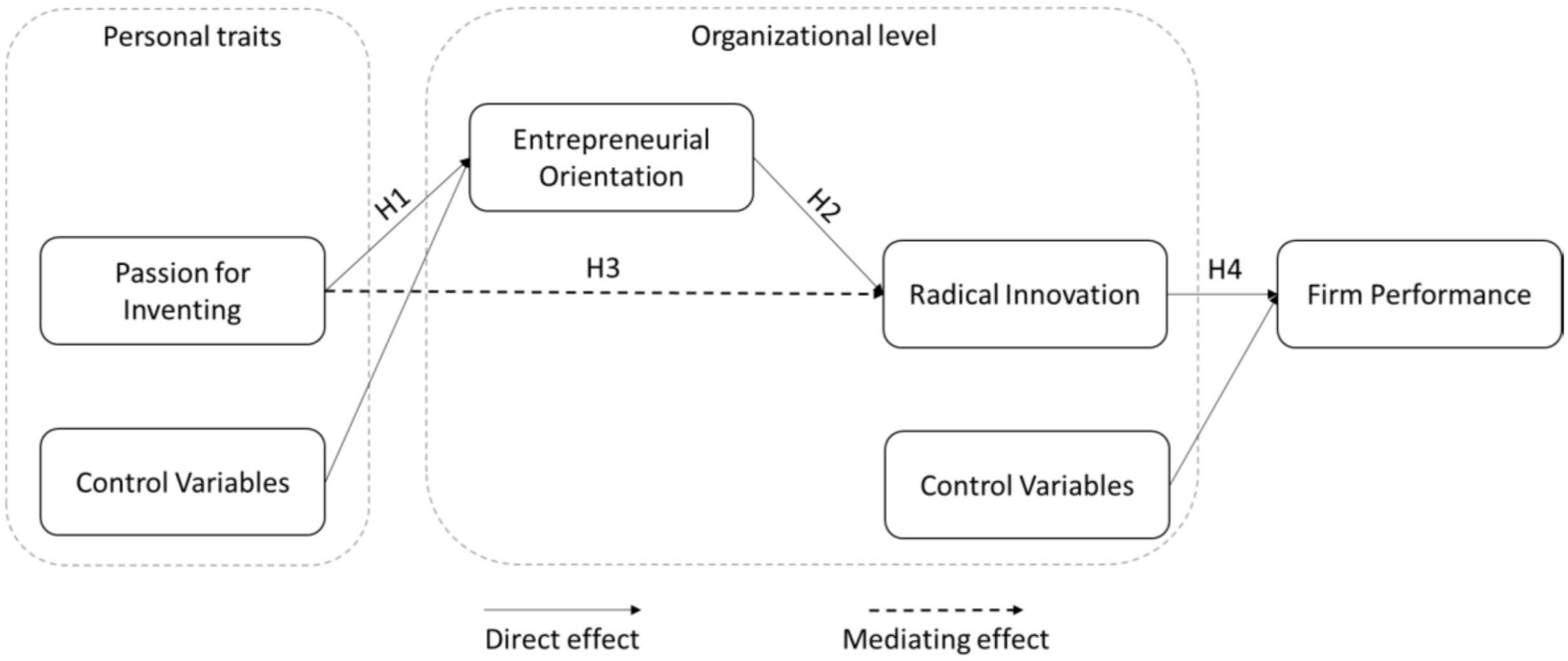
Radical innovation has a positive impact on the firm's future performance, while incremental innovation affects current performance. It happens because radical innovations are usually more resource demanding (Baker and Sinkula, 2002) but can

generate high long-term returns when they are successful (Iyer et al., 2006). Furthermore, radical innovation allows firms to create a market's niche, shape customer's preferences and behaviors (Rubera and Kirca, 2012; Zhou et al., 2005) and make obsolete current products, services, and processes (Beck et al., 2016). Consequently, innovative firms can respond faster and better to the environmental changes than no innovative firms (Brown and Eisenhard, 1995), being able to influence proactively their environment. Manage radical innovation is a firm's challenging task to achieve success (Luo and Junkunc, 2008), where firm's teams need to assume high levels of risk and the results are uncertain (Chandy and Tellis, 1998). Radical innovations often generate economic rents (Song and Thieme., 2008), greater customer benefits as cost reductions, simplicity, satisfaction, product offer and distribution, accelerating market penetration and driving customers loyalty (Boso et al., 2016). These benefits enable firms to achieving higher performance (Slater et al., 2014). For these reasons, we believe in the assumption that radical innovation has a positive effect on firm's performance. According to these arguments our hypotheses state that:

Hypothesis 4: ***Radical Innovation predicts greater Firm Performance.***

Figure 5 illustrates the relationship of our hypotheses according to the arguments found in the theoretical development.

Figure 5 – Framework and hypotheses.



Source: Elaborated by the authors.

4 METHODOLOGY

4.1 Data Analysis

We use partial least squares structural equation modeling (PLS-SEM) to test our hypotheses. It was the most suitable method for this research for three reasons: (1) it has a predictive nature (Hair et al., 2019; Sarstedt et al., 2014); (2) can be used to identify different causal relationships (Astrachan et al., 2014; Jöreskog and Wold, 1982); and (3) is less demanding than other methods in terms of minimum sample size (Henseler et al., 2015).

4.2 Sample

We use a sample from the Brazilian Start-up Association. This database is composed of 1,072 start-ups in the stages of operation and traction (i.e., formalized

firms) and the respondents were the chief executives of the firms because we are seeking to understand the impact of CEO's passion for inventing in the firm's entrepreneurial orientation and radical innovation.

The survey was sent by e-mail with a cover letter that described the objectives of the research. In the first wave, 41 forms were returned; in the second, we received a further 49 forms and in the third wave 45 additional forms were answered, making a total of 135 returned questionnaires. To reinforce the validity of the collected data, only complete questionnaires were included, which led us to discard 10 incomplete forms. This left a final sample of 125 start-ups, with an effective response rate of 12%. The sample size and response rate may be considered adequate when compared to similar studies (Chen et al., 2012; Grühn et al., 2016; Sciascia et al., 2014; Vega-Vazques et al., 2016). Table 6 shows the sample demographic information (frequency and percentage of respondents).

Table 6 - Respondent´s demographic variables

Variable	Category	Frequency	Percentage
FIRM AGE	Less than 1 year	20	16,0%
	From 1 to 3 years	34	27,2%
	More than 3 years	71	56,8%
FIRM SIZE	Fewer than 9 employees	92	73,6%
	From 10 to 19	15	12,0%
	More than 20 employees	18	14,4%
DEVELOPMENT STAGE	Operation	78	62,4%
	Traction	47	37,6%
ENTREPRENEUR EXPERIENCE	Yes	72	42,4%
	No	53	57,6%
GENDER	Female	20	16,0%
	Male	105	84,0%

Source: Elaborated by the authors.

4.3 Commom Method Variance (CMV)

This study may incur in CMV because we collected data from a single source. For this reason, we use several techniques to lessen CMV. The firs one is the collection of predictive and dependent variables concurrently, using the same type of items to measure the variables in the study (Likert Scale) and the use of the same method to collect data (survey). Second, to reduce the incidence of socially accepted responses, we informed respondents that they could remain anonymous. We also use questionnaires, which is an advantage over other data collection methods. Research indicates that face-to-face interviews are more likely to induce socially desirable responses (Podsakoff et al., 2003). Finally, we also applied the Harman's one factor test, performing an exploratory factor analysis with all items and the first factor explained 25,81% of the total variance. Hence, our survey did not exhibit a concern regarding CMV.

4.4 Measures

4.4.1 Dependent Variables

Firm Performance (FP). Adapted from Moorman and Rust (1999), is a unidimensional construct made up of subjective measures of ROI and sales growth, derived from a comparison with competitors (*Likert* scale from 1 -much worse than the competitors- to 7 -much better than the competitors) and firm plan expectations (1 -much worse than planned- to 7 -much better than planned). Non-financial

subjective measures were included to collect the perception of executives concerning the customer satisfaction and firm image and reputation (*Likert* scale, 1 -much worse than the competitors to 7 -much better than the competitors).

4.4.2 Independent Variables

CEO Passion for Inventing (CPI): We use a scale of Cardon et al. (2013), which aims to capture the CEO's desire to create disruptive inventions to change the market, through activities such as the development of new products, processes, or services.

Radical Innovation (RI): Adapted from three items scale proposed by Tellis et al. (2009). This variable measure how different is the technology used by a firm, comparing it with the existing technology, and if new products or services better fulfill the customer needs.

4.4.3 Mediating Variable

Entrepreneurial Orientation (EO). Adapted from a scale proposed by Covin and Slevin (1989), EO is proxied through nine items and three dimensions: innovation, risk-taking, and proactivity using a *Likert* scale from 1 (totally disagree) to 7 (totally agree).

4.4.4 Control Variables

4.4.4.1 Personal Traits

Gender (GD): Gender may influence firm´s strategic orientation. According to Cohoon et al. (2010), women are more likely than men to get early funding, have more need of an entrepreneurial mentor and attribute their success to prior experience, while Cardon et al. (2013) found that male entrepreneurs exhibit higher levels of intense positive feelings towards inventing. For these reasons, we employ a dummy variable where 0 = female and 1 = male.

Entrepreneurial Experience (EE): We understand that previous experience would be helpful to the achievement of the entrepreneurial goals (Singer, 1995). We use a dummy variable where 0 = without previous entrepreneurial experience and 1 = with previous entrepreneurial experience.

4.4.4.2 Organizational Characteristics

Development Stage (DS): According to ABS (2016), start-ups have four stages of development: curiosity, idea, operation, and traction. In the first stage, entrepreneurs do not have an idea or a business, but they like to understand better what it is to create and they like managing a start-up. The idea arises when the entrepreneur has a clear concept, begins to know the details of its market, and launch the business. When the entrepreneur formalizes the firm, finds partners and manages the new business, the start-up reaches the operation stage. The last stage, traction, occurs when the

entrepreneur knows what the product is, how much the acquisition of each customer costs and has made the investments to make the company grow. Our sample includes firms in the operation and traction stages, and we use a dummy variable where 0 = operation and 1 = traction stage.

Firm Size (FS): Measured through the number of employees. By having a more flexible structure, usually associated with a lower size, SMEs can adapt more quickly to changes in the external environment, allowing them to take advantage of new opportunities (Zur, 2013).

Firm Age (FA): Following Chen et al. (2012), we proxy age through the difference between the year of data collection and the year of firm´s creation. Some authors claim that the effects of innovation on FP tend to increase in the long term (Madsen, 2007; Wiklund, 1999; Zahra and Covin, 1995).

5 RESULTS

To assess reliability and validity, the measurement model was estimated using SmartPLS 3.3.3 statistical software (Ringle et al., 2015). In Table 7 we show the high internal consistency of constructs and the composite reliability that represents the part of the variance between observed variables and our constructs, exceeds the value of 0.70 recommended by Hair et al. (2017).

Table 7 – Internal consistency of constructs and composite reliability.

Construct	C_Alpha	rho_A	CR	AVE
CPI	0.753	0.760	0.833	0.500
EO	0.793	0.806	0.853	0.493
RI	0.753	0.753	0.888	0.669
FP	0.849	0.852	0.859	0.570

Source: Elaborated by the authors.

Additionally, the Cronbach's Alpha for each of the constructs is higher than 0.70 as suggested by Hair et al. (2017), and the average variance extracted (AVE) that exceed the value of 0.50 (Hair et al., 2012), except to the entrepreneurial orientation construct, but it show a value slightly below 0.5, confirming the convergent validity of each used scale. Finally, it has been found that the reliability of the indicator is higher than 0.50, as its corresponding standardized factor loading is higher than 0.50 (Hair et al., 1999), and is statistically significant ($p < .001$). This guarantees the communality of each construct.

Table 8 shows that the formative construct has convergent validity as the redundancy analysis was above 0.70 (Hair et al., 2017) and the indicators did not present problems of collinearity because the VIF value of every single factor was under 5 (Hair et al., 2017).

Table 8 – Formative construct.

Construct	Indicator	Average	Load	VIF	C_Alpha	rho_A	CR	AVE
CPI					**0.753**	**0.760**	**0.833**	**0.500**
	CPI1	0.307	0.695	1.373				
	CPI2	0.330	0.739	1.951				
	CPI3	0.208	0.638	1.723				
	CPI4	0.121	0.716	1.643				
	CPI5	0.321	0.743	1.549				
EO					**0.793**	**0.806**	**0.853**	**0.493**
	INN1	0.169	0.571	1.300				
	INN2	0.245	0.689	1.506				
	INN3	0.259	0.728	1.528				
	RSK1	0.237	0.667	1.829				
	RSK2	0.222	0.782	1.544				
	RSK3		Eliminated					
	PRO1		Eliminated					
	PRO2	0.260	0.757	1.794				
	PRO3		Eliminated					
RI					**0.753**	**0.753**	**0.859**	**0.669**
	RDI1	0.376	0.829	1.585				
	RDI2	0.448	0.805	1.405				
	RDI3	0.401	0.820	1.562				
FP					**0.849**	**0.852**	**0.888**	**0.570**
	FIN1	0.163	0.741	1.769				
	FIN2	0.153	0.757	2.275				
	FIN3	0.231	0.763	2.107				
	FIN4	0.242	0.776	2.631				
	NFI1	0.308	0.748	2.229				
	NFI2	0.204	0.743	2.193				

Source: Elaborated by the authors.

The discriminant validity was calculated through two tests, which are shown in Table 10. First, below the diagonal, the heterotrait–monotrait test (HTMT) is shown, being considered as a criterion of better performance to determine the discriminant validity of the constructs (Henseler et al., 2015). It was obtained with SmartPLS when requesting the bootstrapping, finding values below 0.90 for the

correlations between the reflective constructs (Henseler et al., 2015). Second, the Fornell–Larcker criterion was calculated using the square root of each construct AVE (diagonal) and the values are higher than their corresponding correlations with any other construct (Fornell and Larcker, 1981). These analyses confirm that the data used in this study are clearly reliable and valid to test our hypotheses (Table 9).

Table 9 – Heterotrait-Monotrait Test (HTMT).

Construct	CPI	EO	RI	FP
CPI	0.707			
EO	0.337	0.702		
RI	0.433	0.641	0.817	
FP	0.125	0.355	0.351	0.754

Source: Elaborated by the authors.

According to Table 10, the CEO's passion for inventing has a positive and significant effect on entrepreneurial orientation (ß = 0.295; $p < 0.01$), confirming Hypothesis 1. Hypothesis 2 was also confirmed, indicating that entrepreneurial orientation has a positive influence on radical innovation (ß = 0.528; $p < 0.01$) and results highlight that radical innovation (H4) has a positive impact on firm performance (ß = 0.291; $p < 0.01$).

Table 10 – Direct hypotheses test.

Hypotheses	Relationships	B Estim. (O)	Std. Deviation (STEDV)	Test T (O / STEDV)	P value
H1	**CPI -> EO**	0.295**	0.088	3.348	0.001
H2	**EO -> RI**	0.528**	0.075	7.058	0.000
H3	**CPI -> RI**	0.169	0.094	1.798	0.072
H4	**RI -> FP**	0.291**	0.093	3.143	0.002

Source: Elaborated by the authors.

To test the mediating hypothesis, we first analyze the direct effect of passion for inventing on radical innovation (ß = 0.169; p > 0.05) and identify that this relationship is not significant. Further, we verify the indirect effects of the model and found a significant total mediating effect of entrepreneurial orientation in the relationship between CEO's passion for inventing and radical innovation (ß = 0.156; p < 0.01), confirming Hypothesis 3 (Table 11).

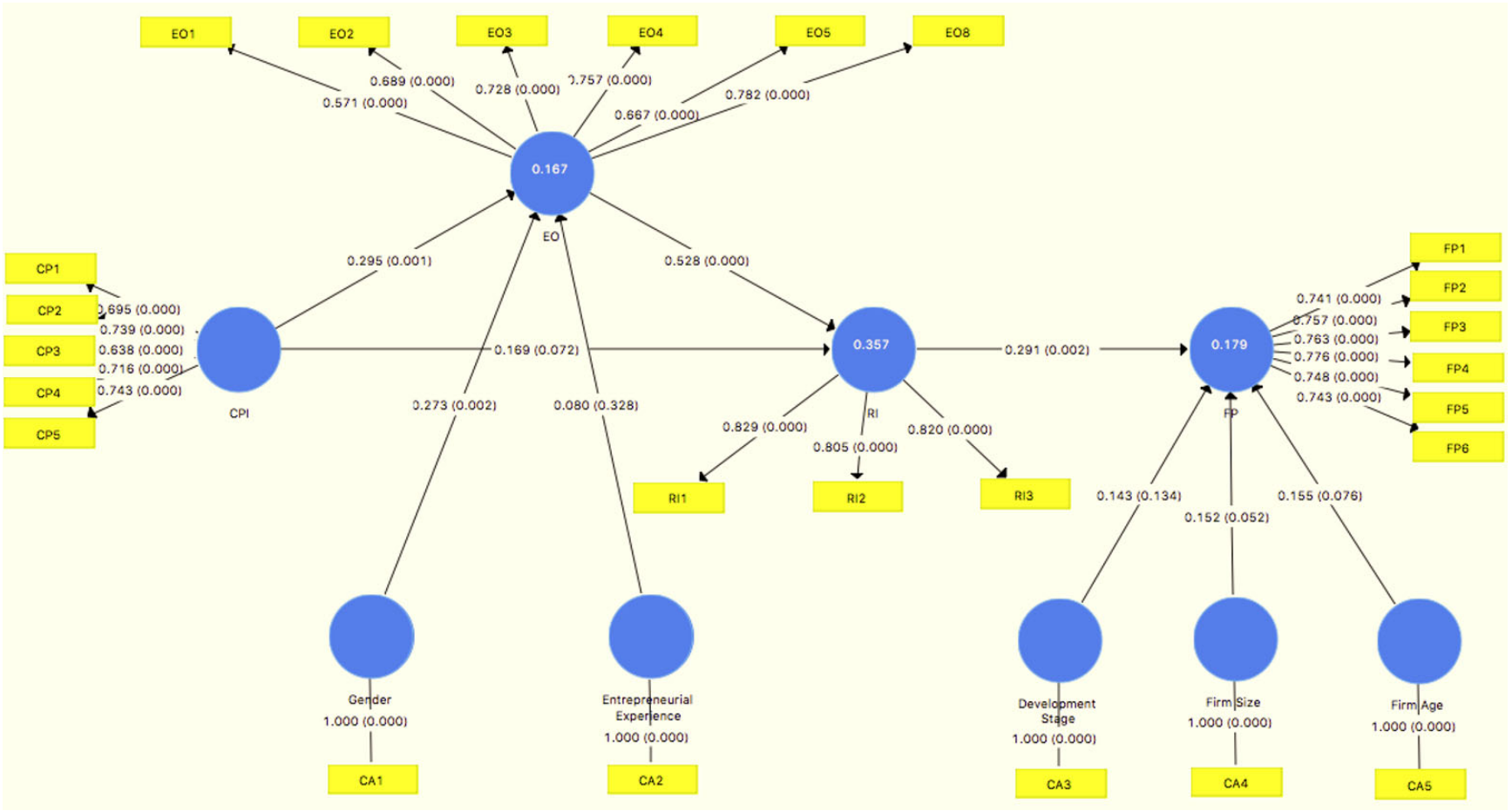
Table 2 – Mediating hypothesis test.

Hypothesis	Relationships	B Estim. (O)	Std. Deviation (STEDV)	Test T (O / STEDV)	P value
H3	**CPI -> EO -> RI**	0.156**	0.054	2.860	0.004

Source: Elaborated by the authors.

Figure 6 demonstrates our structural model with all directs relationships, their loading factors, and p-values.

Figure 6 – Direct effects, loading factors and p-values of the model.



Source: Elaborated by the authors.

Figure 6 shows the two linear equations systems defined by a PLS-SEM model (Henseler et al., 2015). The first one, the measurement model, specifies the relationship between constructs and their formative indicators (load factors). For example, to measure latent variable CEO's passion for inventing (CPI), we use five indicators (CP1, CP2, CP3, CP4, and CP5). The second one, the structural model, analyze the relationships and significances between our constructs. Analyzing both models, we can identify that CEO's passion for inventing predicts a greater entrepreneurial orientation (ß = 0.295; $p < 0.01$; $R^2 = 16.7\%$) which in turn predicts a greater radical innovation (ß = 0.528; $p < 0.01$; $R^2 = 35.7\%$). Them, these results suggest that a passion for inventing enhances firm's ability to launch innovative products and services. In turn, this combination of factors increases the likelihood

that these innovations are disruptive and firms with a greater ability to launch disruptive products and services have a better performance (ß = 0.291; $p < 0.01$; R^2 = 17.9%). Additionally, we identify that entrepreneurial orientation mediates the relationship between CEO's passion for inventing and radical innovation (ß = 0.169; $p > 0.05$), reinforcing the importance of the firms having a structure willing to take risks and act proactively to convert inventions idealized by their executives into radical innovations that will reach the market. These results have academic and managerial implications, which will be discussed in the next section.

6 DISCUSSION

The purpose of this paper was to study the path taken by inventors to increase their firm performance, the mediating effect of entrepreneurial orientation on the relationship between CEO's passion for inventing and radical innovation and our results contribute in several ways. At the theoretical level, we use the Cardon et al. (2009) scale to identify that CEO's passionate about inventing are those who consciously experience an intense positive feeling when is engaging in activities associated with inventing and our results underscore the positive effect of CEO's passion for inventing on firm´s entrepreneurial orientation. We believe that this positive effect was found because entrepreneurs will share their beliefs and encourage employees to take risks and proactively convert their inventions into innovations (Brettel et al., 2015; Engelen et al., 2014), contributing to the recognition

and exploitation of opportunities, and consequently with new ideas development (Baron and Ward, 2004).

Our results were, in some way, consistent with prior work, showing that entrepreneurship, at a firm level, is a determinant factor that raises a firm's innovations (Atuahene-Gima and Ko, 2001; Li et al., 2006; Sharif et al., 2012). We believe that entrepreneurial orientation raises firm's ability to create and combine resources in new ways that allow the development of new products and services because we found a positive effect of entrepreneurial orientation on radical innovation, a result that corroborates Zhou et al. (2005), and reinforcing that entrepreneurial orientation is a relevant antecedent of radical innovation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012). This study also provides a completer and more important model that links radical innovation and firm performance, corroborating previous studies (Brown and Eisenhard, 1995; Schulz and Jobe, 2001; Zhou et al., 2005). Although radical innovation presents a more expensive development (Baker and Sinkula, 2002), we believe that it generates higher returns (Iyer et al., 2006) because it allows firms to create and explore new market niches offering products and services more profitable and suited to customer's needs (Zhou *et al*., 2005). Our results also identify a mediating effect of entrepreneurial orientation on the relationship between CEO's passion for inventing and radical innovation, so that makes the positive relationship between CEO's passion for inventing and radical innovation non-significant, refuting a significant relationship founded by Strese *et al*. (2018). We believe that it occurs because CEO's passionate for inventing need to

create an organizational culture that favors to act proactively and take some risks to convert their inventions into innovations.

This study uses Upper Echelon Theory to provide a richer and perhaps more complete understanding of how personality traits, such as CEO's passion for inventing, influence firm's outcomes like entrepreneurial orientation, radical innovation, and performance. The model we propose incorporates the mediating effect of entrepreneurial orientation, a relevant antecedent of radical innovation, and we test its effect on performance. In this way, we contribute to enriching the theoretical conceptualization of entrepreneurial passion. From a managerial point of view, our results can help investors to analyze entrepreneurial personal traits, such as a passion for inventing, to choose the more attractive new ventures to invest in. It can also help CEOs to understand how they can use their passion for seeking organizational and strategic fit to improve firm performance, by hiring people with similar interests, stimulating risk-taking, and act proactively in search of the innovation's development.

7 CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

The empirical results of this study provide important considerations to CEOs and investors of recently founded firms, especially start-ups. If innovation is the soul of entrepreneurship, the CEO's passion for inventing is its heart. The positive effect of the passion for inventing on entrepreneurial orientation is the fuel that drives the firm's engine of radical innovation, and these characteristics enable firms to reach a

better performance. Our findings, using personal traits such as CEO's passion, show that Upper Echelon Theory is important to explain firm-level outcomes like entrepreneurial orientation, radical innovation, and performance. Additionally, we found a mediating effect of entrepreneurial orientation on the relationship between CEO's passion for inventing and radical innovation.

However, there are several limitations to this study. To further advance our concepts and our understanding, we encourage other researchers to provide more empirical evidence with respect to these important personal and organizational attributes. Since our empirical survey was conducted in Brazil, it would be interesting to see the results of similar frameworks conducted in other countries and cultural contexts. For example, some countries maybe have formal institutional more developed, providing more support (human, financial, managerial) to the improvement of start-ups. Researchers may also investigate the effects of other types of entrepreneurial passion, like founding or developing, on firm's innovations (incremental or radical; products, services, or processes) and consequently, on firm's performance. It is possible that CEO's personality traits affect differently the way that firm's generate innovations.

Furthermore, our respondents are the main executives of investigated firm's and the inclusion of a second interview, with the firm's employees, might reveal the precise emotional transfer of passion. Finally, our study assesses CEO's passion and organizational level variables (entrepreneurial orientation, radical innovation, and performance) at a cross-sectional sample. However, the effects of these variables can

vary across time, mainly for firms that received funding from an investor and need to present positive performance.

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APPENDIX

Construct	Factor loading	Alpha	VIF
CEO Passion for Inventing: (1= totally disagree, 7 = totally agree)		**0.753**	
It is exciting to figure out new ways to solve unmet market needs that can be commercialized.	0.695		1.373
Searching for new ideas for products/services to offer is enjoyable to me.	0.739		1.951
I am motivated to figure out how to make existing products/services better.	0.638		1.723
Scanning the environment for new opportunities really excites me.	0.716		1.643
Inventing new solutions to problems is an important part of who I am.	0.743		1.549
Entrepreneurial Orientation: (1= totally disagree, 7 = totally agree)		**0.793**	
Has market many new lines of products or services in the last 5 years (or since its establishment).	0.571		1.300
Has a strong emphasis on R&D, technological leadership, and innovations.	0.689		1.506
Changes in product or service lines have usually been quite dramatic.	0.728		1.528
Has a strong proclivity for high-risk projects (with changes of very high returns)..	0.667		1.829
Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm´s objectives.	0.782		1.544
Typically adopts a bold, aggressive posture to maximize the probability of exploiting potential opportunities.		Eliminated	
Is very often the first business to introduce new products/services, administrative techniques, operating technologies.		Eliminated	
Typically initiates actions to which competitors then respond.	0.757		1.794
Typically adopts a very competitive, “undo-the competitors” posture.		Eliminated	
Radical Innovation: (1= totally disagree, 7 = totally agree)		**0.753**	
Your firm usually introduces products that are radically different from existing products.	0.829		1.585
Your firm is ahead of others in introducing products based on radically new technologies.	0.805		1.405
Your firm have no difficulty in introducing products that are radically different from existing products in the industry.	0.820		1.562
Firm Performance: (1 = worse than competitor/planned, 7 = better than competitor/planned)		**0.849**	
When compared to your main competitor, your firm´s profitability is.	0.741		1.769
When compared to planned, your firm´s profitability is.	0.757		2.275
When compared to your main competitor, your firm´s sales growth is.	0.763		2.107
When compared to planned, your firm´s sales growth is.	0.776		2.631
When compared to your main competitor, your firm´s sales image and reputation is.	0.748		2.229
When compared to your main competitor, your firm´s customer satisfaction is.	0.743		2.193

CAPÍTULO 5

RESUMEN Y CONCLUSIONES[2]

[2] Esta es una traducción del último capítulo de la tesis *Abstract and Conclusions*.

1 RESUMEN DE LA TESIS DOCTORAL

El capítulo 1 constituye la introducción de esta tesis doctoral. La primera sección de la introducción se dedica a explicar nuestro interés por la orientación emprendedora, que es uno de los temas más investigados en gestión estratégica y emprendimiento (Zur, 2013). Aunque varios estudios señalan que existe una relación positiva entre la orientación emprendedora y el desempeño empresarial (Covin y Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Wiklund, 1999; Wiklund y Shepherd, 2003, 2005; Zahra, 1991; Zahra y Covin 1995; Zur, 2013), hay investigadores que no corroboran esta asunción, alegando que la orientación emprendedora no influye en el desempeño empresarial (Baker y Sinkula, 2009; Morgan y Strong 2003; Stam y Elfring, 2008; Walter et al., 2006) o aún que esta relación no es lineal y tiene la forma de una U invertida (Bhuian et al., 2005; Tang et al., 2008; Tang y Tang, 2012). Como destacamos en la introducción, no es suficiente estudiar aisladamente la relación entre la orientación emprendedora y el desempeño empresarial (Zhou et al., 2005), hay que buscar avanzar en el análisis de los factores internos y externos a la empresa, que pueden mediar o moderar esta relación (Kumar et al., 2011; Matsuno et al., 2002; Wiklund y Shepherd, 2005).

La segunda sección de la introducción establece la estructura de la tesis, explicando los objetivos más específicos de cada capítulo de esta investigación. El primer estudio, presente en el capítulo 2, tiene como objetivo evaluar si la orientación emprendedora influye de la misma manera en el desempeño financiero y no financiero. El segundo estudio, expuesto en el capítulo 3, adopta un enfoque configuracional considerando conjuntamente los efectos moderadores de la

hostilidad e incertidumbre como determinantes de la relación entre la orientación emprendedora y el desempeño empresarial. El tercer estudio, explicado en el capítulo 4, investiga el efecto mediador de la orientación emprendedora en la relación entre la pasión por inventar y la innovación radical, y su influencia en el desempeño de las empresas.

La tercera sección de la introducción hace un repaso sobre las start-ups en Brasil, muestra de empresas utilizadas en esta tesis. La palabra start-up es utilizada desde los años 90 para referirse a empresas recién creadas, con un enfoque en I+D, que desarrollan un modelo de negocio innovador y que actúan en un ambiente de extrema incertidumbre (Ries, 2011). Como poseen un bajo coste de mantenimiento y un modelo de rápido crecimiento (ABS, 2016), suelen obtener un desempeño superior cuando alcanzan el éxito. Con el objetivo de evaluar la capacidad de estas empresas para generar riqueza, Ailenn Lee, en 2013, usó por primera vez el término "unicornio" para describir una start-up valorada en más de mil millones de US$ (Lee, 2022), identificando tres características que presentaban estas: tecnología, escalabilidad y crecimiento acelerado. En Brasil, la primera start-up a recibir el título de unicornio fue la aplicación de transportes 99Táxi, que alcanzo esta marca en el año de 2018. En el mismo año, las empresas de medios pagamentos PagSeguro, Nubank y Stone también se tornaron unicornios y en 2019 la empresa Nubank se transformó en la primera start-up evaluada en más de US$ 10 mil millones (Invest News, 2022). Estos resultados llaman la atención de inversionistas, quienes vislumbran una oportunidad en Brasil, ya que es un país emergente, con una población de más de 200 millones de personas (IBGE, 2022), pero al mismo tiempo

presenta muchos retos que pueden generar nuevos negocios candidatos a unicornio. En 2021, en Brasil, diez nuevas start-ups fueran evaluadas en más de US$ 1 mil millones, totalizando 21 empresas y la expectativa es que otras 13 se tornen un unicornio en 2022 (Infomoney, 2022). Este rápido crecimiento, actuando en un ambiente de extrema incertidumbre, demuestra que las start-ups en Brasil son las empresas ideales para investigar los efectos de la adopción de una alta orientación emprendedora.

En el capítulo 2, "**¿Importa la medida de desempeño? Orientación emprendedora y desempeño de Start-ups**", identificamos evidencias de que una alta orientación emprendedora puede ser prejudicial en el desempeño empresarial, ya que diversos estudios apuntan para un efecto negativo o neutro (Baker y Sinkula, 2009; Morgan y Strong, 2003; Renko et al., 2009; Walter et al., 2006), mientras otros autores encontraron una relación curvilínea, en forma de una U invertida (Bhuian et al., 2005; Tang et al., 2008; Tang y Tang, 2012). Sin embargo, las dos principales justificaciones para estos resultados son que la adopción de una alta orientación emprendedora puede hacer que los costes marginales de desarrollo de las innovaciones superen los beneficios marginales (Brent, 1996), afectando el desempeño financiero y que las empresas, al priorizar la agenda emprendedora para desarrollar las innovaciones, se tornen más impulsadas a la tecnología en lugar de direccionadas al mercado (Atuahene-Gima y Ko, 2001), alejándose de las necesidades de los clientes (enfoque no financiero). Por eso, este capítulo buscó evaluar si la orientación emprendedora influye de la misma manera en los desempeños financiero y no financiero de las start-ups brasileñas.

Las hipótesis planteadas sugieren que la orientación emprendedora posee una relación curvilínea, en forma de una U invertida, tanto para el desempeño financiero cuanto para el desempeño no financiero. Para comprobar estas hipótesis colectamos datos de 140 start-ups y utilizamos el software SPSS para ejecutar regresiones múltiples, considerando la orientación emprendedora como variable independiente, las variables dependientes desempeño financiero y no financiero, y diferentes variables de control como edad de la empresa, tamaño, sector, estado de desarrollo, incertidumbre, hostilidad, genero del emprendedor y experiencia en emprender.

Por un lado, los resultados encontrados rechazan la hipótesis de una relación curvilínea entre la orientación emprendedora y el desempeño financiero, una vez que las regresiones enseñaron valores positivos y significativos solamente para la relación directa de la orientación emprendedora, corroborando los resultados encontrados por diversos autores (Covin y Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Wiklund, 1999; Zahra, 1991; Zur, 2013). Por otro lado, ellos comprueban la hipótesis que sugiere una relación curvilínea, en forma de una U invertida, entre la orientación emprendedora y el desempeño no financiero (satisfacción de los clientes y reputación e imagen de la empresa). De esta manera, podemos concluir que, considerando nuestra muestra de start-ups, el efecto de la orientación emprendedora actúa de manera distinta sobre los desempeños financiero y no financiero. Puede que las empresas con una alta orientación emprendedora acaben enfocando demasiado en los procesos de I+D, generando retos para los emprendedores como hacer la gestión de una creciente cartera de clientes, contratar y capacitar nuevos empleados, aumentar la capacidad de producción e implantar nuevas tecnologías de información

y comunicación, haciendo que los emprendedores cambien su enfoque hacia el interior de la empresa, buscando nuevas tecnologías, y alejándose de las necesidades y deseos de los clientes. Eso puede afectar la calidad percibida por ellos y por consecuencia, su satisfacción y la imagen y reputación de las empresas.

El capítulo 3, "**Orientación emprendedora y desempeño de Start-ups: un enfoque configuracional**", es el segundo estudio empírico de esta tesis doctoral. Dicho trabajo encuentra una vasta literatura que utiliza la Teoría de Recursos y Capacidades para evaluar la relación entre la orientación emprendedora y el desempeño empresarial (Alvarez y Busenitz 2001; Anderson y Eshima 2013; Kellermanns et al. 2016; Lisboa et al. 2016; Wiklund y Shepherd 2003), considerando que la combinación de recursos como la innovación, asunción a riesgos y proactividad derivan en estrategias difíciles de imitar (Lonial y Carter 2015). También encontramos estudios que se apoyan en la Teoría de Contingencia para justificar los efectos moderadores del ambiente externo a la empresa sobre la relación entre la orientación emprendedora y el desempeño empresarial (Becherer y Maurer 1997; Covin y Slevin 1989; Tang et al. 2008; Wiklund y Shepherd 2005), ya que el ambiente externo a la empresa puede afectar las oportunidades y las innovaciones (Tidd 2001), siendo que las dos principales variables ambientales son la incertidumbre y la hostilidad (Khandwalla 1977, Kreiser et al. 2020, Rauch et al. 2009).

Un ambiente incierto hace que surjan cambios inesperados (Milliken, 1987), principalmente con relación a las preferencias de los clientes, dificultando la previsión de volumen y combinación de productos y servicios (Tachizawa y

Thomsen 2007). Mientras un entorno hostil puede limitar el surgimiento de oportunidades y disminuir la lealtad de los clientes (Hall, 1980), amenazando la viabilidad y el desempeño de las empresas (Covin y Slevin, 1989). Sin embargo, la hostilidad y la incertidumbre coexisten en el mercado (Jaworsky y Kohli, 1993) y por eso creemos que un abordaje configuracional puede aportar nuevos conocimientos al evaluar la moderación conjunta de la hostilidad e incertidumbre sobre la relación entre la orientación emprendedora y el desempeño empresarial, que es el objetivo principal de este capítulo.

En el capítulo planteamos cuatro hipótesis. Que la orientación emprendedora posee un efecto positivo en el desempeño empresarial, que la hostilidad modera positivamente la relación entre la orientación emprendedora y el desempeño empresarial, que la incertidumbre modera positivamente la relación entre la orientación emprendedora y el desempeño empresarial y que la incertidumbre modera el impacto de la hostilidad sobre la relación entre la orientación emprendedora y el desempeño empresarial, de modo que el efecto positivo de la hostilidad aumente en entornos más inciertos. Para comprobar estas hipótesis utilizamos una muestra de 140 start-ups brasileñas, país que en los últimos años pasó por el impedimento de un presidente y sucesivos casos de corrupción que tornan su ambiente de difícil predicción y al mismo tiempo deterioran el ecosistema de negocios, aumentando la hostilidad. Ejecutamos regresiones múltiples con el uso del software SPSS, considerando cinco modelos propuestos de acuerdo con la revisión bibliográfica. El primero usa las variables de control edad de la empresa, tamaño, sector, estado de desarrollo, genero del emprendedor y experiencia en emprender. El

segundo modelo usa la Teoría de Recursos y Capacidades, verificando los efectos directos de la orientación emprendedora, hostilidad e incertidumbre. El tercer se basa en la Teoría de Contingencia, evaluando el efecto moderador de la hostilidad y el cuarto modelo analiza el efecto moderador de la incertidumbre. El quinto y último modelo utiliza la Teoría Configuracional, evaluando los efectos conjuntos de la orientación emprendedora, hostilidad e incertidumbre sobre el desempeño empresarial (interacción de tres vías).

Los resultados encuentran una relación positiva entre la orientación emprendedora y el desempeño empresarial, validando la hipótesis 1. Los efectos moderadores de la hostilidad e incertidumbre no presentaron valores significativos, rechazando las hipótesis 2 y 3. La interacción de tres vías señaló un efecto positivo y significativo en el desempeño empresarial y el análisis gráfico identificó que la relación entre la orientación emprendedora y el desempeño empresarial es más fuerte entre las empresas emprendedoras que operan en entornos con alta incertidumbre y hostilidad, en comparación con sus pares con una orientación emprendedora más baja, validando la hipótesis 4. Así, con base en la Teoría Configuracional, concluimos que adoptar una orientación emprendedora no siempre es la mejor opción para todas las empresas, debido a cuestiones como los efectos de la incertidumbre y hostilidad del entorno.

El capítulo 4, "**Pasión por inventar e innovación radical: el efecto mediador de la orientación emprendedora**", es el último de los estudios de esta tesis. Este trabajo aborda la Teoría del Escalón Superior para entender como aspectos personales de los ejecutivos, más precisamente su pasión por inventar, pueden afectar

la manera como ellos identifican oportunidades (Hambrick y Mason, 1984; Carpenter et al., 2004) y preparan las empresas para responder estratégicamente a los retos que se pretenden (Daft y Weick, 1984). Desde un punto de vista psicológico, la pasión es un sentimiento positivo intenso por las actividades relevantes para la identidad del emprendedor (Cardon et al., 2009). Así, un ejecutivo apasionado por inventar suele dedicarse con placer al desarrollo de nuevas ideas, explorando el mercado en busca de oportunidades que pueden generar productos y servicios extremadamente novedosos (Cardon et al., 2009). Strese et al. (2018) encontraron una relación positiva entre la pasión por inventar y el desarrollo de la innovación radical. Sin embargo, ellos sugieren que la pasión por inventar impulsa el desempeño de las empresas, pero no comprueban empíricamente estas conclusiones. Además, ellos tampoco exploran en su investigación los efectos de la adopción, por parte de los ejecutivos apasionados por inventar, de una orientación emprendedora, que es un antecedente importante de la innovación radical (Alegre y Chiva, 2013; Zortea-Johnston et al., 2012), lo que supone un lapso importante porque las empresas con una alta orientación emprendedora demuestran una mayor capacidad para desarrollar innovaciones radicales (Schindehutte et al., 2008). Por eso, este capítulo tiene por objetivo investigar el camino tomado por los ejecutivos apasionador por inventar para aumentar el desempeño de sus empresas, evaluando el efecto mediador de la orientación emprendedora en la relación entre la pasión por inventar y la innovación radical.

En este capítulo planteamos cuatro hipótesis. La primera, que la pasión por inventar lleva a una mayor orientación emprendedora. La segunda, que la orientación

emprendedora predice una mayor capacidad de la empresa para producir innovación radical. La tercera hipótesis apunta para el efecto mediador de la orientación emprendedora en la relación entre la pasión por inventar y la innovación radical, y por último que la innovación radical predice un desempeño superior. Para contrastar estas hipótesis colectamos una muestra de 125 start-ups brasileñas y usamos modelos de ecuaciones estructurales calculados con el apoyo del software Smart-PLS. Los constructos del modelo propuesto enseñaron una alta consistencia interna, una adecuada fiabilidad, validez convergente y los indicadores no presentaron problemas de colinealidad (Hair et al., 2017).

Los resultados comprueban las cuatro hipótesis planteadas, ya que la pasión por inventar posee un efecto positivo y significante en la orientación emprendedora. La orientación emprendedora también demuestra un efecto positivo y significativo en la innovación radical, la orientación emprendedora media la relación entre la pasión por inventar y la innovación radical y la innovación radical lleva a un desempeño superior. El efecto mediador de la orientación emprendedora en la relación entre la pasión por inventar y la innovación radical, hace que el efecto positivo y significativo encontrado por Strese et al. (2018) sea refutado, propiciando una comprensión más rica y quizá completa sobre cómo los rasgos de personalidad pueden influir en el desempeño empresarial, contribuyendo para la generación de conocimiento sobre la aplicación de la Teoría del Escalón Superior. Además, creemos que este efecto mediador ocurra porque los ejecutivos apasionados por inventar necesiten crear una cultura organizacional que favorezca una actuación proactiva y más arriesgada para convertir sus inventos en innovaciones que llegan al

mercado. Así, al incorporar la orientación emprendedora en nuestro modelo, avanzamos en la conceptualización sobre las Teorías de Escalón Superior y Pasión por Inventar.

2 IMPLICACIONES PRÁCTICAS DE LA TESIS

Como hemos señalado al comienzo de esta tesis, la literatura todavía no posee un consenso sobre en qué situaciones la adopción de una estrategia más emprendedora influye positivamente en los resultados empresariales y los argumentos más utilizados para justificar estas divergencias apuntan a factores internos y externos a la empresa, que de alguna manera pueden afectar esta relación (Kumar et al., 2011; Matsuno et al., 2002; Wiklund y Shepherd, 2005). Así, en esta tesis, hemos buscado evaluar empíricamente algunos de estos factores y explicar cómo ellos pueden afectar el desempeño empresarial, identificando decisiones gerenciales que pueden direccionar la actuación de los emprendedores e inversores de start-ups, especialmente en Brasil, dónde hemos cogido nuestra muestra de empresas.

En el **capítulo 2 "¿Importa la medida de desempeño? Orientación emprendedora y desempeño de Start-ups",** identificamos que la adopción de una orientación emprendedora afecta de manera desigual los resultados financieros y no financieros de las empresas y por eso precisa ser bien planeada. Sabemos que los objetivos empresariales cambian con el tiempo y en principio, los emprendedores buscan la satisfacción de los clientes para construir la reputación y una imagen

favorable de la empresa. Para las start-ups eso es más relevante, pues muchas veces la idea consiste en resolver un problema de los clientes, sin al menos saber cómo van a monetizar su negocio. Por ejemplo, hasta hoy el Whatsapp ofrece gratuitamente el servicio de comunicación para sus usuarios. En las situaciones dónde los emprendedores objetivan la satisfacción de sus clientes y mejorar la imagen y reputación de la empresa, se sugiere mantener una postura emprendedora moderada, dado que la relación entre orientación emprendedora y el desempeño no financiero se mostró curvilínea. Sin embargo, si la empresa busca alcanzar el liderazgo por medio de una estrategia más innovadora, hay que mantener la atención a las necesidades y deseos de los clientes, cuidando que la empresa no se vuelva más orientada a la tecnología que al cliente (Atuahene-Gima y Ko, 2001).

También sugerimos una especial atención a las características del entorno de la empresa, ya que la adopción de una orientación emprendedora parece favorecer a las start-ups que operan en entornos más dinámicos. Por lo tanto, es importante considerar la necesidad y dinámica del mercado, evaluando la velocidad de cambios en los productos, servicios y necesidades de los clientes, así como el lanzamiento de nuevos productos y cambios en la estrategia de los competidores. Cuestiones relacionadas al precio, calidad y la novedad de los productos y servicios disponibles en el mercado también merecen una atención especial, ya que actuar en un entorno más hostil puede afectar negativamente el desempeño financiero de las empresas.

El capítulo 3 **“Orientación emprendedora y desempeño de Start-ups: un enfoque configuracional”,** avanza en el análisis de las variables del entorno, más específicamente la incertidumbre y hostilidad, ya que entornos más dinámicos

requieren que la toma de decisiones ocurra con más velocidad para responder a los cambios ambientales (Jovanovic, 2015) y eso hace que las decisiones sean tomadas con información fragmentada, aumentando los riesgos de estas decisiones. Sin embargo, las start-ups que tienen una postura más innovadora, arriesgada y proactiva parecen dictar las reglas del mercado, dando lugar a un océano azul donde hay menos intensidad competitiva e incertidumbre, ya que los resultados demuestran que las start-ups son recompensadas cuando asumen los riesgos de destinar más recursos a la innovación y expansión de mercados, desarrollan nuevos productos, servicios o procesos, y actúan proactivamente para adelantarse a la competencia y a las necesidades del mercado.

No obstante, parece que las empresas que actúan en sectores más inciertos y competitivos también si benefician de una postura más orientada al emprendimiento que las empresas con una baja orientación emprendedora, que obtienen un mejor desempeño cuando actúan en entornos con un bajo nivel de hostilidad y un alto nivel de incertidumbre. Así, nuestra recomendación práctica a los emprendedores es que mantengan una constante evaluación acerca del entorno y busquen anticipar las necesidades latentes del mercado.

En el capítulo 4 "**Pasión por inventar e innovación radical: el efecto mediador de la orientación emprendedora**", encontramos evidencias que refuerzan la importancia de adoptarse una estrategia hacia el emprendimiento, contribuyendo al desarrollo de innovaciones (Atuahene-Gima y Ko, 2001; Li et al., 2006; Sharif et al., 2012), ya que la orientación emprendedora aumenta la capacidad de las empresas para crear y combinar recursos que favorecen el desarrollo de nuevos

productos o servicios basados en tecnologías disruptivas (Zhou et al. 2005). Aunque la innovación radical presenta un desarrollo más costoso (Baker y Sinkula, 2002), creemos que puede generar un mayor retorno a las empresas (Iyer et al., 2006) porque permite encontrar y explorar nuevos nichos de mercado, ofreciendo productos y servicios más rentables y adecuados a las necesidades de los clientes (Zhou et al., 2005).

También identificamos que los ejecutivos apasionados por inventar (Cardon et al. 2009) consiguen desarrollar una mejor orientación emprendedora y consecuentemente productos y servicios radicalmente diferentes de los disponibles en el mercado (disruptivos). Mas para eso, necesitan crear una cultura organizacional que favorezca actuar proactivamente y asumir riesgos para convertir sus ideas (inventos) en innovaciones, pues de acuerdo con nuestros resultados, la orientación emprendedora posee un efecto mediador en la relación entre la pasión por inventar y la innovación radical. Estos resultados pueden ayudar a los inversores a analizar los rasgos personales de los emprendedores en búsqueda de características como la pasión por la inventar, pues pueden sugerir oportunidades en empresas con un futuro más rentable, mientras consigan garantizar la creación de una cultura emprendedora. También pueden ayudar a los ejecutivos a comprender mejor sus características personales, y como pueden direccionar los ajustes organizacional y estratégico necesarios para mejorar el desempeño de sus empresas. Por ejemplo, contratando personas con intereses similares a los suyos, estimulando la toma de riesgos y actuando de manera proactiva con el objetivo de desarrollar las innovaciones.

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CHAPTER 5

ABSTRACT AND CONCLUSIONS

3 ABSTRACT OF THE DOCTORAL THESIS

Chapter 1 constitutes the introduction of this doctoral thesis. The first section of the introduction is dedicated to explaining our interest in entrepreneurial orientation, which is one of the most researched topics in strategic management and entrepreneurship (Zur, 2013). Although several studies indicate that there is a positive relationship between entrepreneurial orientation and firms performance (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Miller, 1983; Wiklund, 1999; Wiklund and Shepherd , 2003, 2005; Zahra, 1991; Zahra and Covin 1995; Zur, 2013), there are researchers who do not corroborate this assumption, arguing that entrepreneurial orientation does not influence firms performance (Baker and Sinkula, 2009; Morgan and Strong 2003; Stam and Elfring, 2008; Walter et al., 2006) or even that this relationship is not linear and has the shape of an inverted U (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012). As we highlighted in the introduction, it is not enough to study the relationship between entrepreneurial orientation and firms' performance in isolation (Zhou et al., 2005), we must seek to advance in the analysis of firms internal and external factors, which can mediate or moderate this relationship (Kumar et al., 2011; Matsuno et al., 2002; Wiklund and Shepherd, 2005).

The second section of the introduction establishes the structure of the thesis, explaining the more specific objectives of each chapter of this research. The first study, presented in chapter 2, aims to assess whether entrepreneurial orientation influences financial and non-financial performance in the same way. The second study, presented in chapter 3, adopts a configurational approach considering jointly

the moderating effects of hostility and uncertainty as determinants of the relationship between entrepreneurial orientation and firms' performance. The third study, explained in Chapter 4, investigates the mediating effect of entrepreneurial orientation on the relationship between passion for invention and radical innovation, and its influence on firm performance.

The third section of the introduction reviews start-ups in Brazil, the sample of firms used in this thesis. The term start-up has been used since the 1990s to refer to newly created firms, with a focus on R&D, that develop an innovative business model and that act in an environment of extreme uncertainty (Ries, 2011). As they have a low maintenance cost and a fast growth model (ABS, 2016), they tend to outperform when successful. To assess the ability of these firms to generate wealth, Ailenn Lee, in 2013, used the term "unicorn" for the first time to describe a start-up valued at more than a billion US$ (Lee, 2022), identifying three characteristics: technology, scalability and accelerated growth. In Brazil, the first start-up to receive the title of unicorn was the transport application 99Táxi, which reached this mark in 2018. In the same year, the payment media firms PagSeguro, Nubank and Stone also became unicorns and in 2019, the Nubank became the first start-up valued at more than US$10 billion (Invest News, 2022). These results draw the attention of investors, who see an opportunity in Brazil, since it is an emerging country, with a population of more than 200 million people (IBGE, 2022), but at the same time, it presents many challenges that can generate new businesses unicorn candidates. In 2021, in Brazil, ten new start-ups were valued at more than US$1 billion, totaling 21 firms and the expectation is that another 13 will become a unicorn in 2022 (Infomoney, 2022). This

rapid growth, acting in an environment of extreme uncertainty, shows that start-ups in Brazil are the ideal firms to investigate the effects of adopting a high entrepreneurial orientation.

In Chapter 2, "**Does Performance Measure Matter? Entrepreneurial orientation and performance of Start-ups**", we identified evidence that a high entrepreneurial orientation can be detrimental to firm's performance, since various studies point to a negative or neutral effect (Baker and Sinkula, 2009; Morgan and Strong, 2003; Renko et al., 2009; Walter et al., 2006), while other authors found a curvilinear relationship, in the form of an inverted U (Bhuian et al., 2005; Tang et al., 2008; Tang and Tang, 2012).). However, the two main justifications for these results are that the adoption of a high entrepreneurial orientation can cause the marginal costs of developing innovations to exceed the marginal benefits (Brent, 1996), affecting financial performance and that firms, by prioritizing the entrepreneurial agenda to develop innovations, become more technology-driven rather than market-oriented (Atuahene-Gima and Ko, 2001), moving away from customer needs (non-financial approach). Therefore, this chapter sought to assess whether the entrepreneurial orientation influences the financial and non-financial performance of Brazilian start-ups in the same way.

The hypotheses proposed suggest that entrepreneurial orientation has a curvilinear relationship, in the form of an inverted U, both for financial performance and for non-financial performance. To test these hypotheses, we collected data from 140 start-ups and used SPSS software to run multiple regressions, considering entrepreneurial orientation as the independent variable, financial and non-financial

performance as dependent variables, and different control variables such as firm's age, size, sector, state of development, uncertainty, hostility, gender of the entrepreneur, and experience in entrepreneurship.

On the one hand, the results found reject the hypothesis of a curvilinear relationship between entrepreneurial orientation and financial performance, since the regressions showed positive and significant values only for the direct relationship of entrepreneurial orientation, corroborating the results found by various author. (Covin and Slevin, 1991; Martins et al., 2012; Mason et al., 2015; Wiklund, 1999; Zahra, 1991; Zur, 2013). On the other hand, they test the hypothesis that suggests a curvilinear relationship, in the form of an inverted U, between entrepreneurial orientation and non-financial performance (customer satisfaction and company reputation and image). In this way, we can conclude that, considering our sample of start-ups, the effect of entrepreneurial orientation acts differently on financial and non-financial performance. Firms with a high entrepreneurial orientation may end up focusing too much on R&D processes, creating challenges for entrepreneurs such as managing a growing client base, hiring and training new employees, increasing production capacity and implementing new information and communication technologies, causing entrepreneurs to shift their focus within the firm, seeking new technologies, and away from the needs and desires of customers. This can affect the quality perceived by them and, consequently, their satisfaction and the image and reputation of the firms.

Chapter 3, "**Entrepreneurial Orientation and Performance of Start-ups: A Configurational Approach**", is the second empirical study of this doctoral thesis.

This work finds a vast literature that uses the Theory of Resources and Capacities to evaluate the relationship between entrepreneurial orientation and business performance (Alvarez and Busenitz, 2001; Anderson and Eshima, 2013; Kellermanns et al., 2016; Lisboa et al., 2016; Wiklund and Shepherd, 2003), considering that the combination of resources such as innovation, risk taking and proactivity lead to strategies that are difficult to imitate (Lonial and Carter, 2015). We also found studies that rely on the Contingency Theory to justify the moderating effects of the external business environment on the relationship between entrepreneurial orientation and firm's performance (Becherer and Maurer, 1997; Covin and Slevin, 1989; Tang et al., 2008; Wiklund and Shepherd, 2005), since the external environment can affect opportunities and innovations (Tidd, 2001), with the two main environmental variables being uncertainty and hostility (Khandwalla, 1977, Kreiser et al., 2020, Rauch et al., 2009).

An uncertain environment causes unexpected changes to arise (Milliken, 1987), mainly in relation to customer preferences, making it difficult to forecast the volume and combination of products and services (Tachizawa and Thomsen, 2007). While a hostile environment can limit the emergence of opportunities and decrease customer loyalty (Hall, 1980), threatening the viability and performance of firms (Covin and Slevin, 1989). However, hostility and uncertainty coexist in the market (Jaworsky and Kohli, 1993) and for this reason we believe that a configurational approach can provide new insights by evaluating the joint moderation of hostility and uncertainty on the relationship between entrepreneurial orientation and firm's performance, which is the focus of this chapter.

In this chapter we propose four hypotheses. That entrepreneurial orientation has a positive effect on firm's performance, that hostility positively moderates the relationship between entrepreneurial orientation and firm's performance, that uncertainty positively moderates the relationship between entrepreneurial orientation and firm's performance, and that uncertainty moderates the impact of hostility on the relationship between entrepreneurial orientation and firm's performance, so that the positive effect of hostility increases in more uncertain environments. To test these hypotheses, we used a sample of 140 Brazilian start-ups, a country that in recent years has experienced the impediment of a president and successive cases of corruption that make its environment difficult to predict and at the same time deteriorate the business ecosystem, increasing hostility. We run multiple regressions using SPSS software, considering five models proposed according to the literature review. The first uses the control variables firm's age, size, sector, state of development, gender of the entrepreneur and experience in entrepreneurship. The second model uses the Theory of Resources and Capabilities, verifying the direct effects of entrepreneurial orientation, hostility, and uncertainty on firm's performance. The third model is based on the Contingency Theory, evaluating the moderating effect of hostility and the fourth model analyzes the moderating effect of uncertainty. The fifth and last model uses the Configurational Theory, evaluating the joint effects of entrepreneurial orientation, hostility, and uncertainty on firm's performance (three-way interaction).

The results find a positive relationship between entrepreneurial orientation and firm's performance, validating hypothesis 1. The moderating effects of hostility and uncertainty did not present significant values, rejecting hypotheses 2 and 3. The

three-way interaction indicated a positive and significant effect on firm's performance and graphical analysis identified that the relationship between entrepreneurial orientation and firm's performance is stronger among entrepreneurial firms that operate in environments with high uncertainty and hostility, compared to their peers with a lower entrepreneurial orientation, validating hypothesis 4. Thus, based on the Configurational Theory, we conclude that adopting an entrepreneurial orientation is not always the best option for all firms, due to issues such as the effects of uncertainty and hostility in the environment.

Chapter 4, "**Passion of inventing and radical innovation: the mediating effect of entrepreneurial orientation**", is the last of the studies in this thesis. This work deals with the Upper Echelon Theory to understand how personal aspects of executives, more precisely their passion for inventing, can affect the way they identify opportunities (Hambrick and Mason, 1984; Carpenter et al., 2004) and prepare firms to respond strategically to the challenges that are intended (Daft and Weick, 1984). From a psychological point of view, passion is an intense positive feeling for activities relevant to the identity of the entrepreneur (Cardon et al., 2009). Thus, an executive with a passion for inventing usually devotes himself with pleasure to the development of new ideas, exploring the market in search of opportunities that can generate extremely innovative products and services (Cardon et al., 2009). Strese et al. (2018) found a positive relationship between the passion of inventing and the development of radical innovation. However, they suggest that the passion for invention drives the performance of firms, but they do not empirically test these conclusions. Furthermore, they also do not explore in their research the effects of the

adoption, by passionate inventing executives, of an entrepreneurial orientation, which is an important antecedent of radical innovation (Alegre and Chiva, 2013; Zortea-Johnston et al., 2012), which represents an important gap because firms with a high entrepreneurial orientation show a greater capacity to develop radical innovations (Schindehutte et al., 2008). Therefore, this chapter aims to investigate the path taken by executives passionate about inventing to increase the performance of their firms, evaluating the mediating effect of entrepreneurial orientation in the relationship between passion for inventing and radical innovation.

In this chapter we propose four hypotheses. The first, that the passion for inventing leads to a greater entrepreneurial orientation. The second, that the entrepreneurial orientation predicts a greater capacity of the firm to produce radical innovation. The third hypothesis points to the mediating effect of entrepreneurial orientation on the relationship between passion for inventing and radical innovation, and finally that radical innovation predicts superior performance. To test these hypotheses, we collected a sample of 125 Brazilian start-ups and used structural equation models calculated with the support of Smart-PLS software. The constructs of the proposed model showed high internal consistency, adequate reliability, convergent validity, and the indicators did not present collinearity problems (Hair et al., 2017).

The results confirm the four hypotheses raised, since the passion for inventing has a positive and significant effect on entrepreneurial orientation. Entrepreneurial orientation also demonstrates a positive and significant effect on radical innovation, entrepreneurial orientation mediates the relationship between passion for inventing

and radical innovation, and radical innovation leads to superior performance. The mediating effect of entrepreneurial orientation on the relationship between the passion for inventing and radical innovation refutes the positive and significant effect found by Strese et al. (2018), leading to a richer and perhaps more complete understanding of how traits of personality can influence firm's performance, contributing to the generation of knowledge on the application of the Upper Echelon Theory. Furthermore, we believe that this mediating effect occurs because executives who are passionate about inventing need to create an organizational culture that favors proactive and riskier action to turn their ideas and inventions into innovations that reach the market. Thus, by incorporating the entrepreneurial orientation in our model, we advance in the conceptualization of the Upper Echelon and Passion for Inventing Theories.

4 IMPLICACIONES PRÁCTICAS DE LA TESIS

As we pointed out at the beginning of this thesis, the literature still does not have a consensus on in which situations the adoption of a more entrepreneurial strategy positively influences firm's performance and the most used arguments to justify these divergences point to internal and external factors, which in some way may affect this relationship (Kumar et al., 2011; Matsuno et al., 2002; Wiklund and Shepherd, 2005). Thus, in this thesis, we have sought to empirically evaluate some of these factors and explain how they can affect firm's performance, identifying

managerial decisions that can direct the performance of entrepreneurs and start-up investors, especially in Brazil, where we have taken our sample of firms.

In Chapter 2 "**Does Performance Measurement Matter? Entrepreneurial Orientation and Performance of Start-ups**", we identified that the adoption of an entrepreneurial orientation unequally affects the financial and non-financial performance of firms and therefore needs to be well planned. We know that business objectives change over time, and, in principle, entrepreneurs seek customer satisfaction to build the reputation and favorable image of the firms. For start-ups, this is more relevant, since many times the idea is to solve a customer problem, without even knowing how they are going to monetize their business. For example, until today WhatsApp offers free communication service for its users. In situations where entrepreneurs aim to satisfy their customers and improve the image and reputation of the firm, it is suggested to maintain a moderate entrepreneurial stance, given that the relationship between entrepreneurial orientation and non-financial performance was curvilinear. However, if the firm seeks to achieve leadership through a more innovative strategy, it is necessary to maintain attention to the needs and desires of customers, taking care that the firm does not become more technology-oriented than customer-oriented (Atuahene- Gima and Ko, 2001). We also suggest paying special attention to the firm's environment characteristics, since the adoption of an entrepreneurial orientation seems to favor start-ups that operate in more dynamic environments. Therefore, it is important to consider the need and dynamics of the market, evaluating the speed of changes in products, services, and customer needs, as well as the launch of new products and changes in the strategy of

competitors. Issues related to the price, quality and novelty of the products and services available in the market also deserve special attention, since acting in a more hostile environment can negatively affect the firm's financial performance.

Chapter 3 "**Entrepreneurial orientation and performance of Start-ups: a configurational approach**", advances in the analysis of the environment variables, more specifically uncertainty and hostility, since more dynamic environments require decision-making to occur more quickly to respond to environmental changes (Jovanovic, 2015) and that makes decisions are made with fragmented information, increasing the risks of these decisions. However, start-ups that have a more innovative, risk-taking, and proactive stance seem to dictate the rules of the market, leading to a blue ocean where there is less competitive intensity and uncertainty, as results show that start-ups are rewarded when they take risks to allocate more resources to innovation and market expansion, develop new products, services or processes, and act proactively to anticipate competition and market needs.

However, it seems that firms operating in more uncertain and competitive sectors also benefit from a more entrepreneurial stance than firms with a low entrepreneurial orientation, which perform better when operating in environments with a low level of hostility and a high level of uncertainty. Thus, our practical recommendation to entrepreneurs is that they maintain a constant evaluation of the environment and seek to anticipate the latent needs of the market.

In chapter 4 "**Passion for inventing and radical innovation: the mediating effect of entrepreneurial orientation**", we find evidence that reinforces the

importance of adopting a strategy towards entrepreneurship, contributing to the development of innovations (Atuahene-Gima and Ko, 2001; Li et al., 2006; Sharif et al., 2012), since entrepreneurial orientation increases the ability of firms to create and combine resources that favor the development of new products or services based on disruptive technologies (Zhou et al. 2005). Although radical innovation presents a more expensive development (Baker and Sinkula, 2002), we believe that it can generate a greater return for firms (Iyer et al., 2006) because it allows finding and exploring new market niches, offering products and services more profitable and appropriate to the customer's needs (Zhou et al., 2005).

We also found that executives who are passionate about inventing (Cardon et al. 2009) manage to develop a better entrepreneurial orientation and, consequently, products and services that are radically different from those available on the market (disruptive). But for that, they need to create an organizational culture that favors acting proactively and taking risks to turn their ideas (inventions) into innovations, because according to our results, the entrepreneurial orientation has a mediating effect on the relationship between the passion for inventing and the radical innovation. These results can help investors to analyze the personal traits of entrepreneurs in search of characteristics such as a passion for inventing, as they can suggest opportunities in firms with a more profitable future, while ensuring the creation of an entrepreneurial culture. They can also help executives better understand their personal characteristics, and how they can address the necessary organizational and strategic adjustments to improve the performance of their firms.

For example, hiring people with similar interests to yours, encouraging risk taking and acting proactively with the aim of developing innovations.

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