Essays on entrepreneurial actions in uncertain and resource-constrained situations

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ABSTRACT

Entrepreneurial actions in uncertain and resource-constrained situations

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This dissertation consists of three essays that study entrepreneurial actions in uncertain and resource-constrained situations by focusing on effectuation, bricolage, and bootstrapping literature. The first essay fills some important gaps in the literature on antecedents of effectuation. It does so by introducing three non-economic antecedents of effectuation and scrutinizes the impact of perceived disruptiveness of the business idea, entrepreneurs' motivation, and their ambiguity tolerance (indicators of innovators) with regard to taking effectual processes. 75 hand-collected responses from nascent ventures that are active in Montreal, Canada, and 200 responses via Qualtrics from new ventures operating across Canada form the sample of the first essay. The results are consistent in both samples and show the significant impact of perceived disruptiveness of the product/service and autonomous type of motivation on using effectuation.

The second essay starts a new dialogue in the literature of effectuation/causation and focuses on the performance of entrepreneurs rather than firms. It addresses the questions about whether entrepreneurs can cognitively recognize when effectual/causal approaches are likely to yield better performance and execute them. Based on a sample of 200 entrepreneurs in Canada, the second essay studies the effect of openness to change, optimism, ambition, and team size on the entrepreneurs' capability of choosing and fulfilling the best approach (effectuation vs causation) at different levels of product/service disruptiveness.

The third essay is meant to obviate some limitations regarding entrepreneurial approaches to overcome resource scarcity (bricolage, effectuation, and bootstrapping), namely, the considerable amount of overlap among approaches, unclear boundaries between what entrepreneurs do and how they do it, different antecedents of the approaches, and the multidimensional nature of them. To obviate the mentioned limitations, the third essay makes two major contributions to the literature. First, it introduces four distinct, single-dimensional, and easily measurable innovative courses of action that entrepreneurs undertake to overcome resource scarcity. Second, to stress the differences among the courses of action and to stimulate empirical studies in the future, it elaborates on process-related, organizational, environmental, and individual factors that affect the decision of entrepreneurs on prioritizing some innovative courses of action over others to overcome resource scarcity.

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CONTRIBUTION OF AUTHORS

Although I employ the author's "we" in all three papers (chapters 2, 3, 4) I am the sole author of this thesis. My use of "we" equally reflects my discomfort with the pronoun "I" in my written productions, the theoretical and technical guidance of my thesis committee and other mentors, and my intention to enlist co-authors on the way to publication.

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CHAPTER 1

THESIS OVERVIEW

This dissertation consists of three essays that study entrepreneurial actions in uncertain and resource-constrained situations by focusing on four main entrepreneurial approaches, namely, causation, effectuation, bricolage, and bootstrapping. To walk the readers through the mentioned approaches, I briefly bring known definitions of them in the next paragraphs.

Causation is a process by which entrepreneurs gather means to create ends that they envisage (Sarasvathy, 2001) and try to control the future by predicting it. To that end, they analyze long-run opportunities and select what they think would provide the best returns, develop a strategy to best take advantage of resources and capabilities, implement control processes to make sure they meet objectives, and keep a clear and consistent vision for the future (Chandler et al., 2011). In addition to the mentioned traditional approach, in entrepreneurship research, other theoretical approaches have been developed in recent two decades because the processes entrepreneurs undertake are not always as linear and based on the prediction as the causal approach explains.

In contrast to causation, more recent theoretical approaches, namely, effectuation, bricolage, and bootstrapping, postulate that under the condition of uncertainty or resource scarcity, entrepreneurs focus primarily on the resources they have at hand, combine them to create a new application, pay less attention to market needs in uncovering an opportunity, go beyond pre-existing knowledge, ignore long-term returns, and focus primarily on what they are willing to lose in making decisions about whether to pursue an opportunity or not.

Effectuation is a process by which entrepreneurs develop ends based on available means (Sarasvathy, 2001) and try to control the future without predicting it. As Chandler et al. (2011) define, effectuation is formed by flexibility (embracing contingencies rather than sticking with pre-defined visions), experimentation (learning by doing rather than using pre-existing knowledge), affordable loss (considering what we can lose rather than calculating what we can gain), and pre-commitment (viewing influential individuals and firms as potential stakeholders rather than competitors).

While using bricolage, entrepreneurs may change the functionality of resources, combine them to create a new effect (Baker & Nelson, 2005), or mobilize other individuals or firms in their network (formal or informal) to obtain resources (Baker et al., 2003). The mentioned tasks could occur within a venture or among different entrepreneurs as a collective action (Duymedjian & Rüling, 2010) to exploit a business opportunity or address a social cause (Di Domenico et al., 2010).

By bootstrapping, entrepreneurs reduce overall capital requirements, improve cash flow, and use personal sources of financing (Ebben & Johnson, 2006). About bootstrapping, Grichnik et al. (2014) enumerate four dimensions: customer-related (e.g. offering customers discounts if they pay cash and using interest on overdue payments), joint resource utilization (e.g. sharing employees or equipment with others, and having bundle purchases with others), internal self-financing (e.g. obtaining loans from relatives/friends and withholding own salary) and temporary resources (e.g. borrowing equipment from others and leasing equipment instead of buying).

While effectuation will be used as a theoretical approach in all three essays of this thesis, I pay attention to causation in the second essay, and develop a conceptual model including effectuation, bricolage, and bootstrapping in the third essay.

Although in the last two decades effectual approach has become one of the central theoretical frameworks in research about entrepreneurial processes (Grégoire & Cherchem, 2020), there are still gaps in the way it contributes to our understanding of entrepreneurial actions (Arend et al., 2015) because the theory has remained undeveloped (Welter & Kim, 2018) and there is insufficient empirical testing and critical analysis (Perry et al., 2012). As Perry et al. (2012) convey, it may take more than a decade for a theory to go beyond its infancy stage and noticeably influence researchers' understanding of managerial phenomena. Effectuation fits the pattern in this regard so that many theoretical and empirical aspects of it have remained underdeveloped (Grégoire & Cherchem, 2020; Perry et al., 2012).

To address the mentioned insufficiencies, the first and second essays of this thesis are meant to fill some noticeable theoretical and empirical gaps in the literature on effectuation. In the first essay, I address the lack of attention to the types of entrepreneurs who undertake effectuation by studying the characteristics that make entrepreneurs innovators. In the second essay, I test whether entrepreneurs mindfully tailor their entrepreneurial approaches (effectuation vs causation) to what different situations demand and factors that help them fulfill the mentioned task. In the first two essays, I used a quantitative research method which is rare but recommended. The third essay not only makes a theoretical contribution to effectuation literature but also adds to other lenses (bricolage and bootstrapping) that researchers use to explain what entrepreneurs do to overcome resource scarcity while growing their ventures. In the following paragraphs, I briefly elaborate on the mentioned contributions.

Chapter 2 (the first essay) intends to contribute to filling some of the mentioned gaps by discussing and empirically testing some key antecedents of effectuation that have not been addressed so far. Although some studies, directly or indirectly, have introduced antecedents of effectuation, there is

still a meaningful gap in the literature with regard to what makes entrepreneurs effectuate. In the most recent review of effectuation literature, Grégoire & Cherchem (2020: 621) state that "effectuation research continues to face a series of theoretical and methodological challenges" and suggest strong and convincing theoretical explanations for why a particular antecedent variable mobilizes effectuation.

I believe one of the reasons that make research about the antecedents of effectuation fragmented is that prior studies (i.e. Harms & Schiele, 2012; Johansson & McKelvie, 2012) considered factors that lead to using more effectuation at different levels but ignored the type of entrepreneurs who should fulfill effectual processes. To partially fill the mentioned gap and to make a meaningful link among antecedents, in the first essay, I try to test if the characteristics that make an entrepreneur an "innovator" (Chanana & More, 2020) prompt her/him to use more effectuation. The mentioned characteristics emanate from non-economic behaviors and are meant to explain an approach (effectuation) that cannot be explained by economists' theories.

The way Chanana & More (2020) differentiate innovators (who have an internal desire to come up with something new) from other types of entrepreneurs including imitators (people who copy others' business ideas), hustlers (ones who start with a small business and gradually grow it), researchers (who analyze the idea a lot before starting it), and buyers (people who have a lot of money and often acquire businesses) is well-matched with what Steve Jobs (2005) advises fresh alumni of Stanford University. He suggested that to be "adventurous", people should stay "hungry" and stay "foolish". Accordingly, in the first essay, I scrutinize if higher levels of disruptiveness in products/services (being adventurous to come up with something new), more autonomous type of motivation (being hungry and internally motivated), and a higher tolerance for ambiguity (being foolish and not an analytical risk-taker) lead to use more effectuation. Therefore:

First, I propose that entrepreneurs may use different levels of effectuation depending on the degree of perceived disruptiveness of their products and services. On the supply side, new markets are recently emerging more rapidly (Innosight, 2016) and on the demand side, the speed at which the population absorbs new technologies and products is higher than ever (Bygrave and Zacharakis, 2016). Accordingly, the first research question is: How is entrepreneurs' perception of the disruptiveness of their products/services associated with the use of effectuation?

Second, I address the impact of different types of motivation on taking an effectual approach, in response to Reymen et al.'s (2015) call based on their belief that the next stage of theory development in effectuation research should be devoted to building a better understanding of the motivations behind effectuation. Accordingly, the second research question is: What type of motivation is associated with a greater likelihood of undertaking effectual processes? I address this research question by using self-determination theory to understand if autonomous motivation (formed by the combination of intrinsic, integrated, and identified types of motivations) plays a more important role in undertaking effectuation than controlled motivation (formed by the combination of introjected and external types of motivation).

Third, I add to the literature by focusing on a psychological characteristic that makes it possible for entrepreneurs to endure effectual processes. Although Sarasvathy (2001) assumes that all entrepreneurs "can" but few "do" fulfill effectual processes, Arend et al. (2015) believe few entrepreneurs "can" effectuate. The first essay focuses on the impact of ambiguity tolerance on undertaking effectual processes and studies if entrepreneurs that are more tolerant of ambiguity "can" perform effectuation more than those who are less tolerant. A high level of ambiguity intertwined with effectual processes was illustrated by Sarasvathy (2001) in the seminal paper and mentioned as an inseparable part of effectuation in later studies (i.e. Liu, 2019). Therefore, as the

third research question, I ask: Do entrepreneurs with higher levels of ambiguity tolerance effectuate more than other entrepreneurs?

The first essay also makes an empirical contribution to effectuation literature. Perry et al. (2012) find the lack of empirical studies about effectuation to be surprising. Other scholars believe that many aspects of effectuation theory, such as the consequences of effectuation in different contexts (Cai et al., 2017), have remained untested. To date, there is limited research about effectuation using common methods of quantitative analysis (Welter & Kim, 2018) which is addressed in the first and second essays.

Chapter 3 (the second essay) fills some important gaps in the literature on undertaking effectual and causal approaches and new venture performance. Although some studies have shown when undertaking either an effectual or a causal approach yields better performance, until now, no study has addressed the following critical questions: "assuming there is a meaningful fit between the entrepreneurial approach (effectuation vs causation) and the level of product/service disruptiveness, do entrepreneurs tailor their approach to the level of product/service disruptiveness?" and, if the majority of entrepreneurs cannot tailor their approach to what different situations demand, "which characteristics of individuals and teams help entrepreneurs fulfill the most effective approach (effectuation vs causation)?" addressing the mentioned gap theoretically provides an answer to the question Arend et al. (2015) ask regarding the capability of entrepreneurs to identify and fulfill essential courses of action in a timely manner and empirically helps entrepreneurs and advisors choose the best approach (effectuation vs causation) with spending less time, energy, and resources.

Attention to the ability of entrepreneurs to show good performance in different ventures in different situations partially addresses the gap Wiklund et al. (2011) accentuate. They believe that

measuring the performance of entrepreneurial firms, which is a pervasive method in the strategy literature, is insufficient and cannot capture entrepreneurs' performance in a long timeframe. The perspective that our research proposes can start a new dialogue about the way researchers measure the performance of entrepreneurs (not the firms). This means that we call some entrepreneurs successful not because they could fulfill effectual processes to develop a disruptive product or causal processes to develop a product with incremental improvement in only one firm, but because successful entrepreneurs can recognize what different situations demand, show flexibility to switch between different processes, and capitalize on their capabilities to fulfill the process that looks promising.

The importance of the mentioned questions stands out clearly when we pay attention to differences among entrepreneurs and different drivers of effectual and causal processes. There are some individual factors that have been known as antecedents of effectuation. The mentioned factors include experience (Dew et al., 2009), personal creativity (Engel et al., 2013), passion (Stroe et al., 2018), and optimism (Zhang et al., 2019). Also, some other factors such as education have been introduced as drivers of causation (Johansson & McKelvie, 2012). Because entrepreneurs are clearly different from each other according to the mentioned factors and psychological characteristics (Baron, 2000; Miner, 1997), the mentioned questions are worth scrutinizing.

To investigate if most entrepreneurs recognize when effectual or causal approaches are better for venture performance and if they can fulfill them, we utilize a strand of contingency theory that focuses on the "fit" between organizational needs and organizational actions (e.g. the study of Lungeanu and Zajac, 2016). We also address what characteristics (at the individual and team level) help entrepreneurs take action and carry out the mentioned tasks. To that end, in the second essay, I test the relationship between openness to change, optimism, ambition, and team size as

independent variables (IVs) and the ventures' capability of choosing and fulfilling the best approach for venture performance as the dependent variable. The four mentioned characteristics (IVs) are associated with the capability of entrepreneurs to analyze the situation, comprehend what approach looks promising, show the dynamic capability to change some processes to keep up with the existing situation, undertake a better approach and endure its difficulties.

Therefore, the contributions of the second essay are threefold:

- Attention to product/service disruptiveness and its impact on ventures' performance. The first contribution of this adds to the literature on the relationship between effectuation or causation and performance by introducing a new variable (product/service disruptiveness) that changes the magnitude of the mentioned relationship.
- Using the situational perspective to see if entrepreneurs are capable of tailoring their approaches to the level of product/service disruptiveness. Investigating the mentioned capability addresses the different views between Arend et al. (2015) and Sarasvathy (2001) regarding the entrepreneurs' ability to execute different approaches in different situations.
- Studying characteristics that help entrepreneurs find and fulfill the best approach in different situations. Instead of addressing antecedents of effectuation and causation per se, I investigate the factors that help entrepreneurs recognize the approach that situation demands and follow the approaches (effectuation vs causation) that are associated with better performance.

Chapter 4 (the third essay) compares and contrasts entrepreneurial responses to resource scarcity from a new perspective. Although the literature on bricolage, effectuation, and bootstrapping has been developed separately, some studies have tried to synthesize the three mentioned approaches to create a better understanding of what entrepreneurs do in uncertain and resource-constrained

situations to grow their businesses. The extant literature so far has focused on similarities among different entrepreneurial approaches and the way they complement each other to grow ventures (e.g. Archer et al., 2009), how extensively they are used in general (e.g. Fisher, 2012), what the impact of using them will be on new ventures' performance (An et al., 2019), and mechanisms explaining individuals' behaviors in incidents outside the business sector such as a natural disaster (Nelson & Lima, 2020). However, there is still a lack of knowledge about the factors that make entrepreneurs prioritize some approaches over others.

In the third essay, I suggest that the hardship in finding the circumstances under which entrepreneurs prioritize some actions over others to overcome resource scarcity is due to the fact that, so far, researchers have not distinguished between entrepreneurial approaches and entrepreneurial actions and have tried to measure approaches to assess entrepreneurs' responses to resource scarcity. The third essay has three key aims. First, I explain why measuring entrepreneurial approaches for the mentioned purpose is insufficient. Second, I introduce four innovative courses of action that entrepreneurs can undertake to respond to resource scarcity. Third, I identify process-related, organizational, environmental, and individual factors that make entrepreneurs prioritize some innovative courses of action over other(s) to overcome resource scarcity. The third essay introduces a new approach to compare and contrast entrepreneurial responses to resource scarcity to overcome limitations in prior studies:

- the considerable amount of overlap among approaches
- unclear boundaries between what entrepreneurs do and how they do it
- different antecedents of the approaches
- the multidimensional nature of the approaches

To address the mentioned limitations, the third essay makes two major contributions to the literature. First, I introduce four distinct, single-dimensional, and easily measurable innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively) that entrepreneurs undertake to overcome resource scarcity. Each course of action can be explained by one or more approaches, but the four, in total, delineate innovative responses to resource scarcity whilst overcoming the mentioned limitations. Second, I elaborate on different factors that affect the decision of entrepreneurs to prioritize some courses of action over others.

CHAPTER 2

Assessing the impact of perceived disruptiveness of the business idea, entrepreneurs' motivation, and their ambiguity tolerance on undertaking effectual processes

2.1. Introduction

The entrepreneurship literature in the 1990s was dominated by rational decision-making models developed by neoclassical economists (Perry et al., 2012) who assume that individuals show rational goal-driven behaviors when they start entrepreneurial activities (i.e. Chandler & Jansen, 1992; Drucker; 1998). In contrast, new lenses in entrepreneurship research, such as effectuation (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005), questioned the universality of the mentioned assumption.

According to traditional theories of entrepreneurship, to exploit an opportunity, entrepreneurs follow causation, i.e. they take planned procedures to accumulate resources, produce and market products or services, build organizations, and respond to government and society (Gartner, 1985). In contrast, the effectual logic (Sarasvathy, 2001) claims that, under conditions of uncertainty, entrepreneurs focus primarily on the resources they have at hand, pay less attention to market needs in uncovering an opportunity, go beyond pre-existing knowledge, ignore long-term returns, and focus primarily on what they are willing to lose in making decisions about whether to pursue an opportunity or not. While causation processes (actions that traditional theories of entrepreneurship introduce) take a particular outcome as given and focus on selecting among means to create that outcome, effectual processes take a set of means as given and focus on selecting among possible outcomes that can be created with that set of means.

As mentioned in chapter 1, although in the last two decades effectual logic has become one of the central theoretical frameworks in research about entrepreneurial processes (Chandler et al., 2011; Grégoire & Cherchem, 2020), there are still gaps in the way it contributes to our understanding of entrepreneurial actions (Arend et al., 2015; Reymen et al., 2015), because the theory remains undeveloped (Arend et al., 2015; Welter & Kim, 2018) and there is insufficient empirical testing and critical analysis (Perry et al., 2012). As Perry et al. (2012) convey, it may take more than a decade for a theory to go beyond its infancy stage and noticeably influence researchers' understanding of managerial phenomena. Effectuation fits the pattern in this regard so that many theoretical and empirical aspects of it have remained underdeveloped (Grégoire & Cherchem, 2020; Perry et al., 2012). While some researchers consider the effectual logic to be a theory (i.e. Matalamäki, 2017), there are still scholars who seriously question the notion that the effectuation perspective qualifies as a comprehensive theory (Arend et al., 2015) and view it just as a particular mode of entrepreneurial action. This research intends to contribute to filling some of the mentioned gaps by discussing and empirically testing some key antecedents of effectuation that have not been addressed so far.

Previous studies have introduced antecedents of effectual processes at industry, organizational, and individual levels. Uncertainty (Welter & Kim, 2018) and resource scarcity (Reymen et al., 2017) at the industry level, entrepreneurial orientation (Johansson & McKelvie, 2012), organizational desire to show better performance (Reymen et al., 2015), high reputational capital (Johansson & McKelvie, 2012), and being at an early stage (Reymen et al., 2015) at the organizational level, and experience (Harms & Schiele, 2012), personal creativity (Engel et al., 2013), self-efficacy (Hinz, 2017), harmonious passion and values of risk perception (Stroe et al.,

2018), and optimism (Zhang et al., 2019) at the individual level have been known as the main antecedents of effectuation.

Although the mentioned studies, directly or indirectly, have introduced antecedents of effectuation, there is still a meaningful gap in the literature with regard to what makes entrepreneurs effectuate. In the most recent review of effectuation literature, Grégoire & Cherchem (2020: 621) state that "effectuation research continues to face a series of theoretical and methodological challenges" and suggest strong and convincing theoretical explanations for why a particular antecedent variable mobilizes effectuation. We believe one of the reasons that make research about the antecedents of effectuation fragmented is that prior studies (i.e. Harms & Schiele, 2012; Johansson & McKelvie, 2012) considered factors that lead to using more effectuation at different levels but ignored the type of entrepreneurs who should fulfill effectual/causal processes. To partially fill the mentioned gap and to make a meaningful link among antecedents, in this research, we try to test if the characteristics that make an entrepreneur an "innovator" (Chanana & More, 2020) prompt her/him to use more effectuation.

The way Chanana & More (2020) differentiate innovators (who have an internal desire to come up with something new) from other types of entrepreneurs including imitators (people who copy others' business ideas), hustlers (ones who start with a small business and gradually grow it), researchers (who analyze the idea a lot before starting it), and buyers (people who have a lot of money and often acquire businesses) is well-matched with what Steve Jobs (2005) advises fresh alumni of Stanford University. He suggested that to be "adventurous", people should stay "hungry" and stay "foolish". Accordingly, in this research, we scrutinize if higher levels of disruptiveness in products/services (being adventurous to come up with something new), more autonomous type

of motivation (being hungry and internally motivated), and a higher tolerance for ambiguity (being foolish and not an analytical risk-taker) lead to use ore effectuation.

This research not only accentuates the necessity of the link among different antecedents of effectuation but also contributes to our understanding of factors that lead to using more effectuation by introducing three new antecedents:

First, we propose that entrepreneurs may use different levels of effectuation depending on their perception of the degree of disruptiveness of their products and services. The impact of the level of disruptiveness of products/services on entrepreneurial processes is worth scrutinizing because customers witness more revolutionary products and new markets than ever (Patwa et al., 2021). Even in the seminal theoretical paper, effectuation theory was developed under the assumption that businesses are becoming more entrepreneurial and free-market-oriented (Sarasvathy, 2001). On the supply side, new markets are recently emerging more rapidly (Innosight, 2016) and on the demand side, the speed at which the population absorbs new technologies and products is higher than ever (Bygrave and Zacharakis, 2016). Accordingly, the first research question is: How is disruptiveness of the product/service associated with the use of effectuation?

Second, we address the impact of different types of motivation on using effectuation, in response to Reymen et al.'s (2015) call based on their belief that the next stage of theory development in effectuation research should be devoted to building a better understanding of the motivations behind effectuation. Perry et al. (2012) stress that "a business launch may never occur, or several business launches may occur that result from the entrepreneur's generalized aspiration. As such, to understand the effectuation phenomenon, it would be necessary to study entrepreneurs rather than firms. p.851" Accordingly, our second research question is: What type of motivation is associated with a greater likelihood of undertaking effectual processes? We address this research

question by using self-determination theory to understand if autonomous motivation (formed by the combination of intrinsic, integrated, and identified types of motivations) plays a more important role in undertaking effectuation than controlled motivation (formed by the combination of introjected and external types of motivation). DeTienne & Chandler (2010) convey that much of the literature on entrepreneurship and economics relies on the extrinsic type of motivation. To provide a more insightful argument, in this research, first, we differentiate among different types of extrinsic motivation (external, introjected, identified, and integrated) and second we use the typology that Moran et al. (2012) suggest (autonomous vs controlled) to shed more light on how the entrepreneurial actions are influenced by different types of motivation.

Third, we add to the literature by focusing on a psychological characteristic that makes it possible for entrepreneurs to endure effectual processes. Although Sarasvathy (2001) assumes that all entrepreneurs "can" but few "do" fulfill effectual processes, Arend et al. (2015) believe few entrepreneurs "can" effectuate. The question of which entrepreneurs "can" effectuate has been partially addressed in the extant literature, which has addressed the abilities of entrepreneurs with high levels of experience (Harms & Schiele, 2012), personal creativity (Engel et al., 2013), and self-efficacy (Hinz, 2017). In this research, we focus on the impact of ambiguity tolerance on undertaking effectual processes and study if entrepreneurs that are more tolerant of ambiguity "can" perform effectuation more than those who are less tolerant. A high level of ambiguity intertwined with effectual processes was illustrated by Sarasvathy (2001) in the seminal paper and mentioned as an inseparable part of effectuation in later studies (i.e. Brettel et al., 2012; Liu, 2019; Liu & Isaak, 2016). Therefore, as the third research question, we ask: Do entrepreneurs with higher levels of ambiguity tolerance effectuate more than other entrepreneurs?

Addressing the three mentioned antecedents of effectuation not only partially fills the gap regarding the necessity of research about variables that mobilize effectuation (Grégoire & Cherchem, 2020) and makes meaningful links among the antecedents of effectuation (Harms & Schiele, 2012; Johansson & McKelvie) but also addresses variables that violate economists' assumptions about the rational actions of entrepreneurs. We deliberately chose the variables with the mentioned characteristics because, as three independent variables, they should explain a dependent variable (effectuation) that violates assumptions held by economists. Sarasvathy (2001) addresses the mentioned violation even in the title and abstract of her paper and introduces effectuation as an approach that cannot be explained by the theories of economics. Shane & Venkataraman (2000) provide similar reasoning and question the mindsets that view entrepreneurs as individuals who try to maximize the performance advantage. They call these mindsets and assumptions insufficient measures that cannot explain and predict the behavior of entrepreneurs to discover and exploit opportunities.

This study also makes an empirical contribution to effectuation literature. Perry et al. (2012) find the lack of empirical studies about effectuation to be surprising. Other scholars believe that many aspects of effectuation theory, such as the consequences of effectuation in different contexts (Cai et al., 2017), have remained untested. To date, there is limited research about effectuation using common methods of quantitative analysis (Welter & Kim, 2018). Arend et al. (2015) believe that effectuation theory is difficult to test through the usual methods. Perry et al. (2012) suggest moving toward collecting data through questionnaires (as we did in this research). Another contribution of this research is considering multi-level factors as antecedents of effectuation as the related literature lacks this perspective (Johansson & McKelvie, 2012; Reuber et al., 2016). In this research, we study two antecedents at the individual level (motivation and ambiguity tolerance)

and one at the firm level (product/service disruptiveness). Finally, sampling from two different populations and comparing the results may make the findings more insightful and generalizable (Delmar & Wiklund, 2008; Farmer et al., 2011) insofar as our two samples are statistically different in terms of three key variables studied in this research (the level of product/service disruptiveness, autonomous motivation, and using effectuation).

In the remainder of this chapter, we introduce the underlying concepts of effectuation and review the literature about the antecedents of effectuation. Then we formulate hypotheses. After that, we illustrate the method we used to empirically test the hypotheses and show the results. Finally, we discuss how the results may improve our understanding of the antecedents of effectuation, indicate the limitations of the study, and provide some suggestions for future research.

2.2. Theoretical background and the literature gap

According to the seminal theoretical paper on effectuation developed by Sarasvathy (2001), entrepreneurs desire to control the future and make their businesses successful but they differ in the way they fulfill the mentioned desire. Whereas some entrepreneurs attempt to predict the future to control it (causation mindset), others take another route and embrace contingencies to control the future (effectuation mindset). While in causal processes entrepreneurs take a particular outcome as given and try to select among means to create that outcome, in the effectual processes, entrepreneurs evaluate what they access as means and focus on selecting among possible outcomes that sound desirable and attainable.

In contrast to neoclassical economists who introduce entrepreneurial actions based on rational decision-making models and through a purposeful search process (i.e. Chandler & Jansen, 1992; Drucker, 1998), Sarasvathy (2001) introduces effectuation based on four principles. According to effectuation logic, (1) entrepreneurs embrace contingencies rather than focusing on pre-established

knowledge, (2) involve more potential stakeholders in the business rather than attempt to compete with potential competitors, (3) think about what they are willing to lose instead of carrying out profit analysis, and (4) control an unpredictable future rather than predicting an uncertain one. In contrast to effectuation, causation is consistent with planned strategy approaches by which entrepreneurs perform market analysis, try to forecast future trends, set clear goals, and rely on the knowledge they have gained to achieve the mentioned goals.

Research about effectuation has received noticeable scholarly attention from its inception (2001) until now (Alsos and Clausen 2014; Grégoire & Cherchem, 2020). Furthermore, research centered on effectuation has extended beyond entrepreneurship circles and has been used in the literature on networks (Kerr & Coviello, 2020), innovation (Berends et al., 2014), marketing (Chetty et al., 2015), and internationalization (Karami et al., 2019). Within the entrepreneurship field, theoretical debates have been heated in recent years (i.e. Arend et al., 2015; Karri & Goel, 2008; Reuber et al., 2016) and empirical studies have addressed different aspects of effectuation logic.

Empirical aspects of prior work include the antecedents of effectuation (i.e. Harms & Schiele, 2012; Johansson & McKelvie, 2012), the relationship between effectuation and performance (i.e. Cai et al., 2017; Futterer et al. 2018), the relationship between innovation and effectuation (i.e. Heikkilä & Heikkilä, 2017), and the interplay of effectual and causal processes (i.e. Reymen et al., 2017).

Given the focus of this study, below we address factors that have been known as being antecedents of effectuation at industrial, organizational, and individual levels.

Prior research has highlighted uncertainty as the main antecedent of effectuation at the industry level. Sarasvathy (2001) introduces her theory as aiming at explaining entrepreneurial phenomena

under uncertainty although Harms & Schiele (2012) find that uncertainty does not have a systematic influence on undertaking effectuation processes. Second, Stroe et al. (2018) Convey that the high environmental risk perceived by entrepreneurs makes them use effectuation more because the mentioned perception lowers the entrepreneur's perceived ability to control the outcomes of their behavior, to hit the fixed goals, and to follow plans. Therefore, according to the literature, entrepreneurs use more effectuation either they cannot clearly evaluate the chance of success (in uncertain environments) or if they identify that the probability of success is not high enough (in risky environments). According to the extant literature, at the industry level, the third antecedent that is associated with effectual behavior is the scarcity of resources. Reymen et al. (2017) investigate the decision-making logic used by new entrepreneurs to develop their business models and find that, when there is a shortage of resources, entrepreneurs are more likely to follow effectual logic. Also, Reymen et al. (2015) find that while ventures widen their scope of action, they will lack resources and take more effectuation.

At the organizational level, Johansson & McKelvie (2012) find that an entrepreneurial culture that fosters creativity and openness breeds ground for effectual logic. Second, Nguyen et al. (2018) find that portfolio governance mechanisms and portfolio monitoring have negative effects on undertaking effectuation. Another organizational-level antecedent of effectuation is an organizational desire to achieve better performance. Reymen et al. (2015) find that higher stakeholders' dissatisfaction and pressure on the management team lead to taking a higher level of effectuation. Further, Johansson & McKelvie (2012) indicate that businesses with greater reputational capital tend to use effectual logic more because those businesses are able to form relationships more easily and gain essential expertise from their organizational ties. Finally, the lifecycle stage is another antecedent in that ventures at early stages use effectuation more and then

gradually move towards causation as they grow. Reymen et al. (2015) show how narrowing the scope of activities of ventures after the growth stage leads to a decrease in using effectuation and to an increase in using causation.

At the individual level, the most important antecedent which has been assumed to have a positive association with effectuation is the experience of entrepreneurs. Harms & Schiele (2012) take a sample of 65 gazelles and find that experienced entrepreneurs tend to follow effectuation more than causation. Dew et al. (2009) ask 27 expert entrepreneurs and 37 MBA students to think aloud while solving typical decision-making problems in creating a new venture. They find that entrepreneurial experts frame decisions using an effectual logic while novices use a predictive frame and tend to "go by the textbook." The impact of experience gained by founding prior ventures on the use of effectuation is endorsed by the empirical study of Johansson & McKelvie (2012) as well.

Second, Engel et al. (2013) introduce personal creativity as another determinant of effectuation. A third factor, at the individual level, is the high self-efficacy of entrepreneurs that helps them manage the ambiguity of effectual processes. Hinz (2017) introduces the self-efficacy of entrepreneurs derived from their "performance accomplishments", "vicarious experience", and "means and entrepreneurial experience" as an antecedent of effectuation. Stroe et al. (2018) believe that entrepreneurial self-efficacy leads to heuristic thinking and self-belief in being able to change the environment and provide disruptive products. The positive relationship between self-efficacy and effectuation is stressed in the study of Zhang et al. (2019) as well. Fourth, Stroe et al. (2018) believe that harmoniously passionate entrepreneurs who partake in an activity that they adore and feel pleased with are more flexible and able to embrace contingencies and work with different partners, making them more likely to use effectuation than others.

Another antecedent at the individual level has been suggested by Zhang et al. (2019). They show that high levels of optimism in entrepreneurs make them use effectuation more often because they are more susceptible to using heuristic thinking and less able to estimate the limits of their knowledge. Also, Zhang et al. (2019) introduce high levels of perspective-taking (the capability to think in more complex, abstract, and paradoxical ways leading to the ability to empathize with others who hold conflicting views) as another characteristic making entrepreneurs use more effectual logic. They believe entrepreneurs with high levels of perspective can accept the higher levels of unpredictability and uncertainty of effectual processes.

In sum, several studies have introduced antecedents of effectual processes, directly or indirectly, but there is still a meaningful gap in the literature in this regard (Grégoire & Cherchem, 2020). As explained before, we try to partially fill this gap by introducing and testing three new antecedents. The meaningful link among the three mentioned antecedents can be inspired by future studies to fix the fragmented literature (Harms & Schiele, 2012; Johansson & McKelvie, 2012). As discussed earlier, we deliberately chose the variables that violate economists' assumptions about the rational actions of entrepreneurs. The three independent variables are meant to explain a dependent variable (effectuation) that also violates the assumptions held by economists (Sarasvathy, 2001).

2.3. Hypotheses

2.3.1. Product/service disruptiveness

In this section, first, we address the importance of ventures that offer disruptive products/services by shaping new markets or disrupting existing ones. Then we elaborate on the relationship between the disruptiveness of products/services and using effectuation.

Sarasvathy (2001) bases her theory on the fact that businesses are becoming more entrepreneurial and free-market oriented. This fact was illustrated in a report developed by Innosight (2016) which

focuses on Fortune 500 companies after 1965 and identifies trends showing that in recent decades businesses are changing their practices and products rapidly, new markets are emerging quickly, and products are becoming obsolete faster than any time. According to the mentioned report, the 33-year average tenure of the 500 largest companies listed on stock exchanges in the United States in 1965 decreased to 20 years in 1990 and will be 14 years by 2026. Also, according to this report, there is less stability in businesses' positions in markets and most corporate leaders are less in control of their firm's future because start-ups with multi-billion-dollar valuations emerge and grow more rapidly. The numerical analysis in the report not only shows the importance of new entrepreneurial ventures but also highlights the necessity of discussing the processes entrepreneurs take to step beyond strategizing to grow, face day-to-day challenges, and embrace contingencies.

On the demand side, as Bygrave and Zacharakis (2016) report, the speed at which the population absorbs new technologies and products is not comparable to that in the past. While it took 46 years for 25% of the US population to use household electricity in 1873, 26 years to use the automobile in 1925, and 13 years to use mobile phones in 1983, it just took 5 years for 25% of the US population to use the world wide web. Because of the abovementioned trends in both the supply side and the demand side, the processes entrepreneurial ventures take to develop revolutionary products/services are worth scrutinizing in greater depth.

Sarasvathy (2001) starts her argument about effectuation by challenging the universal assumption that entrepreneurs face available markets and that all they need is to enter those markets and grab a share for themselves. Instead, she stresses that "Instead of defining a market as the universe of all possible customers as Kotler defines it, an effectuator would define his or her market as a community of people willing and able to commit enough resources and talents to sustain the particular enterprise. p.252" Sarasvathy (2001) intertwines shaping new markets with effectual

processes and undermines the possibility of "prediction" by asking some questions such as "How do we make the pricing decision when the firm does not yet exist? P.244" Also, she provides some examples of businesses with disruptive products such as Xerox PARC and says that "these endeavors that opened up new markets and industries plugged into and exploited social and technological contingencies that could not have been anticipated or planned for. P.260"

The juxtaposition of providing disruptive products with effectual processes has also been stressed in more recent studies. Sarasvathy & Dew (2008) say "effectuation is about the formation of new ventures and new markets." Johansson & McKelvie (2012) stress that in transitional economies, unlike in stable economies, entrepreneurs face higher environmental uncertainty and shift from the planning mindset which necessitates causal processes to the market-oriented mindset which necessitates effectual processes. Therefore, first, knowing that effectual processes were identified by studying the behavior of entrepreneurs who mostly were trying to come up with disruptive business ideas and second, the attention to the new trend of business practices and consumer behaviors that bring about more disruptions in markets made us scrutinize the relationship between the product/service disruptiveness and undertaking effectuation.

The idea of shifting from effectual processes to causal ones (Sarasvathy & Dew, 2005b) while a new market grows and becomes stable is in line with the three-step entrepreneurial processes that Santos & Eisenhardt (2009) introduce. According to them, in the first stage (claiming the market), entrepreneurs face an ambiguous environment with unclear customers. At this stage, the value chain is not completely established and the product attributes are not well-defined. Sarasvathy (2001) delineates how entrepreneurs establish and promote the identity of their ventures (Santos & Eisenhardt, 2009) by creating an effectual network. After hitting the mentioned target and establishing the ventures' identity, in the second stage, entrepreneurs demark the market and

present themselves more clearly. Santos & Eisenhardt (2009) say that, even in the second stage, entrepreneurs try to avoid competition with powerful firms in related industries, and instead they follow an alliance mechanism which was introduced as pre-commitment by Sarasvathy (2001). In the third stage (controlling the market), entrepreneurs deal with rivals and try to sustain their dominance in the market. The shift from focusing on alliance mechanisms to focusing on competition is explained by Sarasvathy & Dew (2005a: 548) as follows: "As the effectual network grows over time, and includes more and more of the external world, it tends to become less effectual as it eventually coalesces into an empirically distinct new market." Therefore, what entrepreneurs do to disrupt markets (explained by Santos & Eisenhardt, 2009) can be explained by the effectuation mindset to stress why and how entrepreneurs do it.

Schivardi & Schneider (2008) point out that existing incumbents or new entrants may introduce disruptive products in existing markets through a process of experimentation to make their new product work and make existing competitors adopt the new product. Furthermore, as Sabatier et al. (2012) discuss, disrupting the norms of markets necessitates a major change in cooperation with existing suppliers and finding new allies. They show that when entrants' business models fit into the industry's established dominant norm, the value chains do not change noticeably, but when disruptive business models emerge, established value chains change dramatically. Accordingly, the need for finding new allies pushes businesses back toward the demarcation stage (Santos & Eisenhardt, 2009) in which they avoid competition until they can control the market again (the third stage).

If the disruptive product/service is brought by new entrants, not only do they need to build the value chain from scratch (Hansen & Birkinshaw, 2007) and follow effectual processes that incumbents need to take while they disrupt the market, newcomers need to build trust (Ali &

Birley,1998), overcome smallness and newness (Carayannopoulos, 2009), and take on experimentation more than existing firms (Kerr et al., 2014). Therefore, new entrants need to focus even more on effectuation to deal with uncertainties that they face at higher levels.

What makes entrepreneurs choose the extent to which they use effectuation, bricolage, bootstrapping, and other entrepreneurial processes, is the way they perceive phenomena (Karadakal et al., 2015) rather than the objective nature of them. Individual perceptions are affected by both personal characteristics (Hoffman et al., 2015) and external stimuli (Berlyne, 1951). Putting the characteristics of entrepreneurs aside, the process they take to scan the market and assess how much their product/service disrupts the market gives them an initial perception of the degree of disruptiveness of their product/service (Guttentag & Smith, 2017). The mentioned perception is modified by receiving feedback from early customers (Reinhardt & Gurtner, 2015), the modification that may change entrepreneurial processes. Therefore, rather than the objective effect of the product/service on customers' acceptance, entrepreneurs' perception about it plays the most important role in undertaking different processes, therefore:

H1: *Higher perceived disruptiveness of the product/service that entrepreneurs develop is associated with using effectuation more than lower perceived disruptiveness of the product/service that entrepreneurs develop.*

2.3.2. The motivation of entrepreneurs

There is consensus in the entrepreneurship literature that entrepreneurs are not a homogenous group (Lafuente & Salas, 1989; Müller & Gappisch, 2005; Webster, 1977). One aspect that differentiates entrepreneurs is the type of motivation triggering them to start a new business (Antonioli et al., 2016; Arshad & Farooq, 2019; Smith, 1967). As Moran et al. (2012) and Sansone & Harackiewicz (2000) define, there are two primary types of motivation that can guide

individuals' behavior: intrinsic motivation due to an inherent inclination or interest of individuals and extrinsic motivation by which individuals seek reward or consequence separable from an activity itself. Also, extrinsic motivation encompasses different types of motivation including integrated (if the person internalized the reasons for doing the activity), identified (if the person sees value in the activity), introjected (to avoid guilt or anxiety), and external (to gain reward or praise). Moran et al. (2012) introduce the mentioned category and convey that from the integrated type of motivation to the external type, by the order they were brought here, the degree of motivation autonomy decreases and the degree of control increases. In this research, unlike prior studies (i.e. DeTienne & Chandler, 2010) we do not focus on intrinsic vs extrinsic types of motivation, and instead, take the typology that Moran et al. (2012) suggest and divide entrepreneurs' motivation into two categories: autonomous (intrinsic, integrated, identified) vs controlled (introjected and external). In the following paragraphs, we explain how the mentioned typology creates a new understanding of factors that trigger different courses of entrepreneurial action.

The interplay of the motivation of entrepreneurs with the course of action they take has been discussed in effectuation literature. Sarasvathy (2001) differentiates between "aspiration", which is the real propellant of entrepreneurial action, and "goals" that are created through the journeys entrepreneurs take. As Farmer et al. (2011) define "aspirations concern longings, aims, or ambitions. They refer to something desired that is not currently possessed. How we want to see ourselves and who we would like to have a great deal to do with how we will act. P.245" Goals are affected by not only entrepreneurs' aspiration but also by the network of people and organizations that cooperates with entrepreneurs, potential customers who give continuous feedback to founders, and external contingencies (Harms & Schiele, 2012; Perry et al., 2012).

Sarasvathy (2001, p. 244) stresses "if we knew precisely what type of firm we wished to create, we could use existing theories and principles to create the firm. But usually, all the entrepreneur knows when he or she starts out is something very general, such as the desire to make lots of money or to create a valuable legacy like a lasting institution, or, more common, to simply pursue an interesting idea that seems worth pursuing."

The difference between aspirations and goals is accentuated in the research of Engel et al (2013). They propose that entrepreneurs with high levels of financial aspiration and low levels of career goals who are labeled "creators" effectuate more than others as they manipulate their goals more easily to satisfy their aspirations. In our research, we address the "aspiration" of entrepreneurs when we use the term "motivation". We use the latter term firstly because "motivation" has been used to express the original desire of individuals to take action in self-determination theory (Deci & Ryan, 2012). Secondly, many entrepreneurship scholars use the term "motivation" (i.e. Estay et al., 2013; Johnson, 1990;) when they refer to the original desire of entrepreneurs which makes them take action.

Prior research has considered motivation as an antecedent of effectuation without distinguishing different types of motivation. Prior studies (e.g. Allison et al., 2015; Antonioli et al., 2016) have considered all types of extrinsic motivation as one construct. In this study, we draw on Self-Determination Theory to distinguish among different types of motivation and differentiate between the controlled and autonomous motivation of entrepreneurs (Gagné & Deci, 2005). Before elaborating on the relationship between the type of motivation and effectuation, we briefly introduce Self-Determination Theory.

Self-determination theory (Deci & Ryan, 2012; Gagné & Deci, 2005) explains the process through which the motivation of individuals develops and the mechanism with which human behavior and

wellbeing are influenced. According to Self-determination theory, three fundamental needs should be fulfilled after each action: the need for autonomy, the need for competence, and the need for relatedness (Niemiec & Ryan, 2009). Autonomy is perceived when individuals experience a sense of willingness in their actions. While interacting with the world, if individuals feel they are effective, they perceive competence. Finally, the sense of relatedness is satisfied when people cooperate with significant others. Although the first desire (need for autonomy) has been well discussed in the entrepreneurship literature (Baluku et al., 2019; Clark, 2001; Matlay & van Gelderen, 2010), other aspects of entrepreneurs' desire and their relationship with the course of entrepreneurial action have received less attention.

Based on individuals' fundamental needs, different types of motivation (external, introjected, identified, integrated, and intrinsic) are described in research deriving from self-determination theory (da Motta Veiga & Gabriel, 2016; Moran et al., 2012). Although the general definition of extrinsic motivation (the desire to be rewarded by consequences of activity) and intrinsic motivation (an internal inclination of actors) has been well addressed by the existing literature (DeTienne & Chandler, 2010), different types of extrinsic motivation which were defined before have been neglected.

As Gagné & Deci (2005) discuss, the degree of autonomy in motivation is defined according to a sense of volition and experiencing choice. When entrepreneurs pursue an opportunity because they find it interesting, they are doing the activity wholly volitionally. On the other hand, being controlled includes acting with a sense of pressure, a sense of having to engage in the actions. In the following paragraphs, we elaborate on how more autonomous types of motivation (intrinsic, integrated, and identified) highly lead to using effectuation while controlled types (introjected and external) play a less significant role.

Firstly, whether entrepreneurs focus more on what they can lose instead of the amount of profit they can make (the affordable loss aspect) is directly related to the motivation of entrepreneurs. While some entrepreneurship research states that entrepreneurs take action only if the expected present value of the projected profit outweighs the gain from being an employee (Campbell, 1992) and define an entrepreneurial opportunity based on that (Shane & Venkataraman, 2000), Sarasvathy (2001) says that, through effectuation, entrepreneurs prefer "options that create more options in the future over those that maximize returns in the present." Accordingly, entrepreneurs cannot pay attention to the affordable loss instead of gaining the best return if they predominantly focus on satisfying the controlled types of motivation and on maximizing profit in the short run.

Second, more autonomous types of motivation can be expected to make entrepreneurs engage in effectual processes more passionately. Passion is defined as a "hot" feeling or, "the fire of desire" (Cardon et al., 2009) and is known to be the propellant of entrepreneurial action (Thorgren et al., 2014; Thorgren & Wincent, 2015). Although passion, in general, helps entrepreneurs grow their ventures more successfully (Altaf et al., 2019), a harmonious type of passion which is associated with pleasure from doing an activity (therefore it is rooted in autonomous motivation rather than controlled motivation) stimulates effectuation more effectively (Stroe et al., 2018). Harmonious passion brings pleasure from the action itself and not because of external or internal pressures (Lafrenière et all., 2011), and keeps entrepreneurs flexible in their goal pursuit (Vallerand, 2008) and more tolerant to new experimentations (Hodgins & Knee, 2002).

Third, we expect entrepreneurs with more autonomous motivation to show more endurance when contingencies arise and their pre-existing knowledge does not work out, while entrepreneurs with more controlled motivation consider other options more analytically (Shane & Venkataraman, 2000). Effectual processes are generally taken when there is a high amount of uncertainty (Laine

& Galkina, 2017; Welter & Kim, 2018). This requires entrepreneurs to tolerate a high level of ambiguity (Arend et al., 2015; Brettel et al., 2012). Having external motivation may make entrepreneurs maintain their activities related to their ventures by manipulating goals to satisfy their aspirations (Engel et al., 2013), however, they can also choose from other possibilities and options that are less ambiguous and uncertain (Westhead et al., 2003). In the latter case, entrepreneurs with high levels of controlled motivation may quit or spend more time on other entrepreneurial activities in their portfolio instead of paying costs by experimenting with new ways (Fairlie & Holleran, 2012) and embracing contingencies.

Fourth, we expect entrepreneurs with more autonomous motivation to care more about building their personal identity by undertaking effectual processes. As Moran et al. (2012) write, individuals with high levels of integrated motivation believe that their work goals and personal goals are integrated, their work is a big part of who they are, and their work helps them define themselves. Sarasvathy (2001) conveys that effectuation starts with the "who am I?" question and says while causation processes are effect-dependent, effectuation processes are actor-dependent. Accordingly, effectual processes are shaped and taken by entrepreneurs who pursue their personal values and entrepreneurial value at the same time so that they leave a piece of themselves in their ventures. The process of personal identity creation while effectuating is elaborated by Nielsen & Lassen (2012). They believe that personal identity construction is a main part of the effectual process.

Fifth, as Cameron & Pierce (1994) explain, intrinsically motivated behaviors result in flexibility and spontaneity. Di Domenico & Ryan (2017) endorse this notion and say that, when people experience more interest, they exhibit more spontaneous engagement with activities. On the other hand, Pattinson et al. (2020), metaphorically illuminate effectuation processes as spontaneous

phenomena, like the performance of the Argentine Tango! They believe that as the choreography does not precede the dance, similarly, in the entrepreneurship world, the opportunity is embedded in the spontaneous actions of effectuators. Galkina et al. (2017) similarly define effectual networking as a spontaneous and unintended partnership. Therefore, intrinsically motivated entrepreneurs tend to show more spontaneous behaviors and effectuate more.

Due to the mentioned five reasons, we propose that:

H2: *With regard to the main entrepreneur, while having stronger autonomous types of motivation (intrinsic, integrated, and identified motivation) is associated with using effectuation, controlled types of motivation (external and introjected motivation) have no significant effect on using effectuation.*

2.3.3. Ambiguity tolerance

The literature suggests that there are three reasons why having higher ambiguity tolerance enables entrepreneurs to use effectuation. First, entrepreneurs prioritize effectuation over causation when they face ambiguity because causal processes look inefficient and sometimes impossible (i.e. developing a vivid vision when the environment is unpredictable), second, taking effectual processes alleviates the degree of ambiguity, and third entrepreneurs have different thresholds for tolerating ambiguity (Teoh & Foo, 1997). In the following paragraphs, we elaborate on these three arguments.

Sarasvathy (2001) explains the difference between risk and uncertainty. According to her, if we are able to precisely calculate the probability of winning in a game/action we take a risk; otherwise, if we play the game or take an action in an uncertain situation, we tolerate ambiguity. Sarasvathy (2001: 252) continues by explaining how ambiguity that is present in uncertain conditions makes

entrepreneurs effectuate: “If the decision-makers believe they are dealing with a measurable or relatively predictable future, they will tend to do some systematic information gathering and invest some effort on a reasonable analysis of that information, within certain bounds. Similarly, if they believe they are dealing with relatively unpredictable phenomena, they will try to gather information through experimental and iterative learning techniques aimed at first discovering the underlying distribution of the future.” Accordingly, the effectual process becomes more likely when ambiguity is perceived. This belief has been endorsed in other studies too. Arend et al. (2015) believe entrepreneurs use effectuation when the context is “ambiguous enough” so that the prediction of the future is impossible in the long run.

Also, the literature supports the belief that entrepreneurs reduce the amount of ambiguity as they go further into the processes of effectuation. Arend et al. (2015) refer to this as an implicit assumption of effectuation, conveying that the experimental learning process and pre-commitment are expected to reduce ambiguity. Also, Bhowmick (2015) calls effectuation “ambiguity-mitigating action”, which can explain why entrepreneurs lean toward a causal course of action when their ventures grow (Johansson & McKelvie, 2012; Sarasvathy, 2001; Reymen et al., 2015; Reymen et al., 2017). This implies that, by undertaking effectuation, entrepreneurs mitigate ambiguity so that the prediction of the future becomes more possible.

Finally, individuals generally prefer risky situations with known probabilities over ambiguous situations with unknown probabilities (Ellsberg, 1961), therefore, tolerating ambiguity of uncertain conditions cannot be taken for granted. Liu & Isaak (2016) believe that entrepreneurs’ logic orientation is critical to their ability to embrace surprise and ambiguity. They stress that this ability varies among entrepreneurs according to their personal differences and their culture. In

general, people have different tolerance for ambiguity (Chapelle & Roberts, 1986; DeRoma et al., 2003; Norton, 1975). Therefore we propose the following:

H3: *With regard to the main entrepreneur, higher levels of ambiguity tolerance are associated with using effectuation more than lower levels of ambiguity tolerance.*

2.4. Research Method

2.4.1. Sample and procedure

This essay is based on two different samples to deliver more generalizable results (following the studies of Delmar & Wiklund, 2008; Farmer et al., 2011). The first sample was made up of more nascent ventures with higher levels of innovativeness, while the second included more mature entrepreneurial businesses with lower levels of innovativeness. This allowed us to sample entrepreneurs who mostly intend to disrupt markets and satisfy their autonomous goals (first sample) in addition to entrepreneurs who comply more with market norms and have more balanced autonomous and controlled motivation (second sample). Insofar as this research studies the effect of the level of disruptiveness of products/services and the types of motivation on using effectuation, by using results from both samples we are able to provide more informative insights. The numerical comparison between the two samples will be provided later in this section.

First, we sampled nascent entrepreneurial ventures that operate in Montreal, Canada, and are connected to one of its main universities. Up until the end of 2019 and before the COVID 19 pandemic, different reports and statistics were showing a noticeable growth in entrepreneurial activities in Montreal with a vibrant, dynamic, and progressive business culture (i.e. Fondation de l'entrepreneurship, 2018) and a growing number of entrepreneurs in its province of Quebec from 2009 to 2018. According to the Financial Post (2019), among the top five entrepreneurial cities, three of them are in Quebec. Also, based on the ranking of Bloomberg Businessweek (2019) our

chosen university is in the top 5 universities in Canada in terms of business programs and attention to entrepreneurial activities. Accordingly, sampling from ventures that operate in Montreal and use services (workshops, courses, and consulting services) to start their businesses provided by the mentioned university seems suitable for the purpose of this study.

We conducted a pilot study by conducting eight interviews with entrepreneurs who were receiving services from the mentioned university. Based on these, it was evident that the majority of ventures in the pilot sample had noticeable levels of disruptiveness in their products/services and used knowledge-oriented processes to operate. Following this, we sent an email containing the link to an online survey to 161 entrepreneurial teams that were using the mentioned services and received 75 usable responses (the response rate was 46.6% in this hand-collected sample). The data gathering process started in October 2109 and ended in March 2020.

The second sample was gathered by Qualtrics, an online survey company. This sample was made up of Canadian entrepreneurs who have started a serious business activity as a founder at least 5 years before the time we collected the data regardless of how successful the business activity turned out. For this second sample, we used the same online questionnaire and the same procedure as for the first sample.

We implemented quality control strategies with the cooperation of the online survey company to make sure that the respondents qualified to participate in the study and the data were reliable. First, we wanted the respondent to acknowledge that they have pursued a business opportunity as the main founder in the last five years and have put considerable time and energy into it, regardless of how successful the business turned out. Second, we ruled out patterned responses and those ones completed in too short of a time. Third, we included two sets of attention questions to make sure the respondents were genuinely thinking about their responses. We asked how many businesses

respondents had started in the past and later we asked how many businesses they had started had also been successful. By comparing the answers, we ruled out responses in which the number of successful businesses was higher than the number of all businesses started. In another case, we omitted records in which the number of active founders was greater than the total number of people involved in the venture. After finishing the project with Qualtrics, we gathered 278 records, kept 200 reliable responses, and ruled out 78 ones.

As shown in table 1, the two samples are statistically different in the average level of key variables, making the results more generalizable. The average age of ventures in the first sample is about 3 years (37.7 months) and the average stage is 4.61. It means that, on average, ventures are between the Product launched stage (with at least one free user) and the revenue stage (at least one paying user). The average age of ventures in the second sample is about 3.5 years (42.5 months) and the average stage is 5.30. It means that, on average, ventures are between the revenue stage (at least one paying user) and the growth stage (focused on growing users or revenues). Also, the numerical comparison between the two samples (disruptiveness and autonomous motivation) verifies our understanding from the interviews that the majority of entrepreneurs who formed the first sample were noticeably autonomously motivated and intent to disrupt markets by developing highly innovative products/services. Higher levels of effectuation (due to higher levels of disruptiveness and autonomous motivation) in the hand-collected data were anticipated, which is in line with hypotheses 1 and 2. As Farmer et al. (2001) stress, when variability in two different samples is the focal point of the conceptualization of the study, two samples together yield a better understanding of the relationships among variables.

Insert Table 1 about here

2.4.2. Measures

With regard to timeframe, for all variables in this research except for industry and motivational variables, we asked respondents to remember a recent time period in which they did not noticeably change their business practices and did not witness any major shock in their industry and the general environment. Because the extent to which entrepreneurs utilize effectual and causal processes through time changes (i.e. Reymen, et al. 2015), we gave freedom to respondents to choose the length of the time period provided that it is between 4 and 12 months.

Dependent variables: To measure the effectuation (EF), we used the scale developed by Chandler et al. (2011) whose sub-components include flexibility, affordable loss, experimentation, and pre-commitments and were measured separately by different items. Following prior studies (i.e. Johansson & McKelvie, 2012), we used a Likert scale (7 possible responses) to see how much the respondents agree with the items developed by Chandler et al. (2011). While 1 shows the lowest level of using of effectuation, 7 shows the highest level of using it. Although paying attention to the different aspects of effectuation can be informative (Johansson & McKelvie, 2012), knowing the overall effects of antecedents on effectuation is helpful (Harms & Schiele, 2012), therefore we calculated the average of all 13 items used to capture the mentioned sub-components of effectuation. For completeness, we provide two different sets of tables, one set showing overall results for effectuation and another set showing the sub-components. In the following paragraphs, we will show in detail how different tables reveal different information about the results.

For capturing the degree of product/service disruptiveness (DI), we used the scales Chan & Parhankangas (2017) developed to measure how radical vs how incremental was the innovation in products that Kickstarter campaigns developed. The rage started with 1 (not disruptive at all) and ended with 7 (extremely disruptive). Chan & Parhankangas (2017) have some raters to objectively

measure how radical and how incremental the innovation in products was. The objective measurement of products' disruptiveness is essential in their research as the researchers intended to measure the effect of the disruptiveness of the innovation on customers' acceptance. But as discussed before, what makes entrepreneurs choose the extent to which they use effectuation, bricolage, bootstrapping, and other entrepreneurial processes, is the way they perceive phenomena (Karadakal et al., 2015) rather than the objective nature of them. The process entrepreneurs take to scan the market and assess how much their product/service disrupts the market gives them an initial perception about the degree of disruptiveness which will be modified by receiving feedback from early customers (Reinhardt & Gurtner, 2015), the modification that may change entrepreneurial processes. Therefore, in this study, rather than the objective effect of the product/service on customers' acceptance, we measure entrepreneurs' perception of disruptiveness as it plays the most important role in undertaking different processes being analyzed. A similar variable, perceived market innovativeness, has been used in the study of Brettel et al. (2012).

We measured the five types of motivation (external, introjected, identified, integrated, and intrinsic) following Moran et al. (2012) who based their scales on the theoretical work of Deci and Ryan (2000). We measured each type of motivation using three items. We used a Likert scale (7 possible responses) to ask how much the respondents agreed with items developed by Moran et al. (2012). Based on that, we created the variable autonomous motivation (AM) by calculating the average of identified, integrated, and intrinsic types of motivation and created the variable controlled motivation (CM) by calculating the average of external and introjected types of motivation.

With regard to ambiguity tolerance (AT), several scales have been developed in the literature (e.g., McLain, 1993; McLain, 2009). As we intended to focus on job-related ambiguity tolerance of

entrepreneurs, we used job-related scales introduced by Norton (1975) not to distract the minds of the respondents by other aspects of ambiguity (philosophy, interpersonal communication, public image, problem-solving, social, habit, and art forms). The rage started with 1 (not tolerant at all to ambiguity) and ended with 7 (extremely tolerant to ambiguity).

We introduced several control variables, including the venture size (VS), by calculating the natural logarithm of the number of active people (Prasad & Junni, 2017), the venture age (VA: number of months), and the industry (IN) in which they operate based on Global Industry Classification Standard (MSCI, 2020). Moreover, we controlled for the effects of four main factors known as being key antecedents of effectuation. To that end, we measured the stage (ST) of the venture (Sarasvathy, 2001; Reymen et al., 2015) by considering 6 different stages (Concept stage: not yet started developing the product, In development: the product is not usable yet, First: product Ready, but no user yet, Product launched: with at least one free user, Revenue stage: at least one paying user, Growth stage or cash flow positive: focused on growing users or revenues). We measured environmental uncertainty (UN), as Arend et al. (2015) and Harms & Schiele (2012) discuss, by using five items that Miller & Dröge (1986) developed. The rage started with 1 (extreme certainty) and ended with 7 (extreme uncertainty). Also, we controlled for the impact of resource scarcity (RS), as Arend et al. (2015) and Reymen et al. (2017) discuss, by using scales introduced by McKelvie & Davidsson (2009). The mentioned scale not only measures financial resources, but also considers the scarcity of human resources, know-how, and expertise. We asked the respondents to stress to what extent access to different resources was easy for them to grow their ventures. With choices starting from 1 (extremely easy) to 7 (extremely hard), higher scores show higher levels of resource scarcity. Finally, we controlled for the effect of the experience (EX) of entrepreneurs (Dew et al., 2009; Johansson & McKelvie, 2012) by measuring the number of

businesses entrepreneurs had started as a founder/co-founder other than their current business activity.

Because the DV and the IVs were measured from the same respondents (main entrepreneurs) by the same tool (questionnaire), to overcome the threat of common method variance, we took five procedural measures that Tehseen et al. (2017) suggest and used a statistical test to make sure that the procedural measures have been effective:

Regarding the procedural measures, first, we created a temporal separation by measuring the DV and the IVs in different half of the questionnaire. We made it possible for the respondents to take a break while filling out the questionnaires. We measured dependent variables at the second step (out of 11) while we measured independent variables at the last steps. measuring the DV and IVs with the highest time distance maximized the chance of separating the time respondents read items that measure the DV and the IVs.

Second, we tried to create a psychological separation among measurements by adding an explanation to make it clear that the measurements of the DV are not related to the measurement of the IVs. Our additional explanation not only created a psychological separation but also was meant to omit the social desirability of responses. To measure the DV (effectuation), right after we wanted the respondents to stress how much they agree with statements about the process they took, we added: “Please note that none of the following processes and policies is necessarily imperative and beneficial for all ventures. We are eager to know which ones you have taken.”

Third, we protected the anonymity of the respondents and minimized the evaluation apprehension by stressing that they do not have to participate and it was merely their choice to participate or not.

Fourth, we counterbalanced the order of measurement of the IVs and the DV to neutralize some of the potential method biases related to items' embeddedness and question context.

Fifth, we tried to improve scale items through our careful construction by tailoring the scale to the context in which entrepreneurs operate especially those who are related to Concordia University. Not only did the authors modify the questions and answers of the questionnaires by discussing them and receiving feedback from the colleagues, but the questionnaire was also filled out twice by the representative of District 3, an innovation center in Montreal, at different times to make sure that the questions and answers are completely relevant and clear.

Regarding the statistical measure, we performed a Harman one-factor analysis as a post hoc test to check whether a single factor is accountable for variance in the data (Chang et al., 2010; Tehseen et al., 2017). For both samples, we loaded all items from every construct into a factor analysis to test if a single factor results in the majority of the covariance among the measures. In hand-collected data and data gathered by Qualtrics, we respectively found that 18.65% and 18.80% of the variance is correspondent to the first factor. As the mentioned percentages are far below 50%, we could not find a sign of common method bias.

2.5. Results

As illustrated in table 1, we have high levels of effectuation in both samples (5.18 and 4.97 out of 7 for hand-collected data and the one gathered by Qualtrics respectively). The average size of the ventures in the hand-collected sample was marginally larger than that in the sample gathered by Qualtrics. As the variable venture size (VS) captures the natural logarithm of the size of ventures by VS = 1.85 and 1.77, we had an average size of 6.35 and 5.87 people for ventures in the hand-collected sample and ventures in the sample gathered by Qualtrics respectively. The average disruptiveness of products/services (5.62 and 4.87 in the hand-collected sample and the one

gathered by Qualtrics respectively) and autonomous motivation of entrepreneurs (6.18 and 5.82 in the hand-collected sample and the one gathered by Qualtrics respectively) were significantly different in the two samples.

Before testing the hypotheses, we first considered the correlation among variables in both samples. As illustrated in Table 2 and Table 3, the highest correlation among independent variables and control variables is 0.38 for Sample 1 (hand-collected data) and 0.37 for Sample 2 (data gathered by Qualtrics). High correlations between Ind9 (9^{th} category of industry) and Ind8 (8^{th} category of industry) and between St6 (6^{th} stage) and St5 (5^{th} stage) are normal as they represent Industry variables and stage variables that are dummy variables. It means that the last dummy variables in their categories (e.g. In9) are dependent on previous variables in the same category (e.g. In1 to In 8). Accordingly, there is no serious concern regarding multicollinearity.

Insert Table 2 about here

Insert Table 3 about here

To evaluate the reliability of the scales, we measured Cronbach's alpha. As demonstrated in Table 4, for most of the scales the alpha is greater than 0.7 and for all the scales the alpha is greater than 0.6 showing acceptable reliability of data.

Insert Table 4 about here

The results of analyzing the hypotheses are shown in Table 5 and Table 6 based on Ordinary least squares (OLS) regression. For both samples, first, we entered our seven control variables (Model

1). Then we entered the degree of product/service disruptiveness, controlled motivation, autonomous motivation, and ambiguity tolerance separately (Models 2 to 5). In Model 6, we entered all independent variables.

Insert Table 5 about here

Insert Table 6 about here

Hypothesis 1 addresses the relationship between the degree of the product/service disruptiveness and undertaking effectuation. The results (both the effect size and statistical significance) strongly support Hypothesis 1 (model 2) in both samples ($p=.008$, $STD\beta =.38$ and $p=.000$, $STD\beta =.27$ respectively for hand-collected data and data gathered by Qualtrics). As illustrated in Table 7 and Table 8, in both samples the mentioned relationship is stronger between the degree of product/service disruptiveness and the flexibility and experimentation aspects (model 2).

Insert Table 7 about here

Insert Table 8 about here

For Hypothesis 2, we tested the relationship between controlled types of motivation (formed by external and introjected types of motivation) and effectuation and also between autonomous types of motivation (intrinsic, integrated, and identified types of motivation) and effectuation. We found that in both samples, when all independent variables are brought into the model (Model 6), while there is a positive significant relationship between autonomous types of motivation and

effectuation (p=.004, STDβ =.38 and p=.006, STDβ =.20 respectively for hand-collected data and data gathered by Qualtrics), the relationship between controlled types of motivation and effectuation is not significant. The mentioned relationship was stronger between autonomous types of motivation and affordable loss and also between autonomous motivations and flexibility.

In models with a single independent variable (models 3 and 4), while in both samples, the relationship between autonomous motivation and undertaking effectuation was significantly positive (p=.000, STDβ =.44 and p=.000, STDβ =.29 respectively for hand-collected data and data gathered by Qualtrics), only for data gathered by Qualtrics, the relationship between controlled motivation and undertaking effectuation was significantly positive ((p=.02, STDβ =.17)

The relationship between ambiguity tolerance and effectuation is not significant in both samples, therefore, hypothesis 3 is not supported.

In total, we found partial support for the belief that innovators use effectuation more than other types of entrepreneurs as we could find support for two of three hypotheses.

As mentioned before, we controlled for the impact of resource scarcity (RS), as Arend et al. (2015) and Reymen et al. (2017) discuss and used the scale that not only measures financial resources, but also considers scarcity of human resources, know-how, and expertise. Surprisingly, we found a significantly negative relationship between resource scarcity and using effectuation.

2.6. Discussion and conclusion

This research studied the relationship between developing a disruptive product/service, having autonomous or controlled motivation, and possessing high ambiguity tolerance with undertaking an effectual course of action. To study the three mentioned relationships, we tried to find out if innovators use more effectuation than other types of entrepreneurs. This research addresses the

suggestion of prior studies (i.e. Grégoire & Cherchem, 2020) about providing stronger explanations for why a particular antecedent variable mobilizes effectuation.

First, although market creation mechanisms and their relationships with effectual logic are highlighted in the work of Sarasvathy (2001), to date there has not been much attention to the mentioned relationships in empirical papers about effectuation. Our aim was to fill the mentioned gap knowing new markets are recently emerging more rapidly (Innosight, 2016), and the speed at which the population absorbs new technologies and products is higher than ever (Bygrave and Zacharakis, 2016). Second, we addressed the suggestion of Perry et al. (2012) and Reymen et al. (2015) who believe that the next stage of theory development in effectuation research should be devoted to building a better understanding of the motivations behind effectuation. To that end, in this research, we differentiated among different types of extrinsic motivation (external, introjected, identified, and integrated) and used the typology that Moran et al. (2012) suggest (autonomous vs controlled) to delineate how entrepreneurial actions are influenced by different types of motivation. Thirdly, we added to the literature by extending the question: Which psychological characteristics make it possible for entrepreneurs to endure effectual processes? Although a high level of ambiguity involved in effectual processes was elaborated by Sarasvathy (2001) and mentioned as an inseparable part of effectuation in later studies (i.e. Brettel et al., 2012) no study has yet tested if having more tolerance for ambiguity leads to more use of effectuation. Therefore, we tried to find if entrepreneurs with a higher tolerance for ambiguity effectuate more.

By testing the hypotheses, we first found that entrepreneurs who come up with disruptive business ideas use effectuation more than entrepreneurs who comply with norms of markets (especially flexibility and experimentation aspects). Sometimes developing a disruptive product equals creating a new market and the results support the belief of Sarasvathy & Dew (2008) and Johansson

& McKelvie (2012) that effectuation is the key process that entrepreneurs undertake when they try to create new markets. Also, sometimes disruptive products/services change the practices, designs, and norms of an existing market (Schivardi & Schneider, 2008).

Our results also endorse the belief of Sabatier et al. (2012) that disrupting the norms of markets necessitates a major change in the value chains and rebuilding trust (Ali & Birley,1998), taking on experimentation (Kerr et al., 2014) and showing more flexibility (Sarasvathy, 2001) to control the new situation of the market. Our results show that both disrupting an existing market and shaping a new one prompt entrepreneurs to manipulate ends openly and to seek action-based knowledge by conducting experiments.

Our attention to the level of disruptiveness of products/services can trigger a new discussion about antecedents of effectual processes not at the firm level but at the level of products/services when ventures develop more than one product at a given time. Although some antecedents of effectuation at the industry, organizational and individual levels have been discussed in the literature so far, no study has paid attention to the difference among procedures that a given venture takes to develop different products or services even at the same time. In other words, we suggest that at a certain time when industry, organizational and individual factors are fixed, ventures may use different levels of effectuation according to the degree their different products/services disrupt markets. Although in this essay we focused on ventures that developed a product/service as the main activity, we suggest that in future research different processes that a venture takes to develop different products/services with different levels of disruptiveness be studied.

Second, our results show that entrepreneurs with autonomous motivations have a higher desire to use effectuation. The results support the belief that entrepreneurs can think beyond gaining profit (affordable loss) only when they find their job interesting and valuable. Also, entrepreneurs seem

to tolerate the risk and uncertainty of effectual processes (Welter & Kim, 2018), instead of taking a safer route (Shane & Venkataraman, 2000), if they perceive they can build their identity and fulfill their personal goals by persevering in effectual processes. As Steve Jobs (2005) once said "stay hungry stay foolish" to change the world, our results show that only the mentioned autonomous "hunger" to build something meaningful and creative can justify tolerating a high amount of uncertainty involved in effectual processes.

Third, we could not find any empirical support for the relationship between tolerance ambiguity and taking the effectual course of action. As mentioned earlier, although Arend et al. (2015) question the assumption that all entrepreneurs "can" effectuate and they should have certain abilities, Read et al. (2016) in their response convey that all entrepreneurs with different psychological abilities may effectuate in a certain way or the other. The result of this research is more in line with the belief of Read et al. (2016) as we could not find any evidence supporting that more tolerant entrepreneurs of ambiguity are better effectuators.

This study also makes an empirical contribution by answering calls to fill the lack of empirical studies in effectuation research (Perry et al., 2012; Cai et al., 2017). This study is one of few studies to have used questionnaires (Perry et al., 2012), sampled from real entrepreneurial ventures, and targeted multi-level factors (Johansson & McKelvie, 2012; Reuber et al., 2016). We sampled two different populations that were statistically different with regard to three key variables that we studied in this research (the level of product/service disruptiveness, the level of autonomous motivation, and the level of using effectuation). This allowed us to generalize the findings of this research (similar to the studies of Delmar & Wiklund, 2008; Farmer et al., 2011).

With regard to practical contributions, in addition to being of interest to entrepreneurs, the findings of this research may help innovation centers and incubators to customize the services they provide

for entrepreneurs in a better way, based on the level of disruptiveness of the products/services entrepreneurs develop. Based on responses to our study, mainly when we conducted the interviews, contributions of entrepreneurship incubators to ventures' growth such as workshops, coaching, building communities, and sending entrepreneurs to workspaces may trigger both logics (effectuation and causation), but some may steer entrepreneurs to utilize pre-existing knowledge (causation) instead of learning by action (effectuation), and some (i.e. building communities) may encourage entrepreneurs to have more pre-commitments (effectuation) as they face more potential partners. We suggest that entrepreneurship incubators consider the type of entrepreneurs (in addition to other considerations) to customize the services they provide for them.

By following causation procedures, coaches should encourage entrepreneurs to undertake good quality market analyses, know the characteristics of target markets and customers, analyze the strategies of competitors and develop clear plans to enter, set tangible targets, and have vivid visions for the future. While the mentioned pieces of advice and practical support seem completely useful for some start-ups, they may preclude other disruptive ideas followed by innovators who try to develop evolutionary products/ services and shape new markets. In other words, when entrepreneurs try to change the status quo by developing disruptive business ideas, typical overemphasis on sticking with plans and usual managerial advice based on causal logic not only do not help entrepreneurs develop their ideas, but also prolong the entrepreneurial processes more than usual, discourage risk-taking actions, and hinder entrepreneurs from following their disruptive dreams.

Finally, interviews with entrepreneurs to evaluate their motivation (like what we did) may help coaches and managers to see if the entrepreneurs have enough autonomous motivation to fulfill effectual processes or not.

Like other cross-sectional studies, this research has some limitations regarding the research method (Bono & McNamara, 2011). To the best of our knowledge, there is no longitudinal study about effectuation with common quantitative methods. Measuring the variables through time would be more informative and more in line with the dynamism of effectuation (Sarasvathy, 2001; Reymen et al., 2015) and its antecedents (Nielsen & Lassen, 2012). Therefore, we suggest longitudinal methods in future research. Also, to our knowledge, no study related to antecedents of effectual action has gone beyond the industry level so far, therefore, we suggest scrutinizing institutional factors that make entrepreneurs effectuate more. As mentioned earlier, sampling from ventures that develop more than one product/service simultaneously, and attention to different processes (effectual/causal) that entrepreneurs take to develop different products/services adds to the literature and enriches our understanding of the antecedents of effectuation.

Another limitation lies in the small sample size for our hand-collected data. Although some prior quantitative studies had smaller sample sizes than ours such as 55 for the research of Cannatelli (2019), 64 for the study of Dew et al. (2009), 64 for the research of Read et al. (2009), and 50 for the study of Stroe et al. (2018), bigger sample sizes yield more reliable results and make it possible to run structural equation models.

Finally, although we preferred to subjectively measure the level of the disruptiveness of the products/services because entrepreneurs base the processes they undertake on their perception of their products/services' disruptiveness, we like to draw the attention of future researchers to the way this construct should be measured. While using subjective scales seems reliable for research questions similar to those of this study, when the relationship between the level of the disruptiveness of the product/service and customers' acceptance or reaction is studied, we suggest that researchers use objective scales to measure the mentioned construct.

CHAPTER 3

The relationship between effectuation/causation and new venture performance: A situational perspective

3.1. Introduction

As mentioned in chapters 1 and 2, research about effectuation and causation has become an inseparable part of entrepreneurship studies (Alsos & Clausen 2014) and has affected research in other disciplines such as marketing (e.g. Renton & Simmonds, 2019) to show different processes for penetrating a market or developing market share. A noticeable part of the research about effectuation in the entrepreneurship literature has been devoted to studying the impact of undertaking effectuation and causation on new venture performance (Grégoire & Cherchem, 2020). Studies in the mentioned realm can be classified into three categories: First, some studies focus on the main relationship between the entrepreneurial approach (effectuation or causation) and performance and sometimes consider some mediators such as technology orientation (Urban & Heydenrych, 2015) to show how and why the mentioned relationship exists (e.g. the studies of MacKinnon et al., 2012; Pacho & Mushi, 2020).

In the second stream, researchers study factors (as independent variables) leading to better performance and consider effectuation or causation (as moderators) to study the interacting effect of the approach (effectuation or causation) and different independent variables. For example, the multi-focus search was the independent variable in the studies of Feng et al. (2020).

In the third stream, studies consider the relationship between effectuation or causation and performance and highlight other factors affecting the mentioned relationship as moderators. For

instance, Peng et al. (2020) show that environmental uncertainty positively moderates the relation between effectuation and new venture performance.

Although some studies have shown when undertaking either effectuation or causation yields better performance, until now, no study has addressed the following critical questions: “assuming there is a meaningful fit between the entrepreneurial approach (effectuation vs causation) and the level of product/service disruptiveness, do entrepreneurs tailor their approach to the level of product/service disruptiveness?” and, if the majority of entrepreneurs cannot tailor their approach to what different situations demand, “which characteristics of individuals and teams help entrepreneurs fulfill the most effective approach (effectuation vs causation)?”

It is important to understand these questions because, as highlighted in the study of Arend et al. (2015), we cannot take for granted that entrepreneurs have the ability to build different types of firms, wisely scan the industry and the environment, and revise the ventures’ goals over time in order to achieve performance objectives. Due to limitations in individuals’ cognitive ability and mental flexibility, the assumption that the majority of entrepreneurs undertake the best approach in relation to venture performance is unjustified. While Arend et al. (2015) focus more on entrepreneurs’ ability to fulfill effectuation, this research extends the question by studying entrepreneurs’ capability to follow effectual or causal processes in different situations to grow their ventures faster.

Attention to the ability of entrepreneurs to show good performance in different ventures in different situations partially addresses the gap Wiklund et al. (2011) accentuate. They believe that measuring the performance of entrepreneurial firms, which is a pervasive method in the strategy literature, is insufficient and cannot capture entrepreneurs’ performance in a long timeframe. The perspective that our research proposes can start a new dialogue about the way researchers measure

the performance of entrepreneurs (not the firms). This means that we call some entrepreneurs successful not because they could fulfill effectual processes to develop a disruptive product or causal processes to develop a product with incremental improvement in only one firm, but because successful entrepreneurs can recognize what different situations demand, show flexibility to switch between different processes, and capitalize on their capabilities to fulfill the process that looks promising.

Also, the importance of studying whether entrepreneurs can fulfill different approaches (effectuation vs causation) in different situations stands out clearly when we pay attention to differences among entrepreneurs and different drivers of effectual and causal processes. As discussed in chapter 2, there are some individual factors that have been known as antecedents of effectual processes. The mentioned factors include experience (Dew et al., 2009), personal creativity (Engel et al., 2013), passion (Stroe et al., 2018), and optimism (Zhang et al., 2019). Also, some other factors such as education have been introduced as drivers of causal logic (Johansson & McKelvie, 2012). Because entrepreneurs are clearly different from each other according to the mentioned factors and psychological characteristics (Baron, 2000; Miner, 1997), the mentioned questions are worth scrutinizing.

To investigate if most entrepreneurs recognize when effectuation or causation is better for venture performance and if they can fulfill them, we utilize a strand of contingency theory that focuses on the "fit" between organizational needs and organizational action (e.g. the study of Lungeanu and Zajac, 2016). We also address what characteristics (at the individual and team level) help entrepreneurs take action and carry out the mentioned tasks. To that end, in the second essay, we test the relationship between openness to change, optimism, ambition, and team size as independent variables (IVs) and the ventures' capability of choosing and fulfilling the best

entrepreneurial approach for venture performance as the dependent variable. The four mentioned characteristics (IVs) have been identified not because they help entrepreneurs fulfill a specific action in a particular situation but because they give entrepreneurs flexibility and maneuverability to identify and fulfill different actions in different situations to grow the ventures. The mentioned characteristics are associated with the capability of entrepreneurs to analyze the situation, comprehend what approach looks promising, show the dynamic capability to change some processes to keep up with the existing situation, undertake a better approach, and endure its difficulties and ambiguities.

Previous research has studied the magnitude of the relationship between effectual or causal processes and performance at different levels of innovative context (Brettel et al., 2012), environmental dynamism (Mthanti & Urban, 2014), industry growth (Futterer et al., 2018), and availability of resources (Ruiz-Jiménez et al., 2020). This essay evaluates the magnitude of the relationship between both entrepreneurial approaches (effectual and causal) and performance at different levels of product/service disruptiveness. We chose the mentioned factor because of two main reasons:

First, developing products/services at different levels of disruptiveness makes entrepreneurs face different levels of uncertainty (Santos & Eisenhardt, 2009) which have been known as the main reason why some entrepreneurs undertake effectuation more and some lean more into causal processes (Sarasvathy, 2001; Welter & Kim, 2018). Second, while in the research stream related to effectuation/causation and performance, prior studies mainly considered industry-level factors (e.g. industry growth), we pay attention to an organizational factor (product/service disruptiveness) to show that even in the same industry with the same level of innovation, dynamism, and growth, different ventures may undertake different processes to perform well. The mentioned perspective

sheds more light on factors that entrepreneurs can consider to choose processes that fit their ventures.

The importance of paying attention to ventures' approaches (effectuation vs causation) while entrepreneurs face continuous disruptiveness in markets has been highlighted in the report of Innosight (2016) as well. This report shows how the cycle of shaping and disrupting the markets has been recently accelerated and how much the classic procedures that managers used to take to strategically respond to changes seem ineffective these days.

Accordingly, assuming that the alignment of the approach and the level of product/service disruptiveness leads to better performance (the assumption that we test as hypothesis 1), this essay addresses two main questions:

1. Do entrepreneurs tailor their approaches (effectuation or causation) to the level of product/service disruptiveness?

2. Which capabilities in individuals and teams help entrepreneurs tailor the entrepreneurial approach to the level of product/service disruptiveness?

The mentioned assumption and research questions are addressed through six hypotheses. We formulate the first hypothesis to test the assumption of this essay (the alignment of the approach and the level of product/service disruptiveness leads to better performance). The second hypothesis addresses research question 1 which is similar to the main research question in other empirical papers centered around contingency theory. To address questions 2, in hypotheses 3 to 6, we evaluate the relationship between different characteristics in individuals or teams (openness to change, optimism, ambition, team size) and entrepreneurs' ability to execute the best approach (effectuation vs causation).

Therefore, the contributions of this research are threefold:

- Attention to product/service disruptiveness and its impact on ventures' performance. The first contribution of this adds to the literature on the relationship between effectual or causal processes and performance by introducing a new variable (product/service disruptiveness) that changes the magnitude of the mentioned relationship.
- Using the situational perspective to see if entrepreneurs are capable of tailoring their approach to the level of product/service disruptiveness. Investigating the mentioned capability addresses the different views between Arend et al. (2015) and Sarasvathy (2001) regarding the entrepreneurs' ability to execute different actions in different situations.
- Studying characteristics that help entrepreneurs find and fulfill the best approach in different situations. Instead of addressing antecedents of effectuation or causation per se, we investigate the factors that help entrepreneurs recognize the approach that situation demands and follow the approach that is associated with better performance.

Like the second sample of the first essay, the sample of the second essay is made up of 200 entrepreneurs in Canada. The explanations about the data gathered by Qualtrics, elaborated in chapter 2, will be repeated in this chapter as well because the second essay is supposed to be an independent manuscript. This means that the process of sampling, controlling common method bias, sending questionnaires, quality control, and gathering and cleaning the data is the same as those for the second sample of the first essay.

To study the different entrepreneurs' actions, we split data into two categories: the low disruptiveness category and the high disruptiveness category to see which approach leads to better performance and which entrepreneurs undertake the best approach in both categories in terms of venture performance.

In the remainder of the paper, first, we elaborate more on different strands in the literature on effectuation and its links to new venture performance. Then, we explain, how the situational perspective derived from contingency theory can help us add fresh insights to the literature on effectuation. We will use the typical structure of studies in contingency theory to translate the mentioned research questions into hypotheses, and, in the research method part, we explicate the process we took to test the hypotheses. Finally, we elaborate on the results and discuss how the findings of this research can start a new dialogue about effectuation/causation and new venture performance.

3.2. Theoretical background and literature review

In this section, we briefly review prior studies carried out about effectual and causal actions and performance. Also, two main strands of contingency theory will be introduced to show how a lens derived from a strand of contingency theory can help researchers create a better understanding of effectual and causal processes and their relationship with new venture performance.

3.2.1. Effectuation/causation and new venture performance

According to traditional theories of entrepreneurship (e.g. Gartner, 1985), to exploit an opportunity, entrepreneurs follow some planned procedures to accumulate resources, produce and market products or services, build organizations, and respond to government and society. Effectual logic (Sarasvathy, 2001), as an alternative theoretical lens for describing entrepreneurial processes, claims that under certain conditions, entrepreneurs take a different route to discover, create, and exploit opportunities. Effectuators embrace contingencies, step beyond pre-existing knowledge, pay less attention to market needs in uncovering an opportunity, ignore long-term returns, and focus primarily on what they are willing to lose in making decisions about whether to pursue an opportunity. While causation (sets of actions based on predicting the future) takes a particular

outcome as given and focuses on selecting among means to create that outcome, effectuation takes a set of means as given and focuses on selecting among possible outcomes that can be created with that set of means.

As discussed in chapter 2, research about effectuation has become an inseparable part of entrepreneurship studies (Grégoire & Cherchem, 2020) and has affected research in other disciplines as well. The mentioned disciplines include marketing (Renton & Simmonds, 2019) to show effective processes to increase the market share, innovation (Berends et al., 2014) to discuss the logic of small firms' product innovation processes, and internationalization (Tolstoy et al., 2020) to demonstrate effective actions to enter a market successfully. Within the entrepreneurship circle, some studies have added theoretical insights to effectuation (i.e Arend et al., 2015; Reuber et al., 2016) and some have focused on empirical aspects. The mentioned empirical aspects include effectuation and organizational learning (e.g. Cai et al., 2017), the antecedents of effectual action (e.g. Johansson & McKelvie, 2012; Schmidt & Heidenreich, 2014), effectuation or causation, and performance (Futterer et al. 2018; Shirokova et al., 2020), and utilizing effectual and causal processes (e.g. Reymen et al., 2017). As this research intends to fill the theoretical and empirical gap in the third empirical research category, in the following paragraphs in this section, we briefly introduce the findings of prior studies related to effectuation/causation and new venture performance.

By reviewing the research about effectuation/causation and performance, we noticed three different streams in this particular area. First, some studies focus on the main relationship between effectuation or causation and performance and sometimes consider some mediators to show how and why the mentioned relationship exists (MacKinnon et al., 2012). For instance, Read et al. (2009) conduct a meta-analysis and find support for a positive relationship between an effectual

approach to strategy making and venture performance. Urban & Heydenrych (2015) show that different dimensions of effectuation are positively associated with technology orientation and influence firm performance. Cai et al. (2017) show that effectuation has a positive effect on new venture performance while exploratory learning plays a mediating role in the mentioned relationship. Also, Pacho & Mushi (2020) find that effectuation has a positive effect on new venture performance and the flexibility principle plays a mediating role in the mentioned relationship. Eyana et al. (2018) differentiate between financial and non-financial measures of performance. They find that, while causation is positively related to an increase in employment size, effectuation is positively related to financial performance measures.

In the second stream, researchers study factors (as independent variables) leading to better performance and consider effectuation or causation (as moderators) to study the interacting effect of the approach and independent variables. For instance, Deligianni et al. (2017) find that effectuation processes exert a positive effect on the relationship between diversification and performance. Feng et al. (2020) show that while causation weakens the curvilinear effect between multi-focus search and performance, effectuation strengthens the curvilinear relationship between focused search and performance.

In the third stream, studies consider the relationship between effectual or causal processes and performance and highlight factors affecting the mentioned relationship as moderators. Although like the second stream, in the third stream the interacting effect of the approach and some other variables on new venture performance has been studied, unlike the second stream, effectuation and causation are independent variables. In the third stream, the moderators clarify the circumstances under which undertaking effectuation or causation leads to better performance.

In the third stream, Brettel et al. (2012) find that, while effectuation is positively related to success in highly innovative contexts, causation approaches benefit projects with low levels of innovativeness. Mthanti & Urban (2014) hypothesize that environmental dynamism and hostility moderate the relationship between firm performance and effectuation but they cannot find empirical evidence. Yu et al. (2018) are able to find empirical support for their hypothesis and show that effectuation has a positive effect on firm performance when environmental uncertainty is high. Also, Peng et al. (2020) show that environmental uncertainty positively moderates the J-shaped curve relation between effectuation and new venture performance. Futterer et al. (2018) find that effectuation is more effective in high industry growth while causation is more effective in low industry growth. Shirokova et al. (2020) show that, in adverse conditions, causation brings marginal performance improvements for firms and makes it highly unreliable while effectuation leads to more performance improvements and makes it highly reliable. Ruiz-Jiménez et al. (2020) find that while causation leads to better firm performance in experts' ventures, effectuation helps both experts and novices to show better performance. Also, they find that the availability of resources moderates the relationship between causation and performance.

In the remainder of section 3.2, we show how a strand of contingency theory can help us start a new dialogue about effectuation/causation and performance.

3.2.2. Contingency theory and its application in the effectuation literature

Contingency theory began with socio-technical theory in which the technological emphasis of earlier classical theory and the attention of human relations school to people are combined (Jelinek, 1977). Luthans & Stewart (1977) find the roots of "general contingency theory" in the situational perspective. Affected by the "open system perspective" and doubting the universality of other perspectives, Luthans & Stewart (1977) try to develop a theoretical framework to explain and

predict phenomena that in general depend on a set of circumstances. In their model, they introduce environmental factors, resource subsystem, and management subsystem as the main components of any firm and point out that situation variables define the interaction among main elements. According to contingency theory, there is no best way to run a business, to lead an organization, or to make decisions. Instead, the optimal approach is dependent on the internal and external situation.

Sarasvathy (2001) has the same idea with regard to undertaking effectuation or causation. She says that "both causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlapping and intertwining over different contexts of decisions and actions. P.245"

Contingency theory has two main strands. First, some researchers avoid making a general statement about a relationship and simply introduce moderators to show how the magnitude of a specific relationship is contingent on a third variable. In this strand, many scholars tap into the concepts of contingency theory to introduce a boundary condition about a theory or to question the universality of a theory. In general, using a moderator for clarifying a relationship is the main theme of the first strand. For example, Mone et al. (1998) address the disagreement regarding the effects of the decline on innovation to see if such decline increases the organization's capacity to innovate or decreases it. All the studies in the third stream of literature about the effectual or causal approach and performance introduced before (Brettel et al., 2012; Futterer et al., 2018; Mthanti & Urban, 2014; Peng et al., 2020; Ruiz-Jiménez et al., 2020; Shirokova et al., 2020; Yu et al., 2018) fall in the first strand of contingency theory.

Studies in the second strand of contingency theory center their arguments on "fit", introduce an ideal fit, and try to find out what the influence of the fit on the firms' performance or survival is.

Thompson (1967) was one of the scholars who created a theoretical basement to highlight the importance of attention to "fit". He made this proposition that "under norms of rationality, organizations seek to seal off their core technologies from environmental influences." By this basic proposition, he argues that rational organizations try to fit their technologies with environmental factors. Lawrence and Lorsch (1969) accentuate the issue of "fit" between the organization and its several external environments and address perceived environmental uncertainties and responses to them as a basis for structural differences.

Most studies in this strand address technology-structure fit. For instance, Fry & Slocum (1984) study the interaction of structure (organic vs mechanistic) and technology (with different levels of uncertainty), and the influence of that fit on performance. The number of these studies has been so large that Miller et al. (1991) conducted a meta-analysis and tested if the results had been affected by some firms' characteristics or not. Inspired by the mentioned attention to the issue of "fit", the next generation went beyond the technology-structure relationship and addressed the issue of "fit" in other firms' aspects as well. For instance, Lungeanu and Zajac (2016) try to find the impact of the venture-financier (in this case venture capitalists) fit and the impact of fit on ventures' performance. They focus on "stage fit", "time horizons fit", and "industry fit".

In section 2.3, we show how the lens derived from the second strand of contingency theory can help us add more insights to the literature of effectuation/causation and performance.

3.2.3. The literature gap

As we mentioned before, the second strand of contingency theory discusses the "fit" perspective. The classical studies in the second strand of contingency theory (e.g. Argote, 1982) have two main research questions. First, the question being: "Do organizations tailor their action to the characteristics of the environment and organizational needs?" The second one being: "Does the

alignment of the action with the characteristics of the environment and organizational needs lead to better performance?" As mentioned before, the studies about the effectual and causal approach and performance only address the second question. It means no study has addressed the critical question that "Can entrepreneurs cognitively perceive when effectual and causal approaches are associated with better performance and execute the best approach?" It is important to address the mentioned question because it can help us increase our understanding of the capability of entrepreneurs to perform different approaches in different situations that was questioned by Arend et al. (2015).

Arend et al. (2015) question the capability of the majority of entrepreneurs to fulfill effectual and causal processes when they are necessary. They believe that the abilities of entrepreneurs to build several different types of firms, to wisely scan the industry and the environment, and to revise the ventures' goals through time cannot be taken for granted. To empirically test if most entrepreneurs recognize when effectual and causal approaches are essential and if they are able to execute them, we address the first question asked in classical contingency theory research. Also, we try to find the characteristics of individuals and teams that make entrepreneurs capable of doing the mentioned tasks.

As we mentioned earlier the magnitude of the relationship between effectuation/causation and performance at different levels of innovative context (Brettel et al., 2012), environmental dynamism (Mthanti & Urban, 2014), industry growth (Futterer et al., 2018), and availability of resources (Ruiz-Jiménez et al., 2020) has been tested. This research evaluates the magnitude of the relationship between effectual and causal approaches and performance at different levels of product/service disruptiveness. As mentioned earlier, we choose product/service disruptiveness for the mentioned purpose because developing products and services at different levels of

disruptiveness leads to experiencing different levels of uncertainty (Santos & Eisenhardt, 2009), and, therefore, the need for using different levels of effectuation and causation (Sarasvathy, 2001; Welter & Kim, 2018). Also, knowing that similar studies have been mainly using industrial factors to take the contingency theory lens, considering a factor at the organizational level sheds more light on factors that entrepreneurs can consider to choose effectual/causal processes that fit their ventures.

3.3. Hypotheses

In this section, the fit between the entrepreneurial approach (effectuation or causation) and the level of product/service disruptiveness will be discussed. Then, we will translate two different mindsets about the ability of entrepreneurs to take the best approach into two opposing hypotheses. Finally, some characteristics of entrepreneurs and teams that may entrepreneurs tailor the approach to the level of product/service disruptiveness will be introduced.

Attention to new ventures that disrupt markets has constantly been growing in entrepreneurship research circles after Schumpeter (1942) used the term “creative destruction” to address the process of industrial mutation that incessantly revolutionizes the economic structure. As Innosight (2016) reports, while the average tenure of 500 large companies listed on stock exchanges in the United States was 33 years in 1965, it became 20 years in 1990 and will be14 years by 2026. The mentioned reports numerically show how businesses in recent years are changing rapidly, how fast new markets emerge, and how rapidly disruptive products replace the recently adopted ones. The report also accentuates the companies’ failure in responding to the new situation as they “apply existing business models to new markets, fail to respond to disruptive competitors in low-profit segments, or fail to adequately envision and invest in new growth areas, which in some cases can take a decade to pay off. P.4”

More interestingly, the mentioned report stresses the necessity of changing the managers' mindset from planning to a more adaptive mindset while disruptive business ideas continuously emerge. The mentioned notion in the report is derived from a survey in which the executives of 91 companies with revenue greater than $1 billion participated. The results show that the growth strategy in those companies is being undermined by day-to-day decisions. Also, the results show that managers cannot keep a coherent vision of the future.

The attention to shifting from planning strategies to embracing day-to-day contingencies and from having vivid visions to keeping flexibility while facing market disruptions reminds us of the shift of some entrepreneurs' approaches from causation to effectuation. Sarasvathy (2001) ties the necessity of effectuating with calling the readers' attention to new markets that rapidly emerge and the existing markets that are easily being disrupted. She says that, through effectuation, entrepreneurs define their market as a community of people with enough resources and talents. In contrast to the general wisdom that views markets as independent of the firms or entrepreneurs, she believes founders play an active role in bringing together enough stakeholders who shape or reconfigure markets.

Disruptive products/services are introduced to potential customers either by forming a new market or radically changing the norm and common rules of an existing one (Schivardi & Schneider, 2008). As Santos & Eisenhardt (2009) narrate, when entrepreneurs try to form a new market, in the first stage (claiming the market), they face an ambiguous environment and unclear customers. In the first stage, the value chain is not completely established and the product attributes are not well-defined. In this situation, Sarasvathy (2001) explains how different elements of effectuation help entrepreneurs grow their businesses. As there are neither customers nor a logical price, entrepreneurs focus on what they can lose rather than estimating potential profit. They use pre-

committed stakeholders to establish the value chain that does not exist yet and experiment with different product designs to fill the void of knowledge about what the potential customer will need. Also, the founders keep the business flexible to embrace contingencies that an uncertain condition imposes. Therefore, what Sarasvathy (2001) describes as the effectual action is a process to address the market-shaping difficulties that Santos & Eisenhardt (2009) describe.

Also, in an existing market, when incumbents or new entrants come up with disruptive products, they go through the process of experimentation for a limited time to make their new product work and to make the existing players adopt it (Schivardi & Schneider, 2008). Furthermore, as Sabatier et al. (2012) discuss, disrupting the norms of markets necessitates a major change in cooperation with existing suppliers and finding new allies. They explain that when entrants' business models fit into the industry's established dominant norm, the value chains do not change noticeably, but when disruptive business models emerge, established value chains change dramatically. Therefore, similar to the market formation, effectual processes may help entrepreneurs grow their ventures more easily when they intend to disrupt an existing market.

Disrupting markets necessitate R&D activities for some ventures (Chen et al., 2010). Brettel et al. (2012) show that when R&D projects contain high levels of innovativeness, effectual processes especially affordable loss, partnership, and acknowledging unexpected opportunities yield better process output and efficiency. Also, entrepreneurs should tolerate a high level of uncertainty while they shape a new market (Arrend et al., 2015; Sarasvathy, 2001) or disrupt an existing one (Bhagwati & Srinivasan, 1976). Peng et al. (2020) show that uncertainty and effectuation have a positive interactive effect on new venture performance.

On the other hand, although developing less disruptive products/services prompts entrepreneurs to face the existing competition, it lets them enjoy the predictability of the future (Dan & Chieh,

2008). Causation is a process by which entrepreneurs predict the future to control it (Sarasvathy, 2001) and involves aspects that help entrepreneurs show better performance. Some studies (Baum et al. 1998; Ruvio et al., 2010) have shown that having a clear vision can empower entrepreneurial ventures to grow faster. Moreover, low disruptiveness of the product/service means that entrepreneurs face a competitive environment in which formal control (Wu et al. 2005) and strategic planning (Rigtering et al. 2017; Schwenk & Shrader, 1993) yield better results. Brettel et al. (2012) show that when R&D projects deliver less innovativeness outcome, the causal mindset including goal-driven, expected return, and competitive analysis lead to better process output and efficiency.

According to the abovementioned reasons, we propose that:

H1. *The alignment of the entrepreneurial approach (effectuation or causation) with the level of product/service disruptiveness leads to better performance. It means that:*

Hypothesis 1a*: at high levels of product/service disruptiveness, using effectuation is associated with better venture performance.*

Hypothesis 1b*: at low levels of product/service disruptiveness, using causation is associated with better venture performance.*

Assuming that there is a meaningful fit between the entrepreneurial approach (effectuation or causation) and the level of product/service disruptiveness, this essay also studies if entrepreneurs tailor the approach to the level of product/service disruptiveness or not. As mentioned earlier, although there is some evidence in the effectuation literature endorsing the mentioned belief, there are other objections that question the capability of entrepreneurs to fulfill the optimum approach.

When entrepreneurs shape a new market or disrupt an existing one, they experience higher levels of uncertainty and lower levels of predictability (Bhagwati & Srinivasan, 1976). Sarasvathy (2001) explains how entrepreneurs lean toward effectuation in the mentioned situation:

> If the decision-makers believe they are dealing with a measurable or relatively predictable future, they will tend to do some systematic information gathering and invest some effort on a reasonable analysis of that information, within certain bounds. Similarly, if they believe they are dealing with relatively unpredictable phenomena, they will try to gather information through experimental and iterative learning techniques aimed at first discovering the underlying distribution of the future. (p.252)

This notion is endorsed by Bhowmick (2015) who calls effectuation "ambiguity-mitigating action." Entrepreneurs lean toward the causal approach when their ventures grow (Johansson & McKelvie, 2012, Reymen et al., 2015; Reymen et al., 2017; Sarasvathy, 2001). This means that, by undertaking effectuation, entrepreneurs keep mitigating the ambiguity until the prediction of the future becomes more possible. Accordingly, some scholars assume that the majority of entrepreneurs undertake effectuation in any case in which they face high ambiguity, and while the environment predictability increases, they lean into causal processes.

But, as mentioned earlier, the ability of entrepreneurs to choose and undertake the best approach has been questioned by Arend et al. (2015). They convey that: "There exists an unjustified optimism assumed in the abilities of the effectual entrepreneur to build several different types of firms in completely disparate industries, change his or her goals and even to shape and construct them over time. P.16" Arend et al. (2015) believe that, because entrepreneurs can be self-delusional and over-confident about the quality of their abilities, they may develop wrong visions and

undertake inefficient actions. Also, they postulate that some entrepreneurs lack the essential knowledge and skills to properly evaluate the situation and accomplish timely actions.

The lack of sufficient cognitive and psychological abilities and entrepreneurial skills in some entrepreneurs to undertake the best approach have been addressed in other studies as well. The literature supports this belief that entrepreneurs are totally different from each other in terms of cognitive ability (Bajwa et al., 2017; Baron, 2000), ambiguity tolerance (Teoh & Foo, 1997), self-efficacy (Baron et al.,2016), and overconfidence bias (Forbes, 2005), making them behave differently in the same situation.

Furthermore, there are some individual factors that have been known as antecedents of effectual processes. The mentioned factors include experience (Dew et al., 2009), personal creativity (Engel et al., 2013), passion (Stroe et al., 2018), and optimism (Zhang et al., 2019). Also, some other factors such as education have been introduced as drivers of casual logic (Johansson & McKelvie, 2012). Because entrepreneurs are vividly different from each other according to the mentioned factors, some scholars believe that the capability of entrepreneurs to fulfill effectuation and causation are not the same.

Due to the existence of two different mindsets in the literature about the capability of entrepreneurs to choose and perform the best approach, we will empirically test two opposing hypotheses:

H2(a). *The higher (lower) the level of the disruptiveness of the products/services, the more entrepreneurs use effectuation (causation) in new ventures.*

H2(b). *There is no significant relationship between the disruptiveness of the products/services and using effectuation/causation.*

In the following hypotheses in this essay, we scrutinize the impact of some characteristics that may help entrepreneurs undertake the best approach (effectuation vs causation) in different situations. In other words, the second essay does not intend to find the characteristics that make entrepreneurs perform effectuation and causation effectively per se, instead, it introduces characteristics that help entrepreneurs easily switch between the two when the condition necessitates so. Assuming that there is a meaningful fit between the approach and the level of product/service disruptiveness, we intend to investigate which characteristics make entrepreneurs undertake effectuation in higher levels of product/service disruptiveness and simultaneously make them undertake causation in lower levels of product/service disruptiveness.

The mentioned characteristics should help entrepreneurs cope well with the process of change and give them flexibility and capability to undertake different approaches in different situations. Prior studies endorse the belief that individuals with higher levels of openness to change (Chawla & Kelloway, 2004) and optimism (Taylor, 2020) have more abilities to manage the processes of change. Also, the extant literature supports the belief that individuals with higher levels of ambition (Stam et al., 2011) and individuals with the support of more colleagues in entrepreneurial teams (Stewart, 2006) fulfill different tasks that entail high levels of complexity. Therefore, we chose the mentioned four characteristics for the purpose of this study. We split our data set according to the level of product/service disruptiveness and test the targeted characteristics in both categories.

As a first characteristic, we pay attention to the capability of entrepreneurs to change their mindsets and actions. Some entrepreneurs may have a portfolio of ventures at a time (Baert et al., 2016) or start a new business activity after succeeding/failing in a venture (Wright et al., 1997). Even

through the time when entrepreneurs take the venture to the next level or when the environment changes, entrepreneurs need to modify the processes they take (Reymen et al., 2015; 2017).

According to Choi (2007), change-oriented people are individuals with the capability of implementing changes with respect to work methods, procedures, and policies to enhance the situation and performance. On the other hand, resistance to change is rooted in cognitive and behavioral facets (Goodyear, 1990). Change for some people brings about feelings of anxiety, ambiguity, and negative emotions (Bordia et al., 2004) that cause individuals' unwillingness to embrace and support further changes (Appelbaum & Batt, 1994). Also, the reluctance to accept change may result from limited knowledge and awareness that limit the range of options (Datta et al., 2003).

Based on the study of Datta and Rajagopalan (1998), Datta et al. (2003) convey that higher openness to change results from lower firm tenure, age, and higher educational level. They believe that individuals with higher levels of organization tenure are more embedded within routines and practices that maintain the status quo. Also, Hambrick et al. (1993) believe that individuals with long organizational tenures usually lose rather than gain from changes because they have mentally or financially invested in routine and common practices. Also, as Wiersema and Bantel (1992) and Datta et al. (2003) postulate, older people are more committed to past practices, show less interest in the exploration of new alternatives, and are more affected by organizational inertia. Finally, the literature supports the belief that higher levels of formal education have a negative impact on strategic persistence. As Dollinger (1984) stresses, people with higher education levels show more tolerance for ambiguity and the capability to consider multiple alternatives. Therefore, like the study of Datta et al. (2003), we indicate younger entrepreneurs with higher education and lower levels of venture tenure as being more open individuals to change.

One might say higher levels of venture tenure and being older are synonyms of having more experience in the industry or even having more entrepreneurial experience, which can lead to better choices individuals make. Although we do not deny the mentioned fact, the literature has shown that entrepreneurs with longer venture tenure lean into causation processes (Johansson & McKelvie, 2012, Reymen et al., 2015; Reymen et al., 2017) and entrepreneurs with more entrepreneurial experience lean into effectuation processes (Dew et al., 2009). Therefore, individuals with more openness to change seem more capable of overcoming inertia (Datta et al., 2003) and embracing an optimal approach. Accordingly:

H3. *Entrepreneurs with more openness to change (younger, with higher education and lower levels of venture tenure) are more likely to tailor their approach (effectuation vs causation) to the level of disruptiveness of their product/service. At high (low) levels of product/service disruptiveness, entrepreneurs with more openness to change are more likely to undertake effectuation (causation).*

A theory that can explain the extent to which people welcome noticeable changes is the cognitive adaptation theory. According to this theory, people with some positive characteristics such as self-esteem and optimism during stressful life events show higher levels of well-being. Some scholars such as Taylor and Brown (1988) and Wanberg & Banas (2000) use cognitive adaptation theory in the context of organizational change. Taylor & Brown (1988) convey that changes are stressful and only individuals with a high level of optimism handle the mentioned stress well and attempt to see the changes in the best light possible. Also, Wanberg & Banas (2000) endorse the importance of optimism in coping with change. They convey that knowing that optimistic people face the world hoping that good things will happen to them, they tend to be those having a more positive forecast about the consequences of change.

In addition to the flexibility of entrepreneurs to change the approach when they establish a new venture with new features, their capability and readiness to fulfill different types of processes (effectuation vs causation) are important as well. There is evidence in the entrepreneurship literature that more optimistic entrepreneurs are better effectuators. Stroe et al. (2018) believe that passionate entrepreneurs are more flexible to embrace contingencies and to work with different partners, therefore, they are more capable of undertaking effectual processes. In the study of Versluijs (2012), it is shown that higher optimism leads to a larger focus on goals (the causal mindset) too. Accordingly, entrepreneurs with higher optimism tend to be more capable of fulfilling both effectual and casual approaches and be more flexible to switch between the two.

As mentioned before, Arend et al. (2015) stress that entrepreneurs may be self-delusional and over-confident about their abilities, develop wrong visions, and undertake inefficient actions. This means that although some approaches sound beneficial in certain situations (e.g. undertaking effectuation while developing a disruptive product), it does not mean that all entrepreneurs are capable of fulfilling them and yielding satisfactory performance. As we assess the processes entrepreneurs take in this part, not the performance they show, we believe that more optimistic entrepreneurs take better processes no matter how much they are capable of fulfilling them and showing success, therefore:

H4. *Entrepreneurs with higher levels of optimism are more capable of tailoring their approach (effectuation vs causation) to the level of disruptiveness of their product/service. At high (low) levels of product/service disruptiveness, entrepreneurs with higher levels of optimism are more likely to undertake effectuation (causation).*

The entrepreneurship literature discusses heterogeneous categories of entrepreneurial actions and individuals (Honig & Hopp, 2019) with different characteristics. One of the mentioned

characteristics is the different levels of entrepreneurs' ambition (Loomis, 1988). As Stam et al. (2012) define, ambitious entrepreneurs are individuals who involve in entrepreneurial processes "with the aim to create as much value as possible. (p. 26)" According to Hermans et al. (2015), profit, growth, innovation, and other forms of organizational output can measure the values that entrepreneurial ventures can create.

Ambitious entrepreneurship has been called "high-growth oriented" in different studies (e.g. Gundry and Welsch, 2001; Stam et al., 2012) as well. Most scholars define ambitious entrepreneurs as individuals who expect their firm to grow to at least six employees within five years (e.g. Stam et al., 2011). In general, more ambitious entrepreneurs are expected to contribute more to economic growth than less ambitious ones (Bellu and Sherman, 1995; Wiklund and Shepherd, 2003). Stam et al. (2011) use data from the Global Entrepreneurship Monitor and find that only ambitious entrepreneurship contributes heavily to macroeconomic growth in both low-income and high-income countries. They believe that the ability of ambitious entrepreneurs both to create new products and to select optimal processes that guarantee value-adding outcomes makes this kind of entrepreneurship salient. The mentioned optimal processes assure products' rapid adoption or rejection in the markets.

In light of the description of the ability of ambitious entrepreneurs that Stam et al. (2011) provide, we hypothesize that more ambitious entrepreneurs are expected to choose and undertake an optimal approach (effectuation vs causation) in comparison to their counterparts. Moreover, ambitious entrepreneurs are known to be more creative (Gundry and Welsch, 2001; Hermans et al., 2015) and more motivated (Stam et al., 2012) than non-ambitious entrepreneurs. Knowing that making better choices by individuals is influenced by the level of creativity (Fadaee & Abd Alzahrh, 2014) and higher levels of motivation (Shepherd & Patzelt, 2018), we hypothesize that:

H5. *Entrepreneurs with higher levels of ambition are more capable of tailoring their approach (effectuation vs causation) to the level of disruptiveness of their product/service. At high (low) levels of product/service disruptiveness, entrepreneurs with higher levels of ambition are more likely to undertake effectuation (causation).*

The discussion on the difference between individuals and teams that establish and grow ventures has raised some controversies in the literature. While Reich (1987) sees entrepreneurship as a collective action, Shaver and Scott. (1992) sees entrepreneurial action as being based on a key person who considers all possibilities, manages the innovative process, and fulfills the job. Timmons (1994) and Ensley et al. (2000) take the middle ground and not only pay attention to the main entrepreneur who creates the vision and dreams about the future but also consider other co-founders who share that dream. Cooper & Saral (2013) find that in comparison to non-entrepreneurs, many entrepreneurs are more interested in working alone. Personal preference to work alone, inability to locate suitable partners, and some concerns about diluting ownership are some of the reasons that Cooper & Saral (2013) enumerate for the mentioned finding.

Shared skills, expertise, and competencies provided by team members herald better decisions and better actions (Harrison et al., 1995; Kamm and Aldrich, 1991). After studying a sample of 47 early-stage entrepreneurial teams (144 individuals), Santos et al. (2019) find a positive association between team entrepreneurial competence and the reliance both on causal and effectual approaches. Also, Stankiewicz et al. (2020) find that more collective competencies help entrepreneurs fulfill effectual processes better.

Also, teams enjoy pooling financial and physical resources (Cooney, 2005). Not only do team members share personal resources, but also, they share their networks and social capital (Chen & Wang, 2008) which makes financing from external resources easier. Ruiz-Jiménez et al. (2020)

believe that the availability of resources positively moderates the relationship between both approaches (effectuation and causation) and new venture performance. They believe the availability of resources helps entrepreneurs react faster to contingencies and conduct experiments more effectively. On the other hand, identifying new business opportunities, establishing new goals, and writing business plans are more doable when entrepreneurs have enough resources.

Furthermore, teams of entrepreneurs have higher capacities to innovate (Chen, 2007). As Mosakowski (1998) argues, when a team makes strategic decisions, the CEO is not the only person to make operational or strategic decisions. In this case, it is the responsibility of the team of entrepreneurs to initiate innovative decisions. As Nguyen et al. (2018) stress, the innovative mindset can make entrepreneurs experiment with available means, be more creative, and face contingencies more openly when using effectuation is essential. Berends et al. (2014) endorse the mentioned notion and find that during the earlier development phases, ventures follow effectuation logic to increase innovation but they combine it with causation logic, especially in later stages to complete the innovation process. Also, Kristinsson et al. (2016) find that informational diversity in entrepreneurial teams helps the team through idea generation processes and the implementation of ideas into new products or services.

The larger size of the entrepreneurial teams has been noticed as a positive factor that is associated with different aspects of performance (Haleblian and Finkelstein, 1993). We believe that the larger team size can lead to better choice and execution of entrepreneurial action (causation vs effectuation) due to the following reasons. First, undertaking the best approach necessitates finding enough information from the general environment and the industry (Autio et al., 2013). As Eisenhardt & Schoonhoven (1990) convey, larger top management teams absorb and process information faster and better and execute more tasks simultaneously. Second, no matter what the

focal approach is, entrepreneurial actions are facilitated with the availability of resources (Rasmussen & Sørheim, 2006; Shane & Venkataraman, 2000). Jin et al. (2017) believe that more team members increase the availability of resources and increase the level of human capital that leads to better use of the resources. Third, Stewart (2006) shows that ventures with larger team sizes handle complex tasks and uncertain environments better than ventures with smaller sizes. Based on that, because the uncertainty and complexity always affect entrepreneurial actions (Townsend et al., 2018) especially effectuation (Brettel et al., 2014), ventures with larger team sizes tend to handle the complexity of the approach they choose better. Accordingly, we hypothesize that:

H6. *Entrepreneurs who operate in teams with larger sizes are more capable of tailoring their approach (effectuation vs causation) to the level of disruptiveness of their product/service than entrepreneurs who operate in teams with smaller sizes. At high (low) levels of product/service disruptiveness, entrepreneurs who operate in teams with larger sizes are more likely to undertake effectuation (causation).*

3.4. Research Method

3.4.1. Sample and procedure

As illustrated in chapter 2, the research sample was made up of Canadian entrepreneurs who have started a business activity as a founder at least 5 years before the time we collected the data, regardless of how successful the business activity turned out. This data was gathered by Qualtrics, an online survey company. Qualtrics approached entrepreneurs with the mentioned criteria across Canada and invited them to participate in the study. Before participation, all respondents verified that they had started their businesses as the main founder not more than 5 years before the time they were asked and acknowledged that they spent considerable time growing their businesses.

We used an online questionnaire in the Qualtrics platform linked to the invitation message to entrepreneurs. We implemented quality control strategies with the cooperation of the online survey company to make sure that the respondents qualified to participate in the study and the data were reliable. First, we wanted the respondent to acknowledge that they have pursued a business opportunity as the main founder in the last five years and have put considerable time and energy into it, regardless of how successful the business turned out. Second, we ruled out patterned responses and those ones that were completed in too short of a time. Third, we included two sets of attention questions to make sure the respondents were genuinely thinking about their responses. We asked how many businesses respondents had started in the past and later we asked how many of the businesses they had started had also been successful. By comparing the answers, we ruled out responses in which the number of successful businesses was higher than the number of all businesses started. In the other case, we omitted records in which the number of active founders was greater than the total number of people involved in the venture. After finishing the project with Qualtrics, we gathered 278 records, kept 200 reliable responses, and ruled out 78 ones.

All the mentioned entrepreneurs received an email from Qualtrics containing the link to the online survey and thereafter filled out the questionnaire. The data gathering process started in February 2020 and ended in May 2020.

3.4.2. Measures

With regard to timeframe, we asked respondents to remember a recent time period in which they did not noticeably change their business practices and did not witness any major shock in their industry and the general environment. Because the extent to which entrepreneurs utilize effectual and causal processes changes through time (e.g. Reymen, et al. 2015), we gave freedom to respondents to choose the length of the time period provided that it was between 4 and 12 months.

To measure the effectual (EF) and causal (CA) approach, we used the scale developed by Chandler et al. (2011) so that causation and sub-components of effectuation including flexibility, affordable loss, experimentation, and pre-commitments were measured separately by different items. Like prior studies (e.g. Johansson & McKelvie, 2012) we used a Likert scale (7 possible responses) to see how much the respondents agree with the items developed by Chandler et al. (2011). While 1 shows the lowest level of using effectuation or causation, 7 shows the highest level of using them.

For capturing the degree of product/service disruptiveness (DI), we used the scale Chan & Parhankangas (2017) developed. In their study, these scales were used to measure how radical vs how incremental the products that Kickstarter campaigns developed were (values ranging from 1: the lowest level of disruptiveness to 7: the highest level of disruptiveness).

As Brettel et al. (2012) explain, there are at least three reasons to use subjective measures to evaluate venture performance. First, respondents often lack reliable information and interpretation of objective data. Second, subjective performance data has been found to be reliable enough, and thirdly, subjective and objective measures of ventures are positively associated. Based on the scales Brettel et al. (2012) use, venture performance (PE) was measured by 15 subjective items in 3 categories (values ranging from 1: the lowest level of performance to 7: the highest level of performance).

Like Datta et al. (2003), we used a proxy to measure entrepreneurs' openness to change (OC). This was a composite measure of three demographic indicators, namely, (1) entrepreneur's age (2) organizational tenure (the length of the time that the main entrepreneur has been active in the venture), and (3) educational level. The three mentioned quantities were standardized before being used and the final values for openness to change were standardized. For measuring optimism (OP), we used the scale introduced by Scheier et al. (1994) ranging from 1 (the lowest level) to 7 (the

highest level). According to the definition of Cooney (2005), we considered team size (TS) as the number of founders who had a significant financial interest and participated actively in the creation of the venture. Inspired by the study of Stam et al. (2011), we measured the level of entrepreneurs' ambition (AM) by asking entrepreneurs to predict the size of their company within five years. We used the natural logarithm of the mentioned quantity to evaluate entrepreneurs' level of ambition.

We controlled venture size (VS) by calculating the natural logarithm of the number of active people (Prasad & Junni, 2017), venture age (VA: number of months since creation), and industry (IN) in which they operate based on the Global Industry Classification Standard (MSCI, 2020). Also, to rule out the impact of human capital on performance, we controlled the effect of entrepreneurial experience (EX) as Dew et al. (2009) and Johansson & McKelvie (2012) discuss, by asking the number of businesses entrepreneurs had started as a founder/co-founder other than their current business activity.

While testing hypotheses 2 to 6, we controlled for the effects of the main factors known as the antecedents of effectuation and causation. To that end, we measured venture stage (VS) (Sarasvathy, 2001; Reymen et al., 2015), ranging from level 1 (the level of business idea development) to level 6 (the level at which ventures have stable sales and consider the growth plan). Also, we captured environmental uncertainty (UN) as Harms & Schiele (2012) discuss by using five items that Miller & Dröge (1986) developed (Values range from 1 to 7). Table 9 contains the list of all variables with a brief description of the way we measured them. Also, table 10 provides some descriptive statistics about the variables.

Insert table 9 about here

Insert table 10 about here

When performance is the dependent variable, effectuation and causation act as independent variables, otherwise, effectuation and causation act as dependent variables. Because in all analyses of this research, the DVs and the IVs were measured from the same respondents (main entrepreneurs) by the same tool (questionnaire), to overcome the threat of common method variance, we took five procedural measures that Tehseen et al. (2017) suggest and used a statistical test to make sure that the procedural measures have been effective:

Regarding the procedural measures, first, we created a temporal separation by measuring the DVs and the IVs in different parts of the questionnaire. We made it possible for the respondents to take a break while filling out the questionnaires to maximize the probability of temporal separation. We measured effectuation and causation in the first half of the questionnaire while we measured performance and the characteristics of entrepreneurs and teams in the second half. Measuring the DVs and the IVs with the highest time distance increased the chance of separating the time respondents read items that measure the DVs and the IVs.

Second, we tried to create a psychological separation among measurements by adding an explanation to make it clear that the measurements of the DVs are not related to the measurement of the IVs. Our additional explanation not only created a psychological separation but also was meant to omit the social desirability of responses. To measure effectuation and causation, right after we wanted the respondents to stress how much they agree with statements about the process they took, we added: “Please note that none of the following processes and policies is necessarily imperative and beneficial for all ventures. We are eager to know which ones you have taken.”

Third, we protected the anonymity of the respondents and minimized the evaluation apprehension by stressing that they do not have to participate, and it was merely their choice to participate or not.

Fourth, we counterbalanced the order of measurement of the IVs and the DV for most of the analyses to neutralize some of the potential method biases related to items' embeddedness and question context.

Fifth, we tried to improve scale items through our careful construction by tailoring the scale to the context in which entrepreneurs operate especially those who are related to Concordia University. Not only did the authors of this research modify the questions and answers of the questionnaires by discussing them and receiving feedback from colleagues, but the questionnaire was also filled twice by the representative of District 3, an innovation center in Montreal, Canada, at different times to make sure that the questions and answers are completely relevant and clear.

Regarding the statistical measure, we performed a Harman one-factor analysis as a post hoc test to check whether a single factor is accountable for variance in the data (Chang et al., 2010; Tehseen et al., 2017). We loaded all items from every construct into the factor analysis and found that 16.54% of the variance is correspondent to the first factor. As the mentioned percentages are far below 50%, we could not find a sign of common method bias.

3.5. Results

Before testing the hypotheses, we first consider the correlations among variables. As illustrated in table 11, the correlations among independent variables and control variables are less than 0.4. This shows that there is no serious concern regarding multicollinearity. The correlation between the size of ventures and the level of ambition is high because the first variable indicates the existing

size of ventures and the second one represents the size of the ventures in the future. High correlations between Ind9 (9^{th} category of industry) and Ind8 (8^{th} category of industry) and between St6 (6^{th} stage) and St5 (5^{th} stage) are normal as they respectively represent Industry variables and stage variables that are dummy variables. It means that the last dummy variables in their categories (e.g. In9) are dependent on previous variables in the same category (e.g. In1 to In 8).

Insert table 11 about here

Also, the high correlation between effectuation and causation did not surprise us. The complementary function of the mentioned approaches in entrepreneurial ventures has been theoretically elaborated by Sarasvathy (2001) and empirically endorsed in empirical studies. For example, a high correlation between causation and effectuation has been found in the study of Guo et al. (2016), Shirkova et al. (2020), and Yu et al. (2018) by $\alpha = 0.33$, 0.41, and 0.67 respectively. Accordingly, there is no serious concern regarding multicollinearity. We double-checked the multi-collinearity issue by calculating variance inflation factors (VIFs). As illustrated in table 12, all VIFs are far less than 3.00, obviating the concern regarding multicollinearity.

Insert table 12 about here

Also, to evaluate the reliability of the scales, we measured Cronbach's alpha. As demonstrated in table 13, for most of the scales the alpha is more than 0.7 and for all the scales the alpha is more than 0.6 showing acceptable reliability of data.

Insert table 13 about here

Like Brettel et al. (2012), we split data into two categories: the low disruptiveness category and the high disruptiveness category to test hypotheses 1, 3, 4, 5, and 6. The disruptiveness values between 1 and 4.75 fall into the first category (94 records) and values between 4.76 and 7 fall into the second category (106 records) as there is no exact cutting point to split the data into two categories with the same number of records.

According to hypothesis 1a, at high levels of product/service disruptiveness, undertaking an effectual approach is associated with better venture performance. Also, according to hypothesis 1b, at low levels of product/service disruptiveness, undertaking a causal approach is associated with better venture performance. As demonstrated in table 14b, both hypotheses 1a and 1b are fully supported (β=0.32 and $p<.01$ for effectuation in high disruptiveness and β=0.37 and $p<.01$ for causation in low disruptiveness). Also, we separately tested the mentioned fit in three different aspects of performance as well. As shown in table 14C, the issue of fit is salient in the growth and financial aspects of performance, but not regarding R&D outputs.

Insert tables 14a to 14c about here

In hypothesis 2, we test if entrepreneurs undertake the action that yields the best results for their venture. As shown in table 15, the results support evidence that entrepreneurs use more effectuation when they develop highly disruptive products/services (β=0.37 and $p<.001$), but we found the opposite results for using causation while entrepreneurs develop less disruptive products/services. Instead of a negative relationship between the degree of disruptiveness and

causation, we found a significant positive relationship (β=0.36 and p<.001). Therefore, hypothesis 2(a) is only partially supported.

Insert table 15 about here

As mentioned earlier, for testing hypotheses 3, 4, 5, and 6, like Brettel et al. (2012), we split data into two categories: the low disruptiveness category and the high disruptiveness category. Knowing that effectuation leads to better performance in the high-disruptiveness category, and causation leads to better performance in the low-disruptiveness category, and the fact that entrepreneurs do not necessarily take the best approach, we investigated which entrepreneurs do. Therefore, we run the ordinary least squares regression analysis in both categories to see which characteristics have a positive association both with causation in the low-disruptiveness category and with effectuation in the high-disruptiveness category.

Insert tables 16a and 16b about here

Hypotheses 3 to 6 predict that ventures whose main entrepreneur has higher levels of openness to change, optimism, ambition, and ventures with more founders use more effectuation in the high disruptiveness category and more causation in the low disruptiveness category. The results in table 16b show support for hypothesis 3 (model 2: β=0.33 and p<.01 in high disruptiveness and β=0.26 and p<.05 for low disruptiveness) and hypothesis 5 (model 4: β=0.42 and p<.01 in high disruptiveness and β= 0.19 and p<.05 in low disruptiveness). Also, we found partial support for hypothesis 4 (model 3: β = 0.23 and p<.05 in high disruptiveness and β=- 0.04 and p>.1 in low disruptiveness) and no support for hypothesis 6. Regarding hypothesis 4, we also assessed the

curvilinear relationship (quadratic function) between optimism and the best approaches for which we found no significant support.

3.6. Discussion and conclusion

The second essay contributes to the effectuation literature by addressing two research questions about whether entrepreneurs can identify and fulfill the approach (effectuation vs causation) that leads to better performance and about the characteristics that help entrepreneurs identify and fulfill the mentioned approach. We did so in three different ways. First, we paid attention to product/service disruptiveness and its impact on ventures' performance to see if there is a meaningful fit between the entrepreneurial approach (effectuation vs causation) and the extent to which products/services are disruptive. This adds to the literature on the relationship between effectuation/causation and performance by introducing a new variable (product/service disruptiveness) that changes the magnitude of the mentioned relationship. Because businesses in recent years are changing rapidly, new markets emerge faster than ever, and disruptive products replace the recently adopted ones more rapidly (Innosight, 2016), attention to the product/service disruptiveness and its impact on the approach that entrepreneurs undertake seems necessary and timely.

Also, by using a situational lens, inspired by contingency theory, we studied if entrepreneurs tailor their entrepreneurial approach to the level of product/service disruptiveness. Investigating the mentioned capability addresses the different views between Arend et al. (2015) and Sarasvathy (2001) regarding the entrepreneurs' ability to execute different processes in different situations.

Finally, we studied individuals' capabilities and a team characteristic that can help entrepreneurs find and fulfill the best approach in different situations. By doing that, we stepped beyond addressing antecedents of effectuation and causation per se and investigated the factors that help

entrepreneurs recognize the approach that situation demands and follow the approach (effectuation vs causation) that are associated with better performance.

The results showed that, while in high levels of product/service disruptiveness, undertaking an effectual approach leads to better performance, in low levels of product/service disruptiveness, undertaking a causal approach yields better performance. This means that there is a meaningful fit between the approaches and the level of product/service disruptiveness.

Also, the results showed that taking causation in lower levels of product/service disruptiveness cannot be taken for granted. As mentioned previously, Although Sarasvathy (2001) assumes that all entrepreneurs "can" but few "do" fulfill effectual processes, Arend et al. (2015) believe few entrepreneurs "can" effectuate. The results of this study are mostly in line with what Sarasvathy (2001) assumes because we found a positive relationship between product/ service disruptiveness and undertaking effectuation.

But the concern that has been neglected in the literature is whether entrepreneurs are capable of executing different approaches (effectuation vs causation) in different situations or not. The results of this study showed that the answer to the mentioned questions is that they do not. In the case of lower product/service disruptiveness, entrepreneurs did not lean more toward causal processes although in the mentioned case undertaking causation leads to better performance. As mentioned earlier, this can be rooted in the weakness of entrepreneurs' cognitive abilities to recognize what the essential action should be (Haynie & Shepherd, 2009). The mentioned result is in line with the notion that entrepreneurs do not necessarily undertake effectuation, causation, or other entrepreneurial processes consciously with an analytical mindset and due to logical reasons. As Hunt & Lerner (2018) narrate, the notion that entrepreneurship results exclusively from rational

judgment is inconsistent with scientific findings but it is emanated from a combination of a-rational behaviors and deliberative judgments. The finding of our research endorses the mentioned belief.

This may be due to the inability of entrepreneurs to fulfill causal processes (Jiang & Rüling, 2019) or the lack of dynamic capability to change the approach from one business activity to another one (Arend et al., 2015) and being embedded in processes that used to work out before.

The results of this research also showed that entrepreneurs with higher levels of openness to change and ambition tailor their approach with the level of product/service disruptiveness better. This means entrepreneurs with the mentioned capabilities tend to mindfully assess how radically their products/services change the market and find processes that look more promising. Also, they are more capable of fulfilling the approach that seems more effective.

In this research, we just focused on the level of disruptiveness of products/services to find the best approach, considered only the general aspects of optimism, and mostly studied linear relationships among variables that all seem to be the limitations of this research. To continue the dialogue we started and to obviate the limitation of this research, we suggest that future research should evaluate the behavior of entrepreneurs in different situations, such as different levels of uncertainty and resource scarcity. Also, in order to yield more precise results, scholars should pay attention to different types of optimism and assess the curvilinear relationship among variables such as team size. Additionally, longitudinal studies and sampling from other societies of entrepreneurs may add other informative insights to the literature.

Another limitation of this research is measuring IVs and DVs from the same source by the same tool (questionnaire). Although we used different procedural measures to prevent common method bias, diversifying measurement tools in future studies makes the findings more reliable. Also,

having a larger sample size enables researchers to perform a structural equation model which yields more robust outcomes than our models (multiple-regression, Ordinary Least Squares). Furthermore, in this research, we split data and measured IVs and DVs into two categories. In future studies, researchers may focus on a more limited number of IVs and instead, pay attention to interactive effects by using moderators. In this way, although the domain of research becomes more limited, a higher amount of variation of different variables will be saved. Also, attention to the interactive impacts of causation and affection on ventures' performance in different situations can add to our understanding of the advantage of both approaches when they are applied simultaneously.

Finally, as mentioned earlier, we preferred to subjectively measure the level of the disruptiveness of the products/services in the first essay because entrepreneurs base the processes they undertake on their perception of their products/services' disruptiveness. In contrast, objectively measuring the level of the disruptiveness of products/services would have yielded more reliable results in the second essay as we studied the impact of the issue of fit on ventures' performance. We suggest that this limitation is obviated in future studies.

CHAPTER 4

Entrepreneurial responses to resource scarcity. The shift of attention from theoretical approaches to innovative courses of action

4.1. Introduction

Resources are crucial for entrepreneurship (Alvarez & Busenitz, 2001; Shane & Venkataraman, 2000) and the extant literature supports the belief that almost all entrepreneurs experience resource scarcity while developing their businesses (Aldrich, 1999). To explain entrepreneurial responses to resource scarcity, a recent stream of entrepreneurship literature has mainly focused on resources at hand (Vanevenhoven et al., 2011) and on developing creative strategies to marshal and control resources (Hisrich et al., 2017).

Three of the main research streams that are included in this literature are about the bricolage approach, i.e. making do with whatever is at hand (Baker & Nelson, 2005), effectuation approach, i.e. developing ends based on available means (Sarasvathy, 2001), and bootstrapping approach, i.e. reducing overall capital requirements, improving cash flow, and using personal sources of financing (Ebben & Johnson, 2006). In this research, we chose the mentioned approaches because they have an antecedent in common, i.e. resource scarcity, and yield some similar outcomes, i.e. overcoming resource scarcity. Also, all three approaches can be measured at the firm level (Davidsson et al., 2017; Chandler et al., 2011; Vanacker et al., 2011); therefore, it is possible for us to study them in this study. We will elaborate on the similarities and differences among the three approaches in section 4.2.3.

Each of the mentioned approaches consists of different forms or dimensions.

While using bricolage, entrepreneurs may change the functionality of resources, combine them to create a new effect (Baker & Nelson, 2005), or mobilize other individuals or firms in their network (formal or informal) to obtain resources (Baker et al., 2003). The mentioned tasks could occur within a venture or among different entrepreneurs as a collective action (Duymedjian & Rüling, 2010) to exploit a business opportunity or address a social cause (Di Domenico et al., 2010).

As Chandler et al. (2011) define, effectuation is formed by flexibility (embracing contingencies rather than sticking with pre-defined visions), experimentation (learning by doing rather than using pre-existing knowledge), affordable loss (considering what we can lose rather than calculating what we can gain), and pre-commitment (viewing influential individuals and firms as potential stakeholders rather than competitors).

About bootstrapping, Grichnik et al. (2014) enumerate four dimensions as well: customer-related (e.g. offering customers discounts if they pay cash and using interest on overdue payments), joint resource utilization (e.g. sharing employees or equipment with others and having bundle purchases with others), internal self-financing (e.g. obtaining loans from relatives/friends and withholding own salary) and temporary resources (e.g. borrowing equipment from others and leasing equipment instead of buying).

Although the literature on bricolage, effectuation, and bootstrapping has been developed separately, some studies have tried to synthesize the three mentioned approaches to create a better understanding of what entrepreneurs do in uncertain and resource-constrained situations to grow their businesses. The mentioned literature, calls bricolage, effectuation, and bootstrapping entrepreneurial approaches (Chandler et al., 2011; Garud & Karnøe, 2003; Grichnik et al., 2014). These can be explained by distinct theoretical perspectives (Ebben & Johnson, 2006, Fisher, 2012) that explain the processes entrepreneurs take (Ekanem, 2005; Perry et al., 2012; Vanevenhoven et

al. 2011) and the behaviors they show (Grichnik et al., 2014; Stinchfield et al., 2013; Werhahn & Brettel, 2012) to overcome resource scarcity and sometimes to mitigate uncertainty (Arend et al., 2015).

The extant literature so far has focused on similarities among different entrepreneurial approaches and the way they complement each other to grow ventures (e.g. Archer et al., 2009), how extensively they are used in general (e.g. Fisher, 2012), what the impact of using them will be on new ventures' performance (An et al., 2019), and mechanisms explaining individuals' behaviors in incidents outside the business sector such as a natural disaster (Nelson & Lima, 2020). However, there is still a lack of knowledge about the factors that make entrepreneurs prioritize one approach over the other(s). To the best of our knowledge, only the research of Servantie & Rispal (2018) has aimed to explain the mentioned prioritization, but it did not find any support for the impact of the venture's stage on the approaches that entrepreneurs prioritize.

In this research, we suggest that the hardship in finding the reasons why entrepreneurs prioritize some actions over others to overcome resource scarcity is due to the fact that, so far, researchers have not distinguished between entrepreneurial approaches and entrepreneurial actions and have tried to measure approaches to assess entrepreneurs' responses to resource scarcity. This study has three key aims. First, we explain why measuring entrepreneurial approaches for the mentioned purpose is insufficient. Second, we introduce four innovative courses of action that entrepreneurs can undertake to respond to resource scarcity. As illustrated in figure 1, three of the mentioned courses of action are internal to the entrepreneurial venture, and each nested in one particular approach. The fourth course of action is networking innovatively which refers to different tasks to obtain essential resources externally. Third, we identify process-related, organizational,

environmental, and individual factors that make entrepreneurs prioritize some innovative courses of action over others to overcome resource scarcity.

Insert figure 1 about here

Although studies that synthesize entrepreneurial responses to resource scarcity focus on different approaches and use different research methods, all of them take the mentioned approaches as different lenses that stimulate distinct courses of action. The extant literature calls entrepreneurs effectuators (González & Herrera, 2020), bricoleurs (Zahra et al., 2009), or bootstrappers (Malmström, 2014) implying that there are some entrepreneurial approaches that prompt entrepreneurs to take interrelated actions that, in total, form a specific course of action such as an effectual action (Sarasvathy & Ramesh, 2019). In other words, although the existing literature highlights the fact that entrepreneurial approaches may have different dimensions (Chandler et al., 2011; Senyard et al., 2014), coexist in firms (Fisher, 2012), and have overlaps (Welter et al., 2016), due to the lack of theoretical support for differentiating between entrepreneurial approaches and entrepreneurial actions, while developing empirical research, all studies measure bricolage, effectuation, bootstrapping, and other similar approaches as distinct courses of action. The mentioned approach in prior studies implies that researchers are faced with four limitations, which are illustrated below.

First, due to a high amount of overlap among approaches, some entrepreneurial actions are hard to be classified as a distinct approach (bricolage, effectuation, or bootstrapping) and can be construed as being simultaneously a part of different entrepreneurial approaches. For instance, if an entrepreneur takes resources from their pre-existing personal network, one scholar might say it stems from bootstrapping approach (Grichnik et al., 2014) and another may say it is a part of

bricolage (Baker et al., 2003; Cheung & Kwong, 2017). Also, more formal networking can be classified both as precommitment, which is a dimension of effectuation (Sarasvathy, 2001), and as a formal partnership, which is a part of bricolage (Kwong et al., 2017). The mentioned difficulty of classifying several different entrepreneurial actions into a limited number of distinct approaches has led to insufficient empirical research (Archer et al., 2009; Weler et al., 2016) and to similar but ambiguous results for many studies. The extant literature mainly finds that entrepreneurs adopt all approaches together (Fisher et al., 2102) to grow their ventures without discussing when a specific approach is preferred (Servantie & Rispal, 2018). Sometimes, overlaps are so salient that some scholars suggest that effectuation is a part of bricolage (Archer, 2009; Vanevenhoven et al., 2011).

Second, by not distinguishing effectively among different actions being executed by entrepreneurs, research obscures the differences among actions and how different outcomes can result from them. In other words, there is a lack of distinction between what entrepreneurs do and how they do it. For instance, the literature supports the belief that experimentation is a shared construct between bricolage and effectuation (Servantie & Rispal, 2018), while we see experimentation only as a procedure by which entrepreneurs fulfill different tasks. According to Chandler et al. (2011), while effectuating, entrepreneurs experiment with different features of the final product when they perform experimentation, while when they are engaging in bricolage, as Baker and Nelson (2005) explain, entrepreneurs experiment with different combinations of resources or change the function of different resources to see which one fits the targeted purpose. Therefore, experimentation in different approaches does not function the same way, leads to different results, and cannot be viewed as a common construct. In other words, experimentation is not what entrepreneurs do, but is how they may fulfill different actions.

Third, sometimes there is no clear distinction among different antecedents that trigger different approaches, therefore, researchers may neglect the fact that different approaches can be undertaken for different reasons. With regard to the main antecedents of entrepreneurial approaches, as Arend et al. (2015) convey, bricolage stems from a penurious environment in which entrepreneurs lack essential resources, while effectuation stems from a resource-constrained situation or an environment that involves a high degree of uncertainty so that no prediction of the future is possible beyond the short term. This means that, while some entrepreneurs effectuate to alleviate the uncertainty of the environment (Bhowmick, 2015), other entrepreneurs may perform bricolage only to gain essential resources (Baker & Nelson, 2005). Therefore, the purpose of entrepreneurs to adopt the two mentioned approaches can be totally different, a fact that has been neglected in some studies that compare effectuation and bricolage.

Fourth, due to the formative and multidimensional nature of some approaches, such as effectuation (Chandler et al., 2011), synthesizing all dimensions of an entrepreneurial approach into one construct hinders researchers from noticing how independently the different dimensions may act. For example, Brettel et al. (2012) believe that the means-driven dimension of effectuation has a negative impact on process efficiency, while other dimensions have a positive impact on process efficiency. Inconsistency of results regarding different dimensions of bootstrapping is even more salient, making it harder to see bootstrapping as one course of action. Harrison et al. (2004) find that, while small firms focus more on cost-reducing bootstrapping techniques, larger firms focus on value-chain based relationships. Schinck & Sarkar (2012) show that different dimensions of bootstrapping are used at different periods in the life of a small firm. Ebben (2009) finds a positive association between owner-related methods of bootstrapping and financial performance but a negative association between delaying-payments methods and financial performance.

To address the mentioned limitations, this research makes two major theoretical contributions to the literature. First, we introduce four distinct, single-dimensional, and easily measurable innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively) that entrepreneurs undertake to overcome resource scarcity. Each course of action can be explained by one or more approaches, but the four, in total, delineate entrepreneurial responses to resource scarcity whilst overcoming the mentioned limitations. To fulfill the mentioned task, at first, we only focus on "what" entrepreneurs do without addressing "why", "how", "when", and "where" entrepreneurs undertake different courses of action to overcome resource scarcity. Second, we elaborate on different factors that affect the decision of entrepreneurs to prioritize some courses of action over the other(s).

Other than the theoretical contributions of this research, the models suggested in this study, can be used by entrepreneurs and entrepreneurship advisors and educators. Prior research has shown that the rate of failure in entrepreneurial activities is very high (Singh et al., 2007) and the main cause of it lies in lack of essential resources (Pendergast, 2003). If entrepreneurs who deal with resource scarcity fully comprehend that other successful entrepreneurs, more or less, have had the same experience facing resource scarcity (Aldrich, 1999) and have overcome it not only by conventional ways of financing but also by utilizing innovative actions (Hisrich et al., 2017), they may try some of the innovative courses of action before quitting. The clear and single-dimensional nature of innovative courses of action that will be introduced in this research makes it easy for entrepreneurship advisors and educators to teach them to entrepreneurs and students without imposing confusion due to the complexity of some theoretical approaches. Also, trying different actions in entrepreneurial activities is full of trial and error (Rerup & Feldman, 2011) and costly (Sosna et al., 2010). We hope knowing when and where one type of innovative action is prioritized

by the majority of entrepreneurs helps less experienced entrepreneurs decrease the mentioned errors and costs.

The mentioned contributions help us provide answers for the following research questions: what are the innovative courses of action that entrepreneurs undertake to overcome resource scarcity? and what factors prompt them to prioritize some innovative courses of action over the others(s)?

In the remainder of this paper, we first elaborate on the different lenses and theories that describe entrepreneurs' responses to resource scarcity and then, in more detail, introduce studies that are meant to synthesize different entrepreneurial approaches. Because we intend to perform a comparative analysis on four courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively), three of which are internal and each nested in one particular approach, we elaborate more on what we already know about the similarities and differences among different approaches. After that, based on our literature review, we introduce the four mentioned innovative courses of action that entrepreneurs undertake to overcome resource scarcity and elaborate on the boundary of each of them. Then, we develop propositions to introduce and explain factors that affect the decision of entrepreneurs to prioritize one or two courses of action over the other(s) to overcome resource scarcity. Finally, we discuss how the dialogue that we have started can create a better understanding of entrepreneurial responses to overcome resource scarcity, illustrate the limitations of our research, and provide suggestions for future studies.

4.2. Theoretical background and literature review

In this part, we first elaborate on the different lenses and theories that describe entrepreneurs' responses to resource scarcity (section 4.2.1). In section 4.2.2, in more detail, we introduce studies that are meant to synthesize different entrepreneurial approaches that address resources scarcity.

We show different perspectives that researchers have taken to assess the mentioned entrepreneurial approaches. To summarize the findings of prior studies, in section 4.2.3, we elaborate more on what we already know about the similarities and differences among the three approaches. We perform the mentioned task because we intend to conduct a comparative analysis of four innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively), three of which are nested in one particular approach. This means that some differences among innovative courses of action may be rooted in differences in different entrepreneurial approaches that explain those courses of action.

4.2.1. Entrepreneurship and resource scarcity

According to the classic perspectives of entrepreneurship research, entrepreneurial activities lead to creating value by bringing together a unique package of resources to pursue an opportunity (Carland et al., 1984; Cornwall and Perlman, 1990). Drucker (1985) conveys that some opportunities arise when political, regulatory, or demographic changes make entrepreneurs react to shifts in the relative costs and benefits of alternative uses for resources. He defines entrepreneurship as an innovative act endowing existing resources with new wealth-producing capacity. Kirzner (1997) believes that opportunities are exploited by those individuals who have different beliefs about the relative value of resources in comparison to others. Shane & Venkataraman, (2000) convey that, when someone finds that a set of resources is not put to its "best use", a business opportunity is discovered.

According to the resource-based view (RBV) of the firm (Barney, 1991: 102), resources are "those attributes of a firm's physical, human, and organizational capital that … enable a firm to conceive of and implement strategies that improve its efficiency and effectiveness". Others have broadened the definition of resources (e.g. Bourdieu, 1986; Pfeffer & Salancik, 1978) and paid attention to

all economic, political, and cultural assets that can be used to improve organizational performance (Baker & Nelson, 2005; Lounsbury & Glynn, 2011).

Attention to the importance of the resources to evaluate if a business idea can turn into a viable business is highlighted in Timmons' model (Hisrich et al., 2017). According to Timmons' model, the availability of resources is as important as the value that a business opportunity creates for customers and the capability of the entrepreneurial team to execute the targeted opportunity.

The extant literature supports the belief that almost all entrepreneurs experience resource scarcity while developing their businesses (e.g. Salunke et al., 2013). Aldrich (1999: 41) conveys that entrepreneurs "can't always get what they want, and certainly don't always get what they need." According to Pendergast (2003), 81 percent of Inc 500 founders relied on personal savings, friends and family, loans, and credit cards. 50 percent of the 2001 Inc 500 CEOs started their businesses with $20,000 or less. According to him, the biggest cause of new venture failure is under-capitalization.

In addition to financial resources, most entrepreneurial ventures have difficulty attracting specific human resources and expertise when those resources are needed (Aldrich & Von Glinow, 1992; Penrose, 1959). Senyard et al. (2009) say that firms are typically created with inadequate financial, social, temporal, and other resources. In addition to the mentioned resources, Ravasi & Turati (2005) consider the skills and competencies of entrepreneurs as well when they refer to resource scarcity. According to them, entrepreneurs should obtain the mentioned resources from industrial, commercial and research partners, consultants, designers, and other stakeholders.

According to the extant literature, the mentioned resource scarcity stems from at least three factors. First, some entrepreneurs operate in resource-constrained environments regardless of how much

their access to resources is higher or lower than the average amount in the industry. According to Ngoasong (2018), a resource-scarce context negatively influences entrepreneurship due to the lack of essential resources and the lack of governmental support. On the other hand, Harima et al. (2020) accentuate the positive impact of entrepreneurial ecosystems on the performance of new ventures. Second, even in resource-abundant environments, some entrepreneurial ventures lack resources. Leibenstein (1968: 75) believes that insofar as entrepreneurs are "gap-fillers" and "input-completers" they lack resources. He coveys that "other things equal, the amount of gap-filling and input-completing required determines the degree of scarcity." Third, without enough time, entrepreneurs cannot take advantage of available resources. Entrepreneurial activities include the pursuit of opportunities either in the process of the creation of new businesses or the renewal of established organizations (Nordqvist & Melin, 2010). Ravasi & Turati (2005) believe that entrepreneurs periodically need to decide what opportunities are worth exploring and what projects should be terminated because collecting an orchestrated bundle of resources to exploit an opportunity is time-consuming.

Three main theoretical streams have been developed to create a better understanding of how entrepreneurs develop the essential bundle of resources when they face resource scarcity. First, mindsets derived from open-systems models (Boulding, 1956; Scott, 1998) show how variations in resource constraints affect firm outcomes. Open-systems models shifted the attention of scholars from administrative models (Perrow, 1986), which explain the intrinsic processes by which decision-makers consider possible solutions and then select the optimum one, to the organizations' context, its pressures, and constraints. For instance, the mindset derived from population ecology postulates that patterns of firm survival are highly affected by environmental factors including resource abundance.

In contrast, in the second stream, Penrose (1959) differentiates between resources and services (the uses of the resources that are derived from the creativity of managers). According to her, the objective aspect of resources, including financial, physical, and people, should be considered alongside their idiosyncratic aspect. The idiosyncratic aspect defines the processes by which resources contribute to the success of firms. In other words, Penrose (1959) did not reject the fact that entrepreneurs in different locations face different levels of resource abundance, but she takes the capability of entrepreneurs and managers to utilize resources into consideration.

Built mainly on the second stream, the third stream shifts our attention from what hinders entrepreneurs from accessing essential resources to how normal it is to lack resources when individuals start new businesses and how innovatively they act to overcome resource scarcity. Hisrich et al. (2017: 84) refer to the overemphasis on the importance of the availability of resources as one of the most common misconceptions and say that "Successful entrepreneurs devise ingeniously creative and stingy strategies to marshal and gain control of resources. Surprising as it may sound, investors and successful entrepreneurs often say one of the worst things that can happen to an entrepreneur is to have too much money too early." Recent entrepreneurial approaches such as effectuation (Sarasvathy, 2001), bricolage (Baker & Nelson, 2005), and bootstrapping (Bhide, 1992) fall into the third stream. We will elaborate more on them in the following sections.

Some researchers have tried to bring more salient approaches of the third stream under a shared umbrella by using the concept "resourcefulness". Although more recent studies have defined resourcefulness as the way entrepreneurs create value in resource-constrained situations (Barraket et al., 2019) or creatively gather resources and deploy them to create new or unexpected sources (Williams et al., 2021), prior studies define it more broadly beyond resource mobilization. For

example, Misra et al. (2000) address all competencies-cognitive, affective, and action-oriented competencies that help entrepreneurs exploit opportunities. Also, Bradley (2015) pays attention to broader problems entrepreneurs face such as finding a niche in the market. Although resourcefulness is meant to mainly address creative ways to gather and exploit resources (Bloodgood et al., 2014; Williams et al., 2021), it includes non-creative actions such as self-financing (Michaelis et al., 2022) and can be utilized to gather resources after the opportunity is defined (Barraket et al., 2019; Misra et al.,2000) which signals only causal processes, not effectual ones.

No matter what causes resource scarcity and which perspective explains entrepreneurial responses to it better, entrepreneurs need to find a way to obtain essential resources, otherwise, they fail to develop their businesses successfully. The resource constraints negatively affect entrepreneurs' ability to exploit opportunities (Bygrave & Zacharakis, 2014), entrepreneurial learning, and innovation (Ravasi & Turati, 2005). To avoid the mentioned negative influences, entrepreneurs tap into different actions that will be explained in section 4.3.

4.2.2. Studies that analyze entrepreneurial approaches addressing resource scarcity

As mentioned before, in this section, in more detail, we introduce studies that are meant to synthesize different entrepreneurial approaches. We show different perspectives that researchers have taken to assess entrepreneurial approaches that address resource scarcity.

Having analyzed the main streams of literature addressing resource scarcity, we move on to reviewing the literature on the main entrepreneurial approaches that address such resource scarcity. Archer et al. (2009) try to find the roots of resemblance among three such approaches – bricolage, effectuation, and improvisation – and delineate the common themes among them, namely, novelty, the nature of the opportunity, resources and resource constraints, goals, and a bias for action.

Fisher (2012), Servantie & Rispal, (2018), and An et al. (2020) compare and contrast bricolage, effectuation, and causation. Fisher (2012) relies on an alternate template research design and highlights behavioral similarities and differences among the mentioned three approaches by analyzing six entrepreneurial ventures as different cases to see if the mentioned approaches are observable in the case study. He finds that, across all ventures, while the behaviors associated with bricolage and effectuation are prevalent, causal processes are only taken alongside behaviors associated with effectuation and bricolage, not alone.

Servantie & Rispal (2018) show how the combination of bricolage, causation, and effectuation evolves through time and introduce factors responsible for changes over a particular venture's life cycle. They find that bricolage, effectuation, and causation coexist despite their different behavioral components and entrepreneurs do not noticeably prioritize an exclusive approach over others for any of the phases of the entrepreneurial process. However, they find that effectuation is long-lasting throughout the whole process, bricolage is undertaken mostly in the emergence period, and causation is mostly implemented in the replication and sustainability periods. An et al. (2020) study the impact of undertaking the entrepreneurial approaches on performance at different sizes and stages of ventures. For instance, they find both the combination of bricolage and effectuation (and the absence of causation) and the combination of causation and bricolage (and the absence of effectuation) are associated with better performance for small early-stage firms.

Welter et al. (2016) theoretically compare and contrast opportunity creation, bricolage, and effectuation, similar to what Fisher (2012) and Archer et al. (2009) did. Based on the mentioned study, Ghezzi (2019) shows how digital start-ups connect and combine lean start-up approaches with other entrepreneurial approaches (bricolage, effectuation, and opportunity creation).

Nelson & Lima (2020) use the experience of Brazilian people before, during, and after a major natural disaster to find the application of entrepreneurial action in response to a major environmental disaster. They find that residents responded over time with combinations of different varieties of social bricolage, effectuation, and gradually more causation.

While the extant literature focuses on similarities among different entrepreneurial approaches and how they complement each other to grow ventures (e.g. Archer et al., 2009), how extensively they are used in general (e.g. Fisher, 2012), what the impact of using them will be on ventures performance (An et al., 2019), and mechanisms that they explain individuals' behaviors to respond to a disaster (Nelson & Lima, 2020), scholars have not addressed the factors that make entrepreneurs prioritize one approach over the other(s). As discussed before, to the best of our knowledge, only the research of Servantie & Rispal (2018) has aimed to explain the mentioned prioritization, but it was unsuccessful in finding support for the impact of ventures' stages on the approaches entrepreneurs prioritize.

In this research, we intend to introduce four different courses of action based on the literature on the different approaches of bricolage, effectuation, and bootstrapping to overcome the limitations that make comparison among different approaches difficult and to delineate the factors making entrepreneurs prioritize some actions over the others to overcome resource scarcity. As mentioned earlier, the limitations are (1) a high amount of overlap among approaches (2) no clear distinction between what entrepreneurs do and how they do it, (3) no clear distinction among different antecedents that trigger different approaches, and (4) the formative and multidimensional nature of approaches.

Although one of the courses of action that we introduce (networking innovatively) can be explained by the literature on all three approaches, each of the internal courses of action is nested

in one particular approach (manipulating resources is nested in bricolage, manipulating ends in effectuation, and maximizing available cash in bootstrapping), therefore, each can be explained by one stream of literature. Accordingly, knowing the similarities and differences among the mentioned three approaches helps us define each course of action and specify their boundaries better. In section 4.2.3, we enumerate the mentioned similarities and differences among different approaches.

4.2.3. Similarities and differences among entrepreneurial approaches that address resource scarcity

According to the existing literature, bricolage, effectuation, and bootstrapping have several similarities. These include questioning individual rationality, considering resource scarcity as the antecedent of all approaches, attention to action orientation, the dependence of entrepreneurial actions on actors, highlighting heavy use of experimentation, and developing communities.

First, from a theoretical standpoint, all three approaches are in line with important shifts in management theory questioning managerial rationality and interpreting individual actions beyond the assumptions held in economics (Stinchfield et al., 2013). To elaborate on effectuation, Sarasvathy (2004) introduce entrepreneurs as individuals with diverse types of motivation, psychological traits, and behaviors affected by non-economic considerations. Bricolage delineates a variety of innovative behaviors that do not stem from an economic mindset and conventional rationalistic thinking (Baker & Nelson, 2005; Levi-Strauss, 1962). Likewise, bootstrapping is known as an alternative resource management approach to avoid market-based resource transactions explained by economists (Harrison et al., 2004; Venkataraman, 2003).

Second, all three approaches assume that resources are key elements to exploit entrepreneurial opportunities (Banea et al., 2008, Fisher, 2012) and resource scarcity is known as the shared

antecedent of all three approaches: bricolage (Davidsson et al., 2017; Hooi et al., 2016; Kwong et al., 2019), effectuation (Arend et al., 2015; Reymen et al., 2015; Reymen et al., 2017), and bootstrapping (Ebben & Johnson, 2006; Grichnik et al., 2014).

Third, all three approaches are based on action. As Archer et al. (2009) explain, action orientation is explicitly a part of the meaning of "making do" (Baker and Nelson, 2005). Effectuation elaborates on the way entrepreneurs take action to control the future filled with unpredictability without attempting to predict it (Sarasvathy, 2001). Also, the studies of Freear et al. (1995) and Auken (2005) show that entrepreneurs test and utilize so many bootstrapping techniques (around 30) to "make it work" and to overcome resource scarcity. As Ebben (2009:349) narrates, small firm owners "do not realize that their actions are referred to as bootstrapping or view them as strategic in any sense; many see it as simply doing whatever it takes to get by."

Fourth, all three approaches are dependent on the actor. As Welter et al. (2016) discuss, in effectuation, boundary conditions are delineated through the specific decision-making heuristics and behavioral patterns of individuals (Dew et al., 2009; Sarasvathy, 2001). Similarly, bricolage focuses on the actor and encompasses behaviors that an individual perceives to be positively influential in the opportunity exploitation process (Baker and Nelson, 2005). Also, Grichnik et al. (2014) find that the use of bootstrapping strategies is an individualistic choice of entrepreneurs beyond environmental factors. They find positive relationships between individual factors such as human capital, managerial experience, education, and engaging in bootstrapping procedures.

Fifth, all three approaches involve heavy use of experimentation. Experimentation has been vividly mentioned in the seminal work of Sarasvathy (2001) in contrast to the assumption of using pre-existing knowledge and has been quantifiable in some research (e.g. Chandler et al., 2011) by measuring the activities that entrepreneurs undertake to shape and reshape the final

product/service. Also, any kind of resource manipulation (such as exploring a new use and combining resources) necessitates experimentation as entrepreneurs fulfill the mentioned task for the first time and in an innovative way (Servantie & Rispal, 2018; Welter et al., 2016). Archer et al. (2009) accentuate the mentioned novelty and say that, while bricolage is oriented to new challenges (problems or opportunities), effectuation brings about new effects. Moreover, Lahm Jr & Little Jr (2005) explain the way some entrepreneurs get trapped in the "do-it-yourself" strategy while bootstrapping and experiment with many different ways to fulfill a task, therefore, sometimes they squander time and energy.

Sixth, to fulfill all three approaches, entrepreneurs develop a strong community prior to launching their product. Avoiding unnecessary competitive actions and focusing on cooperative ties with all stakeholders have been highlighted in the literature on effectuation (Mumi, 2017; Sarasvathy, & Dew, 2003). As Fisher (2012) describes, entrepreneurs need the mentioned ties to develop and test products, to receive feedback from early customers, and sometimes to presell the product. In bricolage, entrepreneurs may combine their resources with what they obtain in their organization and their personal network (Baker et al., 2003; Kwong et al., 2017). Also, bootstrapping activities are facilitated within the community of entrepreneurial ventures (Fincher & Tenenberg, 2006) and the ability of entrepreneurs to approach other colleagues due to high social capital makes them engage more in bootstrapping (Jayawarna et al., 2015; Jones & Jayawarna, 2010; Menzies et al., 2003).

The mentioned six similarities (especially having an antecedent in common, i.e. resource scarcity, and some similar outcomes, i.e. overcoming resource scarcity) and the fact that all of the three approaches can be measured at the firm level (Davidsson et al., 2017; Chandler et al., 2011;

Vanacker et al., 2011) make it possible for us to study them in a model that was illustrated in figure 1.

Although bricolage, effectuation, and bootstrapping have many aspects in common, they have key differences, namely that they address different theoretical standpoints, can be driven by different antecedents, can have different impacts on opportunity exploitation, and can be undertaken by entrepreneurs with meaningful differences in the level of experience and expertise.

First, from a theoretical standpoint, as Archer et al. (2009) stress, bricolage is a theory of organizational behavior and it implies that we study the observable behaviors in useful ways, but effectuation is meant to capture a consistent set of ideas that justify entrepreneurs' actions and decision-making approach. About bootstrapping, many scholars (e.g. Rutherford et al., 2017) believe that bootstrapping is a construct, not a theory. Grichnik et al. (2014:312) convey that the theoretical arguments refer to bootstrapping merely as an "innovative resource management activity in the earliest phases of firm development."

Second, with regard to the main antecedent, as Arend et al. (2015) convey, bricolage stems from a penurious environment in which entrepreneurs lack essential resources while effectuation begins in a resource-constrained situation or an environment that involves a high degree of uncertainty so that no prediction of the future is possible beyond the short term. Also, like bricolage, bootstrapping techniques are always followed by entrepreneurs to address resources scarcity (Löfqvist, 2017). This means that bricolage and bootstrapping can be compared to effectuation only when entrepreneurs use effectuation to overcome resource scarcity, not when they undertake effectuation to mitigate uncertainty.

Third, with regard to the outcome, as Fisher (2012) narrates, effectuation involves identifying and exploiting opportunities in new markets while entrepreneurs in penurious environments perform bricolage to seek resources and ignore the opportunity to engage in bricolage. Welter et al. (2016:12) endorse this notion and convey that, while entrepreneurs effectuate to create or exploit an opportunity, in bricolage it is possible that "the actor in question acts as a bricoleur without prospect or direction of forming an opportunity." This implies that while undertaking effectuation should have a positive association with opportunity exploitation, using more bricolage does not necessarily lead to better opportunity exploitation. The literature on bootstrapping also supports the fact that the desire to exploit opportunities prompts entrepreneurs to utilize bootstrapping techniques. Vanacker et al. (2011) believe that entrepreneurs sometimes pursue new opportunities without having enough attention to the resources they need, therefore, bootstrapping techniques allow them to pursue new opportunities without the need to raise external finance. This implies that using bootstrapping, at least at the early stages of ventures, helps entrepreneurs make better progress in exploiting business opportunities.

Fourth, with regard to the individuals' human capital, effectuation is known to be undertaken by experts. The literature on effectuation endorses the positive relationship between entrepreneurs' experience and using effectuation (e.g. Harms & Schiele, 2012). Also, in practice, there is empirical evidence that groups of novices (fresh graduates of MBA programs) follow the textbook and undertake causal processes, while expert entrepreneurs mainly effectuate to solve business issues (Dew et al., 2009). Likewise, entrepreneurs with more managerial experience engage in bootstrapping to a greater extent (Grichnik et al., 2014). Instead, bricolage may be undertaken by both experts and novices (Archer, 2009).

In section 4.3, first, we introduce conventional actions to overcome resource scarcity to set clear boundaries between conventional and innovative courses of action. Then, we elaborate on the four proposed innovative courses of action that help entrepreneurs overcome resource scarcity in more innovative ways.

4.3. Entrepreneurial responses to overcome resource scarcity

4.3.1. Conventional actions to overcome resource scarcity

As mentioned earlier, in addition to financial resources, most entrepreneurial ventures have difficulty gaining human resources, expertise, social, temporal, and other types of resources. Also, in addition to tangible resources, gaining intangible resources, such as intellectual property and brand identity, is critical for entrepreneurs to grow their ventures (Anderson & Eshima, 2013). Although different types of resources are essential for entrepreneurial firms, financial resources are known to play a central role in the success of firms because many types of resources can be gained by financial resources. The entrepreneurship literature discusses the way entrepreneurs gain human resources (Klaas & Klimchak, 2006), available technologies (Schneider, 2009), and assets (Gaillard & Kankanamge, 2020) by means of financial capital. Because of this, raising financial capital in entrepreneurial firms has been studied more often by entrepreneurship scholars in comparison to other types of resources.

Berger and Udell (1998) developed a framework that illustrates the conventional actions that entrepreneurs undertake to obtain financial resources. This framework has been accepted by many studies about financing entrepreneurship. Berger and Udell (1998) illustrate the financial sources that entrepreneurs use at different stages and how capital structure varies with firm size and age. They show that, due to the informational opacity of entrepreneurial ventures in regard to the financial statements and contracts with their labor force, their suppliers, and their customers,

entrepreneurs have limited access to public funds. Other than using personal savings and credit and borrowing from friends and family members (Bygrave & Zacharakis, 2004), which has been reflected in the literature on bootstrapping as well (Grichnik et al., 2014), it is only possible for entrepreneurs to approach some business angels and short-term financial institution loans at early stages.

According to Berger and Udell (1998), when entrepreneurial ventures grow and show some signs of success, they may approach venture capitals, use trade credit, get loans from intermediate-term financial institutions, and tap into mezzanine financing (the hybrid of debt and equity financing that gives lenders the right to convert to an equity interest). Only small businesses at later stages with clear and healthy financial performance may consider public equity, commercial papers, medium-term notes, private placements, and public debt as sources of financing.

In addition to public and private funds, there are other options that entrepreneurial ventures use to gain resources. For example, franchising is a key tool to combat resource scarcity by which a franchisor sells the right to use its trade name, operating systems, and product specifications to a franchisee (Castrogiovanni et al., 2006; Combs & Ketchen, 2003). Through emerging and growing crowdfunding platforms in the last two decades, entrepreneurs also raise funds from the public mostly by obtaining equity (Moritz et al., 2015), getting a loan (Best et al., 2013), preselling products/services (Dai & Zhang, 2019), or receiving donations (Rijanto, 2018). Premium-based crowdfunding is a type of preselling strategy that has been mentioned in the literature on bootstrapping as well (Lahm et al., 2005). Furthermore, government agencies (Pahnke et al., 2015) provide financial resources and scientific support for promising ventures that signal high-quality performance and seem to yield beneficial outcomes for society. Using governmental subsidies has been mentioned as one of the strategies of bootstrapping as well (Schinck, & Sarkar, 2012).

4.3.2. Innovative courses of action to overcome resource scarcity

In the previous section, we illustrated actions that entrepreneurs undertake to gain resources mostly from outside of their business boundaries, networks, and value chains. In other words, undertaking the mentioned actions necessitates entrepreneurs to partner with new individuals/organizations, adding new ties to their networks, reaching external individuals/organizations to gain support, or adding to the business liabilities by debt financing. In contrast, innovative courses of action stem from some internal techniques that entrepreneurs utilize within the boundary of their firms based on resources in hand or some techniques to gain or share resources with others in informal and innovative ways to overcome resources scarcity.

Viewing innovative courses of action in two main categories (internal and external) is precedented in the literature on entrepreneurship. Vanevenhoven et al. (2011) pay attention to internal vs external types of bricolage. Perry et al. (2011) use the same terminology for categorizing bootstrapping techniques. Also, the recent literature on resourcefulness categorizes entrepreneurial actions to overcome resource scarcity into two groups: 'self-reliant resourcefulness behaviors' and 'joint resourcefulness behaviors" (Michaelis et al., 2022).

In this section, based on the extant literature, we propose and elaborate on the mentioned four innovative courses of action that entrepreneurs undertake to overcome resource scarcity: manipulating resources, manipulating ends, maximizing available cash, and networking innovatively.

The first innovative course of action that entrepreneurs use to overcome resource scarcity is manipulating resources (i.e. customizing and modifying some features of resources, changing the functionality of resources, or combining resources in new and innovative ways). The approach in the extant literature that most comprehensively elaborates on this course of action is bricolage.

Bricolage is a concept first introduced by Claude Levi-Strauss (1967) who tried to elaborate on the nature of sensemaking from a sociological standpoint. As explained by Duymedjian and Rüling (2010) as well as Vanevenhoven et al. (2011), bricolage entails stock or repertoire, which are the elements on which the individual acts; dialogue, which shows the relationship that entrepreneurs maintain with the stock or repertoire; and outcome, which is the consequence of undertaking the action. Bricolage involves performing entrepreneurial activities by whatever is at hand (Miner et al., 2001), using whatever resources and repertoire are available to entrepreneurs (Weick,1993), combining resources at hand (Ciborra, 2002), the invention of resources from the available materials (Cunha, 2005) or resource cooptation (DiDomenico et al., 2010) than can be seen as complementary resources.

Although different definitions capture different aspects of bricolage in terms of the actions that stem from this approach, manipulating resources is the shared principle among them. As Baker and Nelson (2005) postulate, three core elements of bricolage – namely, making do with what is at hand, taking on diverse or novel tasks, and utilizing diverse skills and resources – help entrepreneurs overcome extreme environmental constraints. Also, some studies show that entrepreneurs may transfer some unused resources from one department to the other (Halme et al., 2012) or take a hybrid approach and, in addition to internal bricolage, use external resources from somewhere else (Kwong et al., 2019). At least three kinds of resources – namely, material, labor, and skills – can be manipulated in the process of bricolage (Desa, 2012).

As illustrated in figure 1, we differentiate between manipulating resources, as a course of action, and bricolage, as a key entrepreneurial approach, by focusing on what entrepreneurs do **to** available resources **within** their organizations and exclude other activities that bricoleurs do (such as approaching other organizations) to gain and combine resources. In addition, we only focus on

"what" entrepreneurs do no matter "how" and "why" they do it, the tasks that bricolage, as a theoretical approach, does. As mentioned in the introduction, the mentioned perspective in this article helps us differentiate between the courses of action (focusing on what entrepreneurs do) and approaches (theoretical perspectives that are meant to address all "what", "who", "why", "how", "when", and "where" questions). As Whetten (1989) explains, clearly addressing the "what" question opens the door to find answers for other questions, the task that we partially try to do while developing our propositions.

The second course of action to overcome resource scarcity is manipulating ends. By undertaking this action, entrepreneurs take available resources as given (without necessarily manipulating resources) and focus on what they can do **with** them[1]. Although this course of action does not cover all aspects of effectuation, it seems to be the heart of the effectual approach as Sarasvathy (2001, p.245) defines effectuation as the processes that "take a set of means as given and focus on selecting between possible effects that can be created with that set of means." The flexibility of entrepreneurs to manipulate ends while taking an effectual approach has been endorsed in other studies as well (e.g. Cai et al., 2017; Harms & Schiele, 2012; Welter & Kim, 2018). Although a high level of uncertainty may prompt entrepreneurs to effectuate to increase the predictability of the future (Laine & Galkina, 2017), resource scarcity can lead to use effectuation as well (Arend et al., 2015).

Sarasvathy (2001, 2008) explains how two dimensions of effectuation (flexibility and experimentation) involve a high degree of manipulating ends. According to her, entrepreneurs

[1] The difference between what entrepreneurs do **to** resources and **with** resources is rooted in what entrepreneurs view as given. In the former case, the functionality of resources and the combination of them may change (while the end is given) while in the latter case, the functionality of resources and the combination of them are given while the ends may change.

keep their ventures flexible by embracing contingencies, tapping into new opportunities whenever they arise, and changing aspects of their final products to keep up with unexpected events. As the degree of availability of resources may change through time (Ben-David, 1996), what businesses can do with available resources changes as well, therefore, manipulating ends may be a continuous routine for some ventures. On the other hand, experimentation mostly takes place in shorter periods of time (Dancy et al., 2010) by which entrepreneurs test different features of the product or the business model to see which option meets the need of targeted customers better.

Chandler et al. (2011) highlight focusing on manipulating ends in the mentioned components of effectuation. To measure experimentation, they suggest using some items including "we experimented with different products and/or business models", "the product/service that we now provide is essentially the same as originally conceptualized" "the product/service that we now provide is substantially different than we first imagined." Also, to measure flexibility, they suggest using some items including "we allowed the business to evolve as opportunities emerged.", "we adapted what we were doing to the resources we had.", and "we were flexible and took advantage of opportunities as they arose.", items that all address manipulating ends.

We differentiate between manipulating ends, as a course of action, and effectuation, as a general entrepreneurial approach, by focusing on what entrepreneurs do with available resources to come up with different scenarios as the final product. Therefore, we exclude precommitment and affordable loss, the two dimensions of effectuation, but include all internal and external factors that make entrepreneurs manipulate ends. The mentioned factors can be external contingencies (the factor that effectuation considers), a new possibility of combining resources to create an opportunity (Shane & Venkataraman, 200) that gets shaped in entrepreneurs' minds, or any

changes in entrepreneurs' access to resources, e.g. when a cofounder quits or financial support from a family member or a friend is cut off or added.

When gaining resources seems hard or impossible via orthodox methods, in addition to manipulating resources and ends, sometimes entrepreneurs try to lease, borrow, share or temporarily obtain resources, or obviate the need of possessing additional resources by cutting some costs or by using some techniques related to receive and pay cash. All of the mentioned tasks form the third innovative course of action to overcome resources-scarcity which is called maximizing available cash. According to the literature on bootstrapping, different forms of this course of action are delaying payments, minimizing accounts receivable, minimizing investment (Schinck & Sarkar, 2012), becoming a frugal minimalist (Arora, 2002; Lam, 2010), terminating business relations with late payers, prioritizing customers who pay quickly, considering discounts for customers paying cash, obtaining advance customer payments, speeding up invoicing, and adding interest on overdue payment (Grichnik et al., 2014). As mentioned earlier, the approach of bootstrapping also has a conventional element, self-financing that was discussed earlier. Also, a collection of techniques to approach others to gain resources is another part of bootstrapping that partially contributes to the fourth innovative course of action.

The fourth innovative course of action to gain resources is networking innovatively. Successful entrepreneurs cultivate the art of networking to augment their own scarce resources (Das & Teng, 1997; Low & MacMillan, 1988). Some studies introduce effective networks within regions as a major element supporting entrepreneurship (National Commission, 2000). Different forms of networking innovatively have been mentioned in different streams of literature on financing entrepreneurship. In the research stream centered on bricolage, resources are gained from pre-existing personal and professional networks (Baker et al., 2003), partners who provide easy-access

financial resources with small sizes (Kariv & Coleman, 2015), family, friends, acquaintances (Cheung & Kwong, 2017). Also, entrepreneurs may "hijack" resources controlled by others (Stritar, R., 2012).

In the research stream centered on effectuation, networking (pre-commitment) can include ties with all stakeholders (Sarasvathy, 2001) and make entrepreneurs enter into agreements with customers, suppliers, other organizations, and even prospective competitors (Jiang & Rüling, 2019). Networking not only increases resources available to new ventures (Sarasvathy & Dew, 2005) and assists young firms in mobilizing external resources from third parties (Deligianni et al. 2017), but it also creates other opportunities such as sharing risk (Brettel et al., 2012; Chandler et al., 2011) and increasing product diversification (Deligianni et al., 2017).

In the research stream centered on bootstrapping, by networking innovatively, entrepreneurs utilize joint resources, share employees, equipment, and premises, make bundle purchases with others, and borrow or lease equipment from others (Grichnik et al., 2014; Lahm et al., 2005; Schinck & Sarkar, 2012). Although Jayawarna et al. (2015) find that gender differences matter in the use of strong and weak ties when entrepreneurs perform bootstrapping, bootstrappers are known to mostly rely on weak ties (Grichnik et al., 2014) and approach friends and family members as well (Perry et al., 2011).

What differentiates networking innovatively from other types of networking is that it is informal and opportunistic (Chell & Baines, 2000), mostly involves weak ties (Grichnik et al., 2014) which are more ephemeral (Zimmer, 1986), and happens within the social context consisting of entrepreneurs and early cooperative stakeholders rather than outsiders and analytical investors (Klyver & Foley, 2012).

As discussed earlier, the most important advantage of analyzing entrepreneurial responses to resource scarcity according to their courses of action, not the approach they hold, is that we can see pure actions (Fisher, 2012). Although entrepreneurs may utilize different courses of action together to gain resources or for satisfying other purposes, the mentioned courses of action are distinct enough to be recognized and utilized solely and purely. In the next section, to stress the differences among the mentioned courses of action and to stimulate empirical studies in the future, we take a comparative method and develop propositions to explain circumstances under which entrepreneurs prioritize some innovative courses of action over others.

4.4. Propositions

So far, we have enumerated the limitations of entrepreneurial approaches that make it hard to explain the reasons why entrepreneurs prioritize some actions over others to overcome resource scarcity in different situations. To obviate the mentioned limitations, we first addressed "what" entrepreneurs do innovatively to overcome resource scarcity no matter "why", "how", "when" and "where" they do them. Addressing the mentioned "what" question illuminates pure actions, differentiates among innovative courses of action and conventional ones, and clarifies the boundaries of innovative courses of action. After clarifying "what" entrepreneurs do innovatively to overcome resource scarcity (undertaking manipulating resources, manipulating ends, maximizing available cash, and networking innovatively), now in section 4.4, we elaborate on different factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity. Because this essay has been developed by reviewing the literature, in each proposition, we address courses of action for which we could find enough evidence from the literature.

The factors in our model, illustrated in figures 2a to 2e, are based on a comprehensive framework proposed by Gartner (1985) that introduces four clusters of factors that affect entrepreneurial activities: factors related to the process by which new opportunities are found/created and exploited, individuals who undertake entrepreneurial processes, the environmental forces that surround ventures, and the organizations that entrepreneurs create. The model proposed by Gartner (1985) is general enough to be used for explaining many entrepreneurial phenomena. In this research, it helped us provide a logical structure for our model which introduces factors that prompt entrepreneurs to prioritize some courses of action over the other(s) to overcome resource scarcity.

Insert figures 2a about here

4.4.1. Process-related factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity

According to Gartner (1985), to fulfill the entrepreneurial process, an entrepreneur "locates a business opportunity", "accumulates resources", "markets products and services", "produces the product", "builds an organization", and "responds to government and society". As illustrated in figure 2b, in section 4.4.1, we discuss two specific types of entrepreneurship - social entrepreneurship and art entrepreneurship - to stress how the nature of the opportunities that entrepreneurs intend to exploit (the first step of the process) affects the strategies they take to accumulate resources (the second step of the process). We show that a high level of social orientation or artistic nature of the products that entrepreneurs develop makes them stick to certain organizational goals to satisfy their aspirations, which are factors that make entrepreneurs reluctant to manipulate ends.

Insert figures 2b about here

Proposition 1: Innovative courses of action in social entrepreneurship

As mentioned before, by developing proposition 1, we intend to show that a high level of social orientation makes entrepreneurs stick with some organizational goals to satisfy their aspirations and reluctant to manipulate ends.

As mentioned in chapter 3, in the entrepreneurship literature, some scholars such as Sarasvathy (2001) differentiate between "aspiration", which is the real propellant of entrepreneurial action, and "ends" or "goals" that are created through the journeys entrepreneurs take. As Farmer et al. (2011: 245) write, "aspirations concern longings, aims, or ambitions. They refer to something desired that is not currently possessed. How we want to see ourselves and who we would like to have a great deal to do with how we will act." Ends or goals are affected not only by entrepreneurs' aspirations but also by the network of people and organizations that cooperates with entrepreneurs, potential customers who give continuous feedback to founders, and external contingencies (Harms & Schiele, 2012; Perry et al., 2012). Sarasvathy (2001, p. 244) stresses "if we knew precisely what type of firm we wished to create, we could use existing theories and principles to create the firm. But usually, all the entrepreneur knows when he or she starts out is something very general, such as the desire to make lots of money or to create a valuable legacy like a lasting institution, or, more common, to simply pursue an interesting idea that seems worth pursuing."

The difference between aspirations and ends (goals) is accentuated in the research of Engel et al (2013). They propose that entrepreneurs with high levels of financial aspiration and low levels of career goal, labeled "creators", manipulate ends more easily to satisfy their aspirations. We believe that the mentioned reasoning (Engel et al, 2013) is generalizable so that if the entrepreneurs'

aspirations and ends (goals) of their ventures are highly independent of each other, manipulating ends becomes a simpler task for entrepreneurs. On the other hand, a high degree of dependence between aspirations and ends makes it harder for entrepreneurs to manipulate ends, therefore, entrepreneurs become reluctant to manipulate ends when they feel that they can satisfy their aspirations only by developing specific ends.

Social purpose is a key type of aspiration that entrepreneurs may have, implying that entrepreneurs with this type of aspiration will take their end as given. According to Wahid et al. (2019), social entrepreneurship aspiration needs to be disseminated and even taught in schools. Social entrepreneurship focuses on problems affecting the well-being of people and steps beyond financial profitability to address benefits for their communities (Kickul et al., 2018). Social entrepreneurs combine the passion for a social mission with an image of business-like discipline, innovation, and determination (Peredo & McLean, 2006), and aim for value in the form of large-scale benefit (Martin & Osberg, 2007). A social mission is not only a strong aspiration of social entrepreneurs to create value, but also it is explicit, tangible, and central. Dees (1998) makes the mentioned remark and stresses that social entrepreneurs are driven by the perception of a social need and have a vision of how to achieve the outcome they anticipate. The mentioned vivid aspiration which is formulated as a clear vision in the mind of social entrepreneurs makes them reluctant to manipulate ends. Instead, they manipulate resources repeatedly to fulfill the aspiration they keep in mind. Illustrating this, Dees (1998: 5) believes that "social entrepreneurs look for innovative ways to assure that their ventures will have access to resources as long as they are creating social value"

Sullivan et al. (2003) hold the same opinion and say that social entrepreneurs are consciously aware of what they are doing. They believe that social entrepreneurs' social activities or their

"virtuous actions" do not happen coincidentally. They imply that social entrepreneurs meticulously and passionately specify the ends and do not develop them in highly adaptive and flexible ways. Social goals are the exclusive aim of social entrepreneurs (Peredo & McLean, 2006) and constrain the social mission and activities that entrepreneurs fulfill. Weerawardena & Mort (2006) make a similar remark and bring evidence from the cases they analyze.

Manipulating resources in the social sector carries so much importance as almost all social entrepreneurs struggle for gaining essential resources (Bacq et al., 2015). Wealth creation is a secondary purpose for social entrepreneurs and is just a way of measuring value creation (Dees, 1998), a fact that partially explains resource scarcity in social entrepreneurship. Also, manipulating resources necessitates some abilities in entrepreneurs. Social entrepreneurs act passionately (Omorede, 2014), innovatively (Gawell, 2013), boldly and relentlessly (Dees, 1998) and with a high degree of determination (Bahrein et al., 2016), therefore they are likely to be able to manipulate resources. Additionally, empirical evidence in extant literature shows how extensively social entrepreneurs manipulate resources by undertaking bricolage techniques to satisfy their aspirations (e.g. Bacq et al., 2015; Bojica et al., 2018; Desa, 2012).

As we explained before, maximizing available cash is nested in bootstrapping approach, therefore, to see how much social entrepreneurs use the mentioned course of action, it is useful to review the literature on social entrepreneurship and bootstrapping. Jayawarna et al. (2020) find that social entrepreneurs use three bootstrapping mechanisms: "building legitimacy to create a positive organizational image", "persuasion of resource owners to enable resource mobility", and "creating resource communities to facilitate exchange relationships." Although the study of Jayawarna et al. (2020) mainly focuses on the "networking" aspect of bootstrapping, it explains the mechanisms by which social entrepreneurs access free resources as well. Also, Dees (1998) supports the notion

that social entrepreneurs try to maximize available cash as well as they are skilled at doing more with less available resources in more efficient ways. Furthermore, teams of social entrepreneurs possess high levels of creativity (Erro-Garcés, 2020; Monllor & Attaran, 2008) and social capital (Estrin et al., 2013; Westlund & Gawell, 2012) that positively influence all aspects of bootstrapping (Grichnik et al., 2014) including maximizing available cash.

Finally, the literature on social entrepreneurship is filled with pieces of evidence showing how extensively social entrepreneurs network innovatively. Shaw & Carter (2007) believe that social entrepreneurship involves coalitions of actors rather than a single individual and highlight collective actions within cooperative networks. Dufays & Huybrechts (2014) endorse the mentioned belief and explain how the cooperation of social entrepreneurs with different backgrounds, influenced by different institutional logics, but with a shared purpose in mind makes it possible for them to share resources and address a social cause. Oprica (2013) highlights the power of social entrepreneurs gained by a tight network among them and brings the example of the campaign "This Close" to show how networking helped social entrepreneurs address the cause of eradicating polio. Therefore:

Proposition 1: *To overcome resource scarcity, entrepreneurs who intend to follow social aspiration prioritize manipulating resources, maximizing available cash, and networking innovatively over manipulating ends more than entrepreneurs with no social aspiration.*

Proposition 2: Innovative courses of action in art entrepreneurship

As discussed earlier, we intend to show how much the nature of the opportunities that entrepreneurs intend to exploit (the first step of the process) affects the strategies they take to accumulate resources (the second step of the process). We now move on to showing that the artistic

nature of the products that entrepreneurs intend to develop makes them stick with some organizational goals to satisfy their aspirations, factors that make entrepreneurs reluctant to manipulate ends. Also, we will argue that as art entrepreneurs are beyond holding the "making it work" mindset, manipulating resources does not satisfy their meticulous attitudes.

Art entrepreneurship differs from other forms of entrepreneurship because of three main characteristics (Scherdin & Zander, 2011): First, art entrepreneurship entails high levels of creativity and novelty, second, it mostly involves the joy of creating and expressing a feeling or a cause to contribute to the culture and society, and, third, it is concerned with something more than practical usefulness and profitability. Therefore, developing meaningful artwork is deeply associated with an internal desire of entrepreneurs to have a specific impact on the audience.

A similar impact is what Stinchfield et al. (2013) call an "articulated vision" that goes beyond profitability concerns. They believe that art entrepreneurs possess an identity that is impossible to be separated from their ventures' purpose. Hunger for creating something unique and impactful has been witnessed in cases that Fillis (2000) studies. He shows that art entrepreneurs have a specific mission in mind and possess a high level of self-belief in what they do although they receive fierce criticisms sometimes.

Art entrepreneurs share common characteristics with other entrepreneurs as well. As Aggestam (2007) narrates, art entrepreneurs possess both an entrepreneurial mindset, which is affected mostly by extrinsic stimuli, and an art mindset, which is an intrinsic desire to create something aesthetic to influence the lives of their followers. Stinchfield et al. (2013), after studying some art-entrepreneurship cases, find that, in art entrepreneurship, the intrinsic aspect outweighs the extrinsic aspect and that artists' vision dominates the concern of responding to the market needs.

Stinchfield et al. (2013) postulate that artists' identity is firmly tied to their unique vision making them hold a mindset beyond "making it work". Therefore, although art entrepreneurs may manipulate some resources to leave an impact they envisage, they are far beyond holding the "making it work" mindset, the mindset that the majority of bricoleurs hold. Due to the mentioned reason, we do not expect that manipulating resources, as a critical element of bricolage, is a course of action that art entrepreneurs will tend to undertake.

Also, as Holm & Beyes (2021) convey, some art entrepreneurs can be seen as social entrepreneurs as well because they address social causes. They convey that some art entrepreneurs transform public art from "being largely a sculptural tradition" toward "situation-specific engagements with issues of public or local concern." Due to the abovementioned serious and intrinsic vision that art entrepreneurs envisage, like social entrepreneurs, their specific goals are tightly intertwined with their aspirations.

While due to the abovementioned reasons, there seems to be some degree of reluctance among art entrepreneurs to manipulate ends and manipulate resources, the extant literature supports the belief that there is no hurdle for art entrepreneurs to network innovatively (Basu & Werbner, 2001). Becker (1982) studies art entrepreneurs and finds a hidden collaborative network among them. As Basu & Werbner (2001) argue, many of the cooperative ties among art entrepreneurs are invisible in public due to a high level of informality of relationships. Lee (2015:141) explains the way art entrepreneurs in creative industries build up their networks. According to her, due to a large number of freelancers and small specialized firms that work on short-term projects, most of the ties are weak and ephemeral. She argues that "Particularly for freelancers and start-up companies in creative industries, the know-why, know-how, know-who, know-when, and know-from are critical given their lack of access to knowledge sources."

Therefore:

Proposition 2: *To overcome resource scarcity, entrepreneurs who intend to develop artistic work prioritize networking innovatively over manipulating resources and manipulating ends more than entrepreneurs who develop non-artistic work.*

4.4.2. Individual factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity

According to Gartner (1985), the second cluster of factors that affect entrepreneurial activities relates to the background, personality, and characteristics of entrepreneurs, which play important roles in the way these individuals exploit opportunities. In this section, we discuss entrepreneurs' education level, their level of ambition and growth orientation, and the extent to which they are tolerant for uncertainty as individual factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity.

Insert figures 2c about here

Proposition 3: Innovative courses of action and entrepreneurs' level of education

Different studies have endorsed the positive impact of entrepreneurs' education on entrepreneurs' human capital (Volery et al., 2013), successes in fund-raising (Piva & Rossi, 2018), and new venture performance (Kennedy & Drennan, 2001). Specifically, about entrepreneurship education, Dickson et al. (2008) by reviewing empirical studies find a positive association between entrepreneurship education and entrepreneurial action. Similar results were found in the study of Mwasalwiba (2010) and Martin et al. (2013) as well.

Although higher education has different positive impacts on entrepreneurial outcomes, it has some shortcomings for entrepreneurs as well. That is why some entrepreneurs, such as Steve Jobs (2005) and Bill Gates (2016), talk about leaving college with pride. The literature on education and entrepreneurship partially explains some of the shortcomings: One of the impacts of higher education is developing critical thinking abilities and an analytical mindset (Evens et al., 2013) in individuals, while some informal entrepreneurial actions are non-analytic (Salam & Von Schantz, 2017). Jiménez et al. (2015) find that secondary and tertiary education has a positive impact on formal entrepreneurship while secondary education has no association and tertiary education has a negative association with informal entrepreneurship.

As illustrated in figure 1, manipulating resources is nested in the bricolage approach, manipulating ends in the effectuation approach, and maximizing available cash in the bootstrapping approach, therefore, to see how much entrepreneurs with different levels of education use the mentioned courses of action, it is useful to review the literature on entrepreneurs' education and the three approaches.

The analytical mindset in highly educated entrepreneurs that was discussed above, makes entrepreneurs systematically analyze the market and consumer needs and build up a clear vision (Johansson & McKelvie, 2012). According to effectuation (Sarasvathy, 2001), this creates inertia in entrepreneurs to manipulate ends easily. Empirical studies, such as the research of Dew et al. (2009), show that, while expert entrepreneurs take effectual processes, educated individuals go by the textbook and take an analytical approach to solve entrepreneurial issues.

On the other hand, the literature shows the extensive use of bricolage by highly educated entrepreneurs (i.e. Padilla-Meléndez et al., 2020) and supports the fact that entrepreneurs with higher levels of education undertake bootstrapping more (Grichnik et al., 2014). Therefore, we see

no hurdle for educated entrepreneurs to vastly use two dimensions of the mentioned approaches, manipulating resources and maximizing available cash. Therefore:

Proposition 3: *To overcome resource scarcity, entrepreneurs with higher levels of education, prioritize manipulating resources and maximizing available cash over manipulating ends more than entrepreneurs with lower levels of education.*

Proposition 4: Innovative courses of action and entrepreneurs' ambition and growth orientation

The entrepreneurship literature endorses the belief that entrepreneurs are heterogeneous in capabilities (Wilson et al., 2009), motivation (Germak & Robinson, 2014), and intention (Sahinidis et al., 2014), characteristics that affect entrepreneurs' ambition (Loomis, 1988). As Stam et al. (2012: 26) state, ambitious entrepreneurs are individuals who engage in entrepreneurial processes "with the aim to create as much value as possible." According to Hermans et al. (2015), profit, growth, innovation, and other forms of organizational output can measure the value that entrepreneurial ventures can create.

Ambitious entrepreneurship has also been called "high-growth oriented" in different studies (e.g. Gundry and Welsch, 2001). Most scholars define ambitious entrepreneurs as individuals who expect their firm to grow to at least six employees within five years (e.g. Stam et al., 2011). In general, more ambitious entrepreneurs are expected to contribute more to economic growth than less ambitious ones (Bellu & Sherman, 1995; Wiklund & Shepherd, 2003).

There are some characteristics assigned to ambitious entrepreneurs implying their propensity to prioritize manipulating ends over manipulating resources and maximizing available cash. Verheul & Van Mil (2011) show that opportunity-driven entrepreneurship triggers more ambition in entrepreneurs than necessity-driven entrepreneurship. Moreover, according to Guzma´ & Santos

(2001), growth-oriented entrepreneurs have higher intrinsic motivation. Also, ambitious entrepreneurs are known to be more optimistic (Lowe & Ziedonis, 2006) and overconfident (Cieślik et al., 2018). While the literature on effectuation shows how extensively opportunity-driven (Laine & Galkina, 2017), intrinsically motivated (DeTienne & Chandler, 2010), and optimistic (Zhang et al., 2019) entrepreneurs manipulate ends, the literature on bricolage shows how far manipulating resources is from the mindset of perfectionists and ambitious individuals.

Lévi-Strauss (1967) conveys that bricolage sometimes produces unforeseen results. Baker & Nelson (2005) stress that making do is associated with the bias toward action and engagement with problems rather than the attempt to find workable outcomes. Senyard et al. (2009) postulate that bricolage is a useful but imperfect way to make things work when the only other choice is to wait or do nothing. They believe that, when entrepreneurs perform bricolage extensively, it is hard for them to move beyond the "good enough" solutions. Desa & Basu (2013) have the same opinion and say that bricolage offers an imperfect alternative to optimization but can help entrepreneurs reduce the dependency of their ventures on suppliers that provide high-quality resources. On the other hand, Stinchfield et al., (2013) show how necessity-driven and less ambitious entrepreneurs, for which money was the only reason to start the business, "do anything for a buck" and engage in bricolage.

The extant literature similarly supports the belief that bootstrapping is not an appropriate approach to be taken by growth-oriented and ambitious entrepreneurs. Lahm Jr & Little Jr (2005) introduce bootstrapping as an approach taken when other financing choices do not exist. Ebben (2009) believes that bootstrapping methods can be detrimental to the future performance of firms if taken for a long time. Also, Vanacker & Sels (2009) show that bootstrapping strategies have no impact on the growth of entrepreneurial ventures that they sampled.

Accordingly, courses of action that ambitious entrepreneurs undertake to overcome resources scarcity can be better explained by effectuation rather than bricolage and bootstrapping. Because manipulating resources, manipulating ends, and maximizing available cash are respectively nested in bricolage, effectuation, and bootstrapping approaches, we expect that:

Proposition 4: *To overcome resource scarcity, entrepreneurs with higher levels of ambition and growth orientation prioritize manipulating ends over manipulating resources and maximizing available cash more than entrepreneurs with lower levels of ambition and growth orientation.*

Proposition 5: Innovative courses of action and entrepreneurs' tolerance for uncertainty

While developing propositions 5 and 6, we will propose that if entrepreneurs face resource scarcity while they are intolerant to high levels of uncertainty or in the condition of time constraint, to overcome resource scarcity, they avoid courses of action that are uncertain or time-consuming. Instead, they take courses of action that encompass low levels of uncertainty or courses of action that save time and capital for them.

One of the main factors that define the amount of time and cost entrepreneurs should spend and the level of uncertainty that they should face is the extent to which they conduct experiments. First, experimentation is costly (Hampel et al., 2020). Kerr et al. (2014) say that the costs of running experiments play an important role in entrepreneurship. They believe that other than the direct costs of conducting an experiment, the indirect costs should be paid by either the investor or entrepreneur when the results are not satisfying.

second, the outcomes of experimentation are not only risky but also uncertain (Knight, 1921). Kerr et al. (2014) postulate that a consequence of experimentation is extremely uncertain because

entrepreneurs cannot precisely evaluate if a particular technology, process, or product will be successful or not.

Although some scholars (e.g. Manso, 2016) believe that entrepreneurship, in general, is fundamentally about experimentation, the extant literature supports the belief that all internal courses of action that we introduced in this article (manipulating resources, manipulating ends, and maximizing available cash) involve a higher degree of experimentation than other courses of action. As Lindholm-Dahlstrand et al. (2019) convey, entrepreneurial experimentation encompasses both technical and market experimentation. As mentioned before, while manipulating resources and maximizing available cash mostly address the technical aspect, manipulating ends addresses both technical and market experimentation.

Manipulating ends, as illustrated in figure1, has a vivid element of experimentation. As Chandler et al. (2011) define, it may include experimenting with different products and business models. Experimentation can drive successful diversification in new ventures, modify factors such as entrepreneurial aspirations (Deligianni et al., 2017), and market conditions for the next iteration (Arend et al. 2015).

As mentioned before, manipulating resources is nested in bricolage. Guo et al. (2016:538) introduce bricolage as the key constituent action of the experimentation process of business model innovation. They specifically mention how entrepreneurs manipulate resources and explain that "bricolage needs experimentation with new alternatives to recombine and reuse resources and cope with new problems and opportunities" Also Servantie & Rispal (2018) believe that bricolage or "Making do" approach is based on improvised methods and experimentation.

With regard to internal bootstrapping, Winborg & Landström (2001) introduce many different methods of bootstrapping and explain how entrepreneurs try different methods to find out which ones work. Also, Grichnik et al. (2014) convey that in internal bootstrapping, sometimes entrepreneurs insist heavily on "do-it-yourself" that makes them experiment with different tasks that are worth less than other tasks and spend too much time and energy. Accordingly, as all internal courses of action involve a high degree of experimentation, they are more or less uncertain.

In contrast, many aspects of networking innovatively, if possible to be implemented, are fast, easy, and highly certain. The literature on entrepreneurship discusses how much entrepreneurs save time and capital, and enjoy the certainty of gaining resources by borrowing from other entrepreneurs and sharing resources with them, renting instead of buying (Grichnik et al., 2014; Lahm et al., 2005; Schinck & Sarkar, 2012), and gaining resources from family and friends (Cheung & Kwong, 2017). Knowing the fact that it is not always possible for entrepreneurs to tolerate high levels of uncertainty (McMullen & Shepherd, 2006), we propose that:

Proposition 5: *To overcome resource scarcity, entrepreneurs with a lower tolerance for uncertainty, prioritize networking innovatively over internal innovative courses of action (manipulating resources, manipulating ends, and maximizing available cash) more than entrepreneurs with a higher tolerance for uncertainty.*

4.4.3. Environmental factor that makes entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity

In this section, we elaborate on undertaking innovative courses of action in time-constrained situations affected by environmental factors, i.e. the third cluster of factors that affect entrepreneurial activities according to Gartner (1985). Entrepreneurship is known to be the process of finding and exploiting business opportunities (Shane & Venkataraman, 2000), the exploitation

that should be fulfilled in a period of time called the window of opportunity (Bayless & Chaplinsky, 1996). Once this time period is over, the window of opportunity is closed and the chance to exploit the opportunity is no longer possible (White, 1998). Many environmental factors that have been mentioned in the structure that Gartner (1985) suggests affect the length of the time entrepreneurs have and need to find/create and exploit opportunities. The mentioned factors include the availability of financiers, suppliers, universities, experienced entrepreneurs, and the structure of industries and markets (Ho & Wong 2005).

Insert figures 2d about here

Proposition 6: Innovative courses of action in time-constrained situations

In this part, we will propose that if entrepreneurs face resource scarcity in the condition of time constraint, to overcome resource scarcity, they avoid courses of action that are time-consuming, instead, they undertake courses of action that save time and capital for them. One of the main factors that define the amount of time and cost entrepreneurs should spend is the extent to which they conduct experiments. Not only is the experimentation costly (Hampel et al., 2020; Kerr et al., 2014) it is time-consuming. Zahra (2005:25) focuses on family firms and conveys that "family firm managers who combine resources in new ways do not know a priori which combination will succeed in creating value. These managers have to experiment with different combinations of resources, hoping to uncover a successful recipe that they can use to generate new products, goods, or services. This experimentation is time-consuming, expensive, and risky."

In section 4.4.2, we showed that although some scholars (e.g. Manso, 2016) believe that entrepreneurship, in general, is fundamentally about experimentation, all internal courses of action

that we introduced in this article (manipulating resources, manipulating ends, and maximizing available cash) involve a higher degree of experimentation in comparison to networking innovatively, therefore, they are more time-consuming. In contrast, many aspects of networking innovatively, if possible to be implemented, are fast and easy.

As mentioned before, the literature on entrepreneurship discusses how much entrepreneurs save time and capital by borrowing from other entrepreneurs and sharing resources with them, and renting instead of buying (Grichnik et al., 2014; Lahm et al., 2005; Schinck & Sarkar, 2012) Also, different streams of the literature of management regarding the decision on "buying vs making resources" show how much networking instead of internally creating resources can save time and energy (e.g. Cánez et al., 2000; McIvor et al., 1997; Preker et al., 2000).

Knowing the importance of timing in exploiting business opportunities when the window of opportunity may close fast (Sull & Wang, 2005; Zacharakis et al., 2019), we propose that:

Proposition 6: *To overcome resource scarcity, entrepreneurs who intend to exploit an opportunity in more time constraints, prioritize networking innovatively over internal innovative courses of action (manipulating resources, manipulating ends, and maximizing available cash) more than entrepreneurs who intend to exploit an opportunity in fewer time constraints.*

4.4.4. Organizational factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity

According to Gartner (1985), all factors related to the strategies that entrepreneurs take or factors related to products they develop fall into the organization category. This is the fourth cluster of factors that affect entrepreneurial activities according to Gartner's (1985) model. In this part, we discuss the level of product innovation and the organizational stage to explain organizational

factors that make entrepreneurs prioritize some innovative courses of action over the other(s) to overcome resource scarcity.

Insert figures 2e about here

Proposition 7: Innovative courses of action and the level of product innovation

A factor affecting the extent to which entrepreneurs undertake different courses of action while facing resource scarcity is the level and type of innovation they utilize in their ventures. There are many classifications of innovations utilized in entrepreneurial ventures (e.g. typologies used in the study of Ceylan, 2013; Damanpour et al., 1989; Darroch & McNaughton, 2002). For example, Ceylan (2013) uses four categories to classify different aspects of innovation: product innovation referring to the "implementation of new or significantly improved goods or services"; process innovation referring to the "implementation of new or significantly improved production or delivery methods"; marketing innovation referring to the "implementation of new marketing methods"; and organizational innovation referring to the "implementation of new management practices and organizational methods." In this research, we only focus on the product (outcome) innovation to consider the newness of the products for the customers and the extent to which entrepreneurs disrupt markets because the literature (e.g. Brettel et al., 2012) supports the belief that the level of product innovation highly affects the courses of action entrepreneurs choose to undertake.

One of the reasons for the differences in the essential courses of action in different ventures lies in the volume of feedback entrepreneurs need to get from the end-users while developing their products and the extent to which they need to comply with the existing needs of the customers, the

elements that are affected by the degree of product innovation. In this regard Kawasaki (2013) talks about what he learned from Steve Jobs:

> Customers cannot tell you what they want. Customers will tell you they want better faster cheaper Apple II, better faster cheaper status quo, better faster cheaper of what you already make. Nobody asked Apple for 128K Macintosh with no software thanks to my efforts, 400K floppy, 128K RAM, nobody asked that. They wanted better faster cheaper Apple II. Customers usually cannot tell you what they want. You have to have your vision, your passion. You need to jump ahead of them. The way to jump ahead of them is to get to the next curve. The next thing that I learned from Steve Jobs — the action, the true action, the great innovation in the world doesn't occur on the curve you're on, it occurs on the next curve.

The theoretical argument in line with the advice on "jumping ahead of customers" has been mentioned in the study of Handy (1994). According to this study, to sustain the competitive advantage, CEOs and entrepreneurs sometimes should disrupt what their competitors, colleagues, and they do, go to the next sigmoid curve, and come up with a meaningful innovation before it is too late. Also, the remark that "customers cannot tell you what they want" made by Kawasaki (2013) is in line with what Handy (1994) says about the necessity of using new thoughts and mindsets to go to the next curve. Therefore, in theory and practice, some experts (Handy, 1994; Kawasaki, 2013) believe in a minimum level of adaptability with the market and minimal connection with the end-users to develop highly innovative products.

On the other hand, entrepreneurs who develop products with a low level of newness for the customers in existing markets need to adapt to available norms, comply with the dominant product design and do market research (Brettel et al., 2012). Also, while new ventures gather fresh

resources, shifting to the next curve and drastically changing the final product in existing entrepreneurial ventures that are already operating in industries necessitates changing the functionality of resources including physical assets and human resources. Handy (1994) explains the processes that firms need to follow to hire new experts and to train existing employees to change their roles and functionality to adapt to the next curve and to meet new needs. Therefore, manipulating resources seems essential for existing entrepreneurial ventures that intend to noticeably change their products.

On the other hand, maximizing available cash seems an unreliable choice for ventures with highly innovative products. According to Hall & Lerner (2010), to successfully manage the process of innovation, ventures need to finance the R&D activities, which is not in line with "minimizing investment" and "frugal minimalist "approaches. Furthermore, developing highly innovative products necessitates making new markets and creating new needs in potential customers (Sarasvathy, 2001) and drastically changing the supply chain (Sabatier et al., 2012). It is obvious that unstable connections with suppliers and customers leave little room for entrepreneurs to use methods of maximizing available cash such as terminating business relations with late payers, prioritizing customers who pay quickly, considering discounts for customers paying cash, and obtaining advance customer payments in a short run. Therefore:

Proposition 7: *To overcome resource scarcity, entrepreneurs who utilize more product innovation to shape new markets prioritize manipulating resources and manipulating ends over maximizing available cash more than entrepreneurs who develop less innovative products in existing markets.*

Proposition 8: Innovative courses of action and the organizational stage

In this part, we propose that at later stages of developing venture, although entrepreneurs may conduct formal networking and approach conventional financiers more than before (Brush et al., 2006) if they have to overcome resource scarcity by utilizing innovative courses of action, they prioritize internal courses of action over networking innovatively.

Extant research has recognized the firm stage as an important contextual factor (Berends et al. 2014). Stages that may include developing conception, developing the final product with satisfactory features, commercialization, growth, consolidation, maturity, and decline (Brettel et al. 2012). In the early stages of ventures, entrepreneurs face higher levels of scarce resources and uncertain environments, while they usually experience the opposite conditions at later development stages (An et al., 2020). The literature of all three approaches on which we focus in this study (bricolage, effectuation, and bootstrapping) supports the fact that although entrepreneurs undertake the mentioned approaches mostly at the early stages of developing their ventures, they frequently undertake the approaches at later stages when they the level of resource scarcity or/and uncertainty increases. For example, while Berends et al. (2014) find that firms in their nascent stages use more effectuation to overcome resources and uncertainty, Reymen et al. (2015:374) after analyzing some entrepreneurial ventures find that "effectual decision-making can re-appear in later venture creation phases. Thus, effectuation and causation not only co-occur but also re-occur in different patterns over the venture creation process."

Likewise, while some studies show how extensively entrepreneurs use bricolage at early stages, other studies demonstrate that using bricolage may linger until later stages of developing entrepreneurial ventures and create better performance. Davidsson et al. (2017) show that more experienced entrepreneurs use more bricolage at the early stages of ventures than novices. Senyard

et al. (2009) show that while bricolage has a positive effect on making progress in the early stages, it has a negative effect on performance at later stages. But An et al. (2020) study the impact of using bricolage, effectuation, and causation on performance at different stages in small and large firms and find that undertaking bricolage can be beneficial even at later stages. In small early-stage firms, they find that two solutions, namely, a combination of effectuation and bricolage and the absence of causation, and a combination of causation and bricolage and the absence of effectuation lead to better performance. In small late-stage firms, they find two other solutions so that entrepreneurs combine bricolage with the absence of either causation or effectuation. The mentioned study, in general, shows that using bricolage in addition to other approaches yields better performance in small firms even at later stages.

In bootstrapping literature, although some scholars (e.g. Jonsson & Lindbergh, 2013) believe that bootstrapping strategies are insufficient at later stages, the empirical evidence does not support the mentioned notion. Brush et al. (2006) examine the relationship between bootstrapping and the stage of business development and cannot support the hypothesis that ventures at early stages exhibit greater importance of bootstrapping than ventures at emergent or rapid growth stages. Accordingly, undertaking the three mentioned approaches can be prevalent and beneficial for entrepreneurial ventures even at later stages.

Other than studies that measure the general approaches that entrepreneurs undertake at different stages, Ebben & Johnson (2006) differentiate among different dimensions of bootstrapping and hypothesize that the use of customer-related and delaying-payments bootstrapping increases over time while the use of owner-related and joint-utilization bootstrapping decreases over time. Resource dependency theory (RDT), on which they base their arguments, can be utilized in this research as well to support the fact that entrepreneurs shift their attention gradually from

networking innovatively toward other innovative courses of action when their ventures grow. To make our arguments more strongly, other than RDT, we take the "mutual dependence" perspective developed by Casciaro & Piskorski (2005) into consideration as well.

RDT characterizes firms as an open system reflecting on contingencies in the external environment (Pfeffer & Salancik, 1978). According to this perspective, managers should mindfully take measures to reduce dependence on others to gain more power and control over vital resources (Ulrich & Barney, 1984). As Hillman et al. (2009) explain, according to SDT, organizations are not autonomous, but constrained by a network of interdependencies with other organizations; a high level of interdependence decrease the level of control over survival and continued success for the firms; and organizations relentlessly take actions to manage external interdependencies and to gain more power and control.

On the other hand, Casciaro & Piskorski (2005) question the universality of the mentioned belief and introduce two distinct theoretical dimensions of resource dependence, namely, power imbalance and mutual dependence. According to them, Power imbalance shows the difference in the power of each actor over the other while mutual dependence captures the degree of bilateral dependencies in the dyad. Casciaro & Piskorski (2005) postulate that even in high levels of interdependence if two firms have mutual dependence, they share power, and the dependence does not necessarily lead to losing control. But in the case of high dependence and Power imbalance, the more dependent partner loses control over future performance and survival.

In line with the mutual dependence perspective, the entrepreneurship literature supports the belief that almost all entrepreneurial ventures at early stages lack resources (Linna, 2013) and may develop interdependent networks (Larson, 1992) in which they build trust and support each other (Grichnik et al., 2014) to grow their ventures. In contrast, based on SDT, as entrepreneurial

ventures grow, dependencies will change (Sullivan & Ford, 2014) because ventures can gain legitimacy with their operations and approach other outside parties, therefore, mutual dependence does not exist anymore.

With a similar theoretical perspective, Ebben & Johnson (2006) propose that bootstrapping techniques based on networking decrease over time because ventures face lower levels of resource constraints and higher levels of legitimacy. Likewise, we propose that in later stages, entrepreneurs rely less on dimensions of effectuation and bricolage based on networking and use more internal innovative courses of action if they have to rely on innovative courses of action. Accordingly:

Proposition 8: *To overcome resource scarcity, entrepreneurs with ventures at later stages, prioritize internal innovative courses of action (manipulating resources, manipulating ends, and maximizing available cash) over networking innovatively more than entrepreneurs with ventures at earlier stages.*

4.5. Discussion and conclusion

By reviewing the literature on entrepreneurial approaches in resource-constrained and uncertain situations (bricolage, effectuation, and bootstrapping), we have highlighted some limitations in such approaches and in studies that compare and contrast them. The mentioned limitations have been mentioned in some review papers (e.g. Grégoire & Cherchem, 2020) and some critical analyses (e.g. Arend et al., 2015) as well. In this research, we stepped beyond theoretical comparison among entrepreneurial approaches and tried to obviate one of the main reasons for slow progress in the adequate understanding of entrepreneurial actions (Archer et al., 2009) and the difficulty of comprehending the dynamic of using approaches in entrepreneurial firms (An et al., 2019, Fisher, 2012). We showed that theoretically comparing or empirically measuring entrepreneurial approaches leads to the following limitations and difficulties:

- A considerable amount of overlap among approaches: Sometimes researchers cannot assign an action to a particular approach because some entrepreneurial actions can be classified under more than one approach (e.g. networking innovatively with relatives and friends can be classified as bricolage or as bootstrapping)
- Unclear boundaries between what entrepreneurs do and how they do it: Sometimes researchers notice a process (e.g. experimentation) without recognizing the different potential outcomes (e.g. a new product or a new way to use a resource)
- Different antecedents of approaches: Sometimes researchers neglect the fact that one particular action undertaken by two actors can be undertaken for different purposes (e.g. undertaking an effectual approach to gain resources or to decrease a high amount of uncertainty)
- Multidimensional nature of approaches: Sometimes researchers neglect the fact that different dimensions of one approach may act independently (e.g. means-driven dimension of effectuation has a negative impact on process efficiency, while other dimensions have positive impacts on process efficiency)

Our new approach, based on focusing on innovative courses of action rather than on approaches, addresses the mentioned limitations and clarifies tangible boundaries for the different courses of action so that they can be observed and measured easily.

In the third essay, first, we focused on "what" entrepreneurs do to overcome resource scarcity before addressing other theoretical questions (what, who, why, how, where, when) about the actions they undertake because addressing the "what" question opens the door to find answers for other theoretical questions (Whetten, 1989). Second, while developing the propositions we

partially address “when” and “where” questions by introducing factors that make entrepreneurs prioritize some courses of action over the other(s) to overcome resources scarcity.

The insufficiency of attention to the “what” question and lack of unity in the interpretation of the mentioned question in research about some entrepreneurial approaches has been noted in prior studies as well. As Archer et al. (2009) stress, bricolage mostly explains what entrepreneurs do and introduces observable behaviors, while effectuation is meant to capture the ideas that prompt entrepreneurs to undertake some actions. In other words, bricolage addresses “observing certain actions” while effectuation addresses “what leads to certain actions.” Also, Arend et al. (2015) believe that Sarasvathy (2001) has elaborated on “how” entrepreneurs effectuate without clearly addressing other questions.

The multi-dimensional nature of effectuation adds to the mentioned problem. While a dimension mostly addresses the ‘how’ question (experimentation), another dimension mainly addresses the ‘what’ question (flexibility). Also, both effectuation and bricolage are intended to show what actions entrepreneurs do not undertake as both approaches try to step beyond the assumptions held in economists’ models. For example, As Sarasvathy (2001) explains, while effectuating, entrepreneurs do not hold a vivid vision, do not apply formal control mechanisms, do not perform competition analysis, and do not calculate the financial returns (elements of causal action). Also, bricolage elaborates on actions that are not adaptive to institutional definitions and limits (Baker & Nelson, 2005). Instead, in this research, to obviate the mentioned weakness, we focused only on the “what” question to capture what entrepreneurs do to overcome resource scarcity.

The propositions that we offered partially clarify the differences between innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively). Also, they partially address “when” and “where” questions by introducing factors

that make entrepreneurs prioritize some courses of action over the other(s) to overcome resources scarcity. It is our hope that they will trigger empirical research that can elaborate further on the new approach that we introduced.

This research makes two major contributions to the literature. First, to address the "what" question, we elaborate on four distinct, single-dimensional, and easily measurable innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively) that entrepreneurs undertake to overcome resource scarcity. We showed that each course of action can be explained by one or more approaches, but the four, in total, delineate entrepreneurial responses to resource scarcity. Second, to partially address "when" and "where" questions, we elaborate on process-related, organizational, environmental, and individual factors that affect the decision of entrepreneurs on prioritizing one or two innovative courses of action over the other(s) to overcome resource scarcity. The framework that Gartner (1985) proposes helped us build the structure of our model which can help entrepreneurship researchers distinguish innovative courses of action that entrepreneurs undertake to overcome resource scarcity and find out the reasons entrepreneurs prioritize some innovative courses of action over others in different situations. We strongly hope that this research contributes to solving the issue of inadequate understanding of entrepreneurial actions in resource-constrained situations (Archer et al., 2009) and the difficulty of comprehending the dynamic of using approaches in entrepreneurial firms (An et al., 2019, Fisher, 2012).

As mentioned earlier, other than the theoretical contributions of this research, the models suggested in this study, can be used by entrepreneurs and entrepreneurship advisors and educators. The clear and single-dimensional nature of innovative courses of action introduced in this research makes it easy for entrepreneurship advisors and educators to teach them to entrepreneurs and students.

As discussed before, some studies (e.g Archer et al., 2009; Fisher, 2012) have shown that all three entrepreneurial approaches reviewed in this research can be seen at the same time in some entrepreneurial ventures and, most of the time, their functions are supplementary. As three innovative courses of action suggested in this study are nested in the mentioned approaches and the different aspects of the fourth one (network innovatively) have been mentioned in the approaches either, we believe that all four innovative courses of action can be used in entrepreneurial ventures at the same time as well. This is the main reason we formulate propositions in a way that they show when and where entrepreneurs use one or some of the innovative courses of action more than others. For example, although we showed that manipulating ends is not generally prioritized over other innovative courses of action in social ventures, we believe that some social entrepreneurs manipulate ends to some extent to overcome resource scarcity.

Because the extant literature already has validated scales to measure the entrepreneurial approaches, the available items can be chosen and easily used to measure innovative courses of action. For example, according to figure 1, items in the scale developed by Chandler et al. (2011) to measure flexibility and experimentation can be marginally modified and used to measure manipulating ends.

The most important limitation of this research is its focus on the literature on bricolage, effectuation, and bootstrapping. We believe that using other lenses such as improvisation (Hmieleski & Corbett, 2006) and attention to other antecedents of entrepreneurial action, such as uncertainty add more comprehensiveness to our approach. Moreover, we believe that networking innovatively may have different dimensions that can be discussed separately. For instance, while

some factors may make entrepreneurs approach family and friends to gain resources, other factors may make them share resources with other ventures more.

This study has been conducted by different waves of reviewing the literature on bricolage, effectuation, and bootstrapping. In the first wave, the limitations of research that synthesize entrepreneurial approaches have been noticed and elaborated. The mentioned limitations were identified by reviewing not only the studies that directly synthesize entrepreneurial approaches, but also literature on bricolage, effectuation, bootstrapping, and resource-based research in entrepreneurship separately. In the second wave, we tried to find factors that prompt entrepreneurs to use or avoid different courses of action and to conduct a comparative analysis. Later waves of reviewing the literature were conducted to revise the models and propositions by utilizing other theories, such as resource dependence theory. Although the comprehensive literature review in different waves can be seen as a strength of this research, we believe that qualitative methods such as deep interviews with entrepreneurs may open more windows to understanding why entrepreneurs prioritize some courses of action over others to overcome resource scarcity.

Adding the mentioned elements, conducting related qualitative studies, developing valid scales to measure the innovative courses of action that we explained, and performing empirical research based on them are our main suggestions for future research.

As mentioned earlier, some studies define resourcefulness broadly and beyond resource mobilization (e.g. Bradley, 2015; Misra et al., 2000), include none-creative actions such as self-financing in their models (Michaelis et al., 2022), and view gathering resources as an action that should be done after the opportunity is defined (Barraket et al., 2019; Misra et al.,2000) signaling only causation, not effectuation. Due to the mentioned facts, we did not use the resourcefulness concept as the framework in this research. William et al. (2021:1) believe that “literature on

entrepreneurial resourcefulness is fragmented and lacks cohesion in how it is labeled, conceptualized, measured, and deployed." We believe that the innovative courses of action we introduced in this research can be used in future research about resourcefulness to partially fill the mentioned gaps as the four innovative courses of action are in line with the definition that William et al. (2021:2) provide for resourcefulness: "A boundary-breaking behavior of creatively bringing resources to bear and deploying them to generate and capture new or unexpected sources of value in the process of entrepreneurship."

CHAPTER 5

CONCLUSION

Although in the last two decades effectuation, bricolage, and bootstrapping have helped scholars and practitioners explain processes by which entrepreneurs overcome uncertainty and resource scarcity, there are still gaps in the way they contribute to our understanding of entrepreneurial actions (An et al., 2020; Grégoire & Cherchem, 2020; Rutherford et al., 2017) To address the mentioned insufficiencies, this thesis in the first essay, introduced three new antecedents of effectuation and scrutinizes the impact of disruptiveness of the business idea, entrepreneurs' motivation, and their ambiguity tolerance (indicators of innovators) with regard to taking effectual actions. The second essay started a new dialogue in the literature on using effectuation/causation and performance and addressed the questions about whether entrepreneurs can cognitively recognize when effectual/causal actions are likely to yield better performance and execute them. It also studied the effect of openness to change, optimism, ambition, and the team size on the ventures' capability of choosing and fulfilling the best course of action (effectuation vs causation) at different levels of product/service disruptiveness. To obviate the limitations of prior studies that compare and contrast effectuation, bricolage, and bootstrapping, the third essay made two major contributions to the literature. First, it introduced four distinct, single-dimensional, and easily measurable entrepreneurial courses of action that entrepreneurs undertake to overcome resource scarcity. Second, to stress the differences among the courses of action and to stimulate empirical studies in the future, it elaborated on process-related, organizational, environmental, and individual factors that affect the decision of entrepreneurs on prioritizing one or two innovative courses of action over the other(s) to overcome resource scarcity.

In the first essay, By testing the hypotheses, I first found that entrepreneurs who come up with disruptive business ideas use effectuation more than entrepreneurs who comply with norms of markets (especially flexibility and experimentation aspects). Second, the results showed that entrepreneurs with autonomous motivations have a higher desire to take effectual action. The results support the belief that entrepreneurs can think beyond gaining profit (affordable loss) only when they find their job interesting and valuable. The first and the second essays make an empirical contribution by answering calls to fill the lack of empirical studies in effectuation research (Cai et al., 2017). They are among few studies that have used questionnaires (Perry et al., 2012), sampled from real entrepreneurial ventures, and targeted multi-level factors (Reuber et al., 2016). I sampled two different populations that were statistically different with regard to three key variables that I studied in this research (the level of product/service disruptiveness, the level of autonomous motivation, and the level of using effectuation). This allowed me to generalize the findings of the first essay (similar to the studies of Delmar & Wiklund, 2008; Farmer et al., 2011).

Essay 2 contributes to the effectuation literature in three different ways. First, I paid attention to product/service disruptiveness and its impact on ventures' performance to see if there is a meaningful fit between the course of action (effectuation vs causation) and the extent to which products/services are disruptive. Second, by using a situational lens, inspired by contingency theory, I studied if entrepreneurs tailor the course of action to the level of product/service disruptiveness. Investigating the mentioned capability addresses the different views between Arend et al. (2015) and Sarasvathy (2001) regarding the entrepreneurs' ability to execute different actions in different situations. Finally, I studied individuals' capabilities and a team characteristic that can help entrepreneurs find and fulfill the best course of action in different situations. By doing that, I stepped beyond addressing antecedents of effectual or causal actions per se and investigated

the factors that help entrepreneurs recognize the course of action that the situation demands and follow the processes (effectuation vs causation) that are associated with better performance.

The results in the second essay showed that, while in high levels of product/service disruptiveness, undertaking an effectual course of action leads to better performance, in low levels of product/service disruptiveness, undertaking a causal course of action yields better performance. This means that there is a meaningful fit between the courses of action and the level of product/service disruptiveness. Also, the results showed that taking causation in lower levels of product/service disruptiveness cannot be taken for granted. I had a concern that had been neglected in the literature about whether entrepreneurs are capable of executing different actions (effectuation vs causation) in different situations or not. The results of the second essay showed that the answer to the mentioned questions is that they do not. In the case of lower product/service disruptiveness, entrepreneurs did not lean more toward causal processes although in the mentioned case undertaking causation leads to better performance.

The results showed that entrepreneurs with higher levels of openness to change and ambition tailor the course of action with the level of product/service disruptiveness better. This means entrepreneurs with the mentioned capabilities tend to mindfully assess how radically their products/services change the market and find processes that look more promising. Also, they are more capable of fulfilling the course of action that seems more effective.

By reviewing the literature on entrepreneurial approaches in resource-constrained and uncertain situations (bricolage, effectuation, and bootstrapping), in the third essay, I highlighted some limitations in such approaches and in studies that compare and contrast them. The mentioned limitations have been mentioned in some review papers (e.g. Grégoire & Cherchem, 2020) and some critical analyses (e.g. Arend et al., 2015) as well. I showed that theoretically comparing or

empirically measuring entrepreneurial approaches leads to the following limitations and difficulties:

- A considerable amount of overlap among approaches
- Unclear boundaries between what entrepreneurs do and how they do it
- Different antecedents of approaches
- Multidimensional nature of approaches

My new approach, based on focusing on innovative courses of action rather than on approaches, addresses the mentioned limitations and clarifies tangible boundaries for the different courses of action so that they can be observed and measured easily.

The propositions that I offered partially clarify the differences between innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively). Also, they partially address "when" and "where" questions by introducing factors that make entrepreneurs prioritize some courses of action over the other(s) to overcome resources scarcity. It is my hope that they will trigger empirical research that can elaborate further on the new approach that we introduced.

The third essay makes two major contributions to the literature. First, I elaborate on four distinct, single-dimensional, and easily measurable innovative courses of action (manipulating resources, manipulating ends, maximizing available cash, and networking innovatively) that entrepreneurs undertake to overcome resource scarcity. Second, to partially address "when" and "where" questions, I elaborate on process-related, organizational, environmental, and individual factors that affect the decision of entrepreneurs on prioritizing one or two innovative courses of action over the other(s) to overcome resource scarcity.

While I hope the first and the second essays make meaningful theoretical contributions to the literature, I am aware of their limitations regarding the statistical models that I used (OLS) and the threat of common method bias due to using a single method for measuring independent and dependent variables. I provided several suggestions for future studies to address the limitations of the first and the second essays. The most important limitation of the third essay is its focus on the literature on bricolage, effectuation, and bootstrapping. I believe that using other lenses such as improvisation (Hmieleski & Corbett, 2006) and attention to other antecedents of entrepreneurial action, such as uncertainty add more comprehensiveness to our approach. Moreover, I believe that networking innovatively may have different dimensions that can be discussed separately.

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APPENDICES

Table 1. Descriptive statistics and comparison between two samples used in the first essay via ANOVA test

Variables	Hand collected data				Qualtrics data				Between groups		Within groups		F
	Mean	SD	Min	Max	Mean	SD	Min	Max	Df	Mean square	Df	Mean square	
Effectuation (EF)	5.18	.73	2.62	6.58	4.97	.67	3	6.54	1	2.52	273	.47	5.34**
Venture Age (VA)	37.7	12.7	1	99	42.5	13.7	2	100	1	1247	273	180	6.93***
Venture Size (VS)	1.85	.88	0.69	4.80	1.77	1.05	0.69	6.91	1	.341	273	1.02	.334
Uncertainty (UN)	4.23	.92	2.20	6.60	4.12	.85	1.60	6.20	1	.73	273	.75	.97
Resource Scarcity (RS)	3.9	1.15	1	6.11	3.70	1.00	1	6.56	1	1.70	273	1.10	1.55
Experience (EX)	1.21	1.22	0	6	1.02	1.44	0	11	1	2.15	273	1.92	1.12
Stage (ST)*****	4.61	1.46	2	6	5.30	1.18	1	6	1	25.72	273	1.59	16.19****
Disruptiveness (DI)	5.62	1.23	1	7	4.87	1.27	1	7	1	29.80	273	1.59	18.76****
Controlled Motivation (CM)	4.50	1.17	1.50	6.67	4.62	1.03	1.83	7	1	.84	273	1.15	.73
Autonomous Motivation (AM)	6.18	.77	3.89	7	5.82	.85	3.33	7	1	7.24	273	.69	10.47***
Ambiguity Tolerance (AT)	3.67	.99	2.00	6.40	3.60	.92	1.40	6.40	1	.272	273	.886	.307

*p<.1, **p<.05, ***p<.01, ****p<.001

***** Although we created st.1 to st.6 as 6 dummy variables representing 6 different stages, in this table we considered stage of ventures as a united variable to make comparison between the two samples.

Table 2. Correlation among variables- hand-collected data

Variables	EF	VA	VS	Ind.1	Ind.2	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	Ind.9	St.1	St.2	St.3	St.4	St.5	St.6	Un	RS	EX	DI	CM	AM	AT
EF	1																								
VA	.06	1																							
VS	-.04	-.27*	1																						
Ind.1	-.01	.09	-.18	1																					
Ind.2	.22	-.16	.01	-.12	1																				
Ind.3	-.21	-.27*	-.04	-.09	-.23*	1																			
Ind.4	-.01	.12	-.02	-.05	-.13	-.10	1																		
Ind.5	.01	-.09	.02	-.05	-.13	.10	-.06	1																	
Ind.6	-.06	.03	.12	-.07	-.18	-.13	-.08	-.08	1																
Ind.7	.14	.32**	-.07	-.07	-.19	-.14	-.08	-.08	-.11	1															
Ind.8	-.02	-.14	.18	-.04	-.12	-.09	-.05	-.05	-.07	-.07	1														
Ind.9	-.10	.15	-.01	-.11	-.30**	-.22	-.13	-.13	-.17	-.19	-.11	1													
St.1	-	-	-	-	-	-	-	-	-	-	-	-	-												
St.2	-.12	-.27**	-.07	.30**	.21	-.17	-.10	.07	-.13	-.14	-.09	.05	-	1											
St.3	.04	-.04	-.05	-.08	-.02	-.16	-.09	.28*	.31**	.01	-.08	-.10	-	-.15	1										
St.4	-.10	-.02	-.09	.19	-.05	.16	-.07	-.07	-.10	-.10	.19	-.05	-	-.12	-.11	1									
St.5	.20	-.06	.06	-.13	.14	.08	.25*	-.02	-.10	-.02	-.13	-.13	-	-.26*	-.23*	-.18	1								
St.6	-.08	.29*	.07	-.16	-.24*	.07	-.06	-.18	.04	.18	.12	.18	-	-.32*	-.28*	-.23*	-.48*	1							
UN	.15	.03	.07	.13	.13	-.11	-.01	-.06	.02	.19	-.11	-.16	-	-.02	.10	.01	-.04	-.03	1						
RS	-.22	.05	-.07	-.04	.14	.10	-.11	-.02	-.04	.07	.05	-.19	-	.11	-.04	-.04	.01	-.04	-.09	1					
EX	.27*	-.16	.15	.02	-.02	-.07	-.19	-.04	.06	.15	.02	.04	-	-.01	.10	.07	.06	-.16	-.06	-.15	1				
DI	.37**	-.09	.03	-.02	.29*	-.16	.07	.12	-.06	.01	-.33**	-.10	-	.26*	.09	-.19	.16	-.29*	-.28*	-.13	.08	1			
CM	.07	.01	-.05	.08	-.18	.05	-.05	.11	.03	.08	.00	.12	-	-.10	.11	.06	-.16	.12	-.02	-.04	.07	-.06	1		
AM	.46**	-.12	-.04	.04	.25*	.05	-.06	.06	-.29*	.08	-.09	-.13	-	.12	-.01	-.06	.08	-.14	.13	.09	.25	.34**	.09	1	
AT	.11	.10	.06	.11	.17	-.13	.07	.16	-.03	-.14	-.15	-.04	-	.08	-.09	-.11	.21	-.13	.09	-.12	-.03	.21	-.35**	.17	1

Table 3. Correlation among variables - data gathered by Qualtrics

Variables	EF	VA	VS	Ind.1	Ind.2	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	Ind.9	St.1	St.2	St.3	St.4	St.5	St.6	Un	RS	EX	DI	CM	AM	AT
EF	1																								
VA	-.06	1																							
VS	.17	-.06	1																						
Ind.1	-.12	-.01	-.05	1																					
Ind.2	.06	.15*	.01	-.04	1																				
Ind.3	.06	-.06	-.14	-.04	-.08	1																			
Ind.4	.08	-.05	.13	-.04	-.08	-.09	1																		
Ind.5	-.02	-.04	.08	-.05	-.08	-.10	-.10	1																	
Ind.6	-.08	.01	.13	-.04	-.07	-.09	-.09	-.10	1																
Ind.7	.08	-.01	.00	-.04	-.07	-.08	-.09	-.08	-.08	1															
Ind.8	.00	.04	.11	-.02	-.04	-.05	-.05	-.05	-.05	-.04	1														
Ind.9	-.05	.01	-.14	-.14	-.25**	-.30**	-.30**	-.32**	-.28**	-.26**	-.16*	1													
St.1	.01	-.05	-.03	.29**	-.02	-.02	-.02	-.02	-.02	-.02	-.01	-.07	1												
St.2	-.07	-.19	-.08	.12	-.06	.01	-.07	-.01	-.07	.03	-.04	.07	-.02	1											
St.3	.08	-.17	-.07	-.03	.04	.01	.01	.00	.11	-.06	-.04	-.04	-.02	-.06	1										
St.4	-.01	-.12	.02	.28**	.03	.08	.01	-.01	-.07	.03	-.04	-.10	-.02	-.06	-.06	1									
St.5	.04	-.10	-.13	-.07	-.12	-.06	.04	.05	.01	-.08	.00	.09	-.03	-.12	-.11	-.12	1								
St.6	-.03	.31**	.17*	-.19**	.10	.00	.00	-.03	.01	.07	.05	-.03	-.10	-.33**	-.32**	-.33**	-.65**	1							
UN	.27**	.00	.10	.11	-.07	.01	-.03	-.05	.03	.19**	-.01	-.07	.04	.06	.02	.00	-.07	.01	1						
RS	-.27**	-.01	-.24	.04	.01	.14	-.11	-.14*	.01	-.06	.12	.03	-.10	.07	-.05	.02	.08	-.08	.03	1					
EX	.04	-.19	.19	.22**	-.02	-.05	.08	.03	.20**	-.03	-.05	-.16*	.05	-.02	.21**	.15*	-.04	-.13	.14	-.08	1				
DI	.41**	-.12	.12	-.05	.07	-.09	.11	-.04	.04	.13	-.02	.08	.04	.05	.07	.00	.08	-.12	.25**	-.30**	.11	1			
CM	.21**	.02	.02	.04	.06	-.17	.05	.06	.05	-.01	-.10	.02	.06	-.07	.12	-.04	-.11	.08	.02	-.28**	.04	.18*	1		
AM	.36**	-.04	.01	-.10	.00	-.01	.05	.05	-.01	.05	-.11	.00	.07	-.06	.09	-.12	.00	.03	.03	-.24	-.06	.37**	.30**	1	
AT	-.13	.17	.04	.09	.02	-.01	-.05	.06	.02	.03	-.05	-.02	.02	-.08	-.06	-.03	-.07	.14	-.02	-.15	.05	-.11	-.14	-.11	1

Table 4. reliability of the scales, Cronbach's alpha

Variables/ sub-variables		Items	Hand-collected data		Qualtrics data	
Effectuation	Experimentation	We experimented with different products and/or business models.	69.2	72.3	60.3	77.4
		The product/service that we now provide is essentially the same as originally conceptualized (reversed).				
		The product/service that we now provide is substantially different than we first imagined.				
		We tried a number of different approaches until we found a business model that worked.				
	Affordable loss	We were careful not to commit more resources than we could afford to lose.	66.4		84.0	
		We were careful not to risk more money than we were willing to lose with our initial idea.				
		We were careful not to risk so much money that the company would be in real trouble financially if things didn't work out.				
	Flexibility	We allowed the business to evolve as opportunities emerged.	62.2		80.0	
		We adapted what we were doing to the resources we had.				
		We were flexible and took advantage of opportunities as they arose.				
		We avoided courses of action that restricted our flexibility and adaptability.				
	Pre-commitments	We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty.	76.1		71.1	
		We used pre-commitments from customers and suppliers as often as possible.				
Controlled motivation	External	I pursue this business activity because... - others (my boss, parent, partner, etc.) wanted me to do it.	65.0	72.7	63.4	72.3
		I pursue this business activity because... - the situation demands it.				
		I pursue this business activity because... - I make money to do it.				
	Introjected	I pursue this business activity because... - I would feel guilty if I did not do it.	76.6		79.5	
		I pursue this business activity because... - I would feel ashamed if I did not do it.				
		I pursue this business activity because... - I would feel bad about myself if I did not pursue it.				
Autonomous Motivation	Identified	I pursue this business activity because... - I believe my work is valuable.	89.8		87.0	
		I pursue this business activity because... - my work is important.				
		I pursue this business activity because... - I value the work that I am doing.				
	Integrated	I pursue this business activity because... - my work goals and personal goals are integrated.	71.7	89.8	74.3	89.0
		I pursue this business activity because... - my work is a big part of who I am.				
		I pursue this business activity because... - my work helps to define me.				
	Intrinsic	I pursue this business activity because... - I find this work interesting.	75.8		83.9	
		I pursue this business activity because... - the work is fun.				
		I pursue this business activity because... - I find this work engaging.				

Table 4. reliability of the scales, Cronbach's alpha (continued)

Variables/ sub-variables	Items	Hand-collected data	Qualtrics data
Product/service disruptiveness	The product/service that we develop is original.	91.7	83.5
	The individual or team behind this business activity suggests radically new ways of doing things.		
	The individual or team behind this business activity is a good source of highly creative ideas.		
	The individual or team behind this business activity demonstrates originality in his/her/its work.		
	There are no other product/service like what we develop on the market right now.		
	Our product/service is radically new.		
Ambiguity tolerance	I function very poorly whenever there is a serious lack of communication in a job situation. (reversed)	74.7	66.4
	In a situation in which other people evaluate me, I feel a great need for clear and explicit evaluations. (reversed)		
	If I am uncertain about the responsibilities of a job, I get very anxious. (reversed)		
	If I were a scientist, I might become frustrated because my work would never be completed (science will always make new discoveries). (reversed)		
	If I were a doctor, I would prefer the uncertainties of a psychiatrist to the clear and definite work of someone like a surgeon or X-ray specialist.		

Table 5. Multivariate linear regression analysis (Ordinary Least Squares) - Hand-collected data, Dependent variable: effectuation

Model	Constant (Unstandardized)	Control variables (standardized values)										Independent Variables (standardized values)											AdjR²	df	F	STD Error
		VA	VS	Ind.1	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	Ind.9	St2	St3	St4	St5	UN	RS	EX	DI	CM	AM	AT				
1	5.67****	.056	-.12	-.07	-.30**	-.14	-.06	-.20	-.11	-.04	-.29*	-.15	-.04	-.12	.11	.10	-.22*	.26**					.064	17	1.296	.70
2	4.552****	.06	-.14	-.01	-.23	-.14	-.06	-.15	-.11	.10	-.22	-.27*	-.08	-.12	.05	.03	-.16	.25**	.38***				.159	18	1.778*	.66
3	4.781****	.07	-.11	.06	-.32	-.04	.02	.12	.01	.11	-.11	-.13	-.05	-.12	.13	.11	-.22	.26		.12			.063	18	1.274	.70
4	3.355****	.06	-.10	-.05	-.28	-.11	-.05	-.03	-.06	.02	-.19	-.16	-.06	-.08	.11	.04	-.25	.13			.44****		.236	18	2.269**	.63
5	5.654****	.05	-.12	-.07	-.30*	-.14	-.06	-.20	-.11	-.04	-.29*	-.15	-.04	-.12	.11	.10	-.21	.26**				.00	.047	18	1.203	.71
6	2.935***	.08	-.11	-.01	-.25*	-.12	-.04	-.02	-.09	.10	-.17	-.23	-.10	-.09	.08	.01	-.22*	.13	.27*	.04	.38***	-.06	.255	21	2.204**	.63

*p<.1, **p<.05, ***p<.01, ****p<.001

Ind2 and st6 were omitted by the model as "Ind" variables and "St" variables are dummy representing Industry and stage respectively. We had no record for st1 in our sample.

Table 6. Multivariate linear regression analysis (Ordinary Least Squares) - data gathered by Qualtrics, Dependent variable: effectuation

Model	Constant (Unstandardized)	Control variables (standardized values)											Independent Variables (standardized values)												AdjR²	df	F	STD Error
		VA	VS	Ind.1	Ind.2	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	St1	St2	St3	St4	St5	UN	RS	EX	DI	CM	AM	AT				
1	4.605****	-.04	.12	-.18**	.08	.01	.02	-.06	-.15	.03	-.03	.10	-.03	.08	.04	.11	.29****	-.29****	-.01					.165	18	3.179****	.61
2	3.937****	-.01	.11	-.15	.05	.11	.00	-.04	-.15	.00	-.02	.07	-.05	.07	.03	.07	.22***	-.20***	-.02	.27****				.222	19	3.992****	.59
3	3.995****	-.03	.13	-.19	.07	.12	.00	-.07	-.16	.02	-.03	.09	-.02	.07	.05	.13	.29****	.25***	.00		.17**			.186	19	3.397****	.61
4	3.125****	-.02	.12	-.15	.08	.10	.02	-.06	-.14	.02	.01	.06	-.02	.06	.07	.11	.27****	-.22***	.02			.29****		.239	19	4.293****	.59
5	5.066****	-.01	.12	-.16	.08	.10	.01	-.05	-.16	.03	-.04	.09	-.04	.07	.03	.10	.28****	-.31****	.01				-.15	.184	19	3.355****	.61
6	3.083****	.01	.12	-.13	.05	.11	-.01	-.05	-.15	.00	-.01	.05	-.04	.04	.05	.09	.23***	-.17**	.01	.18**	.08	.20***	-.08	.270	22	4.348****	.57

*p<.1, **p<.05, ***p<.01, ****p<.001

Ind9 and st6 were omitted by the model as "Ind" variables and "St" variables are dummy representing Industry and stage respectively.

Table 7. Multivariate linear regression analysis (Ordinary Least Squares)- Hand collected data- Full table

Models	Dependent Variable	Constant (Unstandardized)	Independent Variables (standardized values) DI	CM	AM	AT	AdjR^2	df	F	STD Error
2	Experimentation	3.252**	.40***				.208	74	2.081**	1.16
	Affordable loss	5.429****	-.02				-.120	74	.569	1.23
	Flexibility	5.593****	.33**				.029	74	1.122	.77
	Pre-commitment	3.757**	.17				.002	74	1.007	1.57
3	Experimentation	4.309***		-.05			.09	74	1.404	1.25
	Affordable loss	4.963****		.07			-.111	74	.590	1.23
	Flexibility	5.479****		.20			-.01	74	.954	.79
	Pre-commitment	4.055**		.15			.01	74	1.032	1.56
4	Experimentation	3.287*			.22*		.132	74	1.627*	1.22
	Affordable loss	2.738*			.31**		-.023	74	.906	1.18
	Flexibility	4.140****			.44***		.132	74	1.628*	.73
	Pre-commitment	2.843			.17		.01	74	1.039	1.56
5	Experimentation	4.994****				.08	.092	74	1.417	1.24
	Affordable loss	5.686****				-.08	-.11	74	.591	1.23
	Flexibility	6.370****				.10	-.047	74	.815	.80
	Pre-commitment	5.497***				-.13	.00	74	.984	1.57

*p<.1, **p<.05, ***p<.01, ****p<.001

Control variables in all models: VA, VS, Ind.1, Ind.3, Ind.4, Ind.5, Ind.6, Ind.7, Ind.8, Ind.9, St2, St3, St4, St5, UN, RS, EX

Model 1 includes only control variables; therefore, it is not illustrated in this table.

Table 8. Multivariate linear regression analysis (Ordinary Least Squares)- data gathered by Qualtrics - Full table

Models	Dependent Variable	Constant (Unstandardized)	Independent Variables (standardized values) DI	CM	AM	AT	AdjR^2	df	F	STD Error
2	Experimentation	2.301****	.24***				.281	199	5.085****	.91
	Affordable loss	4.779****	.14*				.016	199	1.171	1.02
	Flexibility	4.743****	.18**				.06	199	1.670**	.80
	Pre-commitment	4.337****	.12				.137	199	2.662****	1.23
3	Experimentation	2.839****		.07			.238	199	4.265****	.94
	Affordable loss	4.490****		.15*			.019	199	1.206	1.02
	Flexibility	4.917****		.08			.040	199	1.433	.81
	Pre-commitment	3.718****		.17**			.151	199	2.863	1.22
4	Experimentation	3.126****			.01		.234	199	4.192****	.94
	Affordable loss	3.149****			.27****		.071	199	1.804**	.99
	Flexibility	2.648****			.42****		.200	199	3.617****	.74
	Pre-commitment	4.038****			.09		.132	199	2.589***	1.23
5	Experimentation	3.291****				-.01	.234	199	4.191****	.94
	Affordable loss	5.845****				-.11	.012	199	1.122	1.022
	Flexibility	5.908****				-.17**	.063	199	1.704**	.80
	Pre-commitment	5.761****				-.14**	.144	199	2.764****	1.22

*p<.1, **p<.05, ***p<.01, ****p<.001

Control variables in all models: VA, VS, Ind.1, Ind.2, Ind.3, Ind.4, Ind.5, Ind.6, Ind.7, Ind.8, St1, St2, St3, St4, St5, UN, RS, EX

Model 1 includes only control variables; therefore, it is not illustrated in this table.

Table 9. The way we measured the variables

variables	The way we measured the variables
Performance (PE)	Based on the scales Brettel et al. (2012) use, venture performance was measured by 15 items: general criteria (7 items), financial aspect (5 items), and R&D output (3 items).
Effectuation (EF)	we used the scale developed by Chandler et al. (2011): 13 items in total.
Causation (CA)	we used the scale developed by Chandler et al. (2011): 7 items in total.
Disruptiveness (DI)	we used the scale developed by Chan & Parhankangas (2017): 6 items in total.
Industry (IN)	based on the Global Industry Classification Standard (MSCI, 2020).
Venture Age (VA)	The number of months since creation.
Venture Size (VS)	Natural logarithm of the number of active people in the venture.
Experience (EX)	The number of businesses entrepreneurs had started as a founder/co-founder other than their current business activity.
Uncertainty (UN)	we used the scale developed by Harms & Schiele (2012): 5 items in total.
Stage (ST)	ranging from level 1 (the level of business idea development) to level 6 (the level at which ventures have stable sales and consider the growth plan).
Openness to Change (OC)	The composite measure of three demographic indicators, namely, (1) entrepreneur's age (2) organizational tenure (the length of the time that the main entrepreneur has been active in the venture), and (3) educational level.
Ambition (AM)	The natural logarithm of the size of the company entrepreneurs intend to create within five years.
Optimism (OP)	we used the scale developed by Scheier et al. (1994): 10 items in total.
Team size (TS)	the number of founders who had a significant financial interest and participated actively in the creation of the venture.

Table 10. Descriptive statistics

Variables	Mean	SD	Min	Max
Effectuation (EF)	4.97	0.67	3	6.54
Causation (CA)	5.32	1.07	2.25	7
Venture Age (VA)	42.5	13.7	2	100
Venture Size (VS)	1.77	1.05	0.69	6.91
Ind.1	.02	.14	0	1
Ind.2	.06	.24	0	1
Ind.3	.09	.28	0	1
Ind.4	.09	.28	0	1
Ind.5	.10	.30	0	1
Ind.6	.08	.26	0	1
Ind.7	.07	.25	0	1
Ind.8	.03	.16	0	1
Ind.9	.49	.50	0	1
St.1	.01	.07	0	1
St.2	.06	.23	0	1
St.3	.05	.22	0	1
St.4	.06	.23	0	1
St.5	.19	.39	0	1
St.6	.65	.48	0	1
Uncertainty (UN)	4.12	0.85	1.60	6.20
Experience (EX)	1.02	1.44	0	11
Disruptiveness (DI)	4.88	1.27	1	7
Openness to change (OC)	.00	1.00	-4.7	2.37
Optimism (OP)	4.76	1.04	1.33	7
Ambition (AM)	2.08	1.26	0.69	7.51
Team Size (TS)	1.76	1.08	1	11
Performance (PE)	4.94	.95	1.58	6.93

Table 11. correlation among variables

Variables	EF	CA	VA	VS	Ind.1	Ind.2	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	Ind.9	St.1	St.2	St.3	St.4	St.5	St.6	UN	EX	DI	OC	OP	AM	TS	PE
EF	1																										
CA	.45**	1																									
VA	-.06	-.01	1																								
VS	.17	.27**	-.06	1																							
Ind.1	-.12	.00	-.01	-.05	1																						
Ind.2	.06	.16*	.15*	.01	-.04	1																					
Ind.3	.06	.01	-.06	-.14	-.04	-.08	1																				
Ind.4	.08	-.07	-.05	.13	-.04	-.08	-.09	1																			
Ind.5	-.02	.04	-.04	.08	-.05	-.08	-.10	-.10	1																		
Ind.6	-.08	-.11	.01	.13	-.04	-.07	-.09	-.09	-.10	1																	
Ind.7	.08	.00	-.01	.00	-.04	-.07	-.08	-.09	-.08	-.08	1																
Ind.8	.00	.03	.04	.11	-.02	-.04	-.05	-.05	-.05	-.05	-.04	1															
Ind.9	-.05	-.02	.01	-.14	-.14	-.25**	-.30**	-.30**	-.32**	-.28**	-.26**	-.16*	1														
St.1	.01	.04	-.05	-.03	.25**	-.02	-.02	-.02	-.02	-.02	-.02	-.01	-.07	1													
St.2	-.07	-.05	-.19	-.08	.12	-.06	.01	-.07	-.01	-.07	.03	-.04	.07	-.02	1												
St.3	.08	.00	-.17	-.07	-.03	.04	.01	.01	.00	.11	-.06	-.04	-.04	-.02	-.06	1											
St.4	-.01	.02	-.12	.02	.28**	.03	.08	.01	-.01	-.07	.03	-.04	-.10	-.02	-.06	-.06	1										
St.5	.04	-.03	-.10	-.13	-.07	-.12	-.06	.04	.05	.01	-.08	.00	.09	-.03	-.12	-.11	-.12	1									
St.6	-.03	.03	.31**	.17*	-.19**	.10	.00	.00	-.03	.01	.07	.05	-.03	-.10	-.33**	-.32**	-.33**	-.65**	1								
UN	.27**	.20**	.00	.10	.11	-.07	.01	-.03	-.05	.03	.19**	-.01	-.07	.04	.06	.02	.00	-.07	.01	1							
EX	.04	.08	-.19	.19	.22**	-.02	-.05	.08	.03	.20**	-.03	-.05	-.16*	.05	-.02	.21**	.15*	-.04	-.13	.14	1						
DI	.31**	.30**	-.12	.12	-.05	.07	-.09	.11	-.04	.04	.13	-.02	.08	.04	.05	.07	.00	.08	-.12	.25**	.11	1					
OC	.24**	.23**	-.35**	.27**	.05	.18*	.09	-.09	.00	.00	-.06	.06	-.06	.05	.08	-.09	-.05	.03	.01	.07	.09	.13	1				
OP	.09	.02	.15*	-.08	.15*	-.13	-.13	.01	.00	.01	.00	.09	.05	.03	.03	.01	.09	-.02	-.05	.01	.01	.04	-.07	1			
AM	.26**	.36**	-.12	.74**	-.08	.13	.04	-.09	.06	-.04	.03	-.01	-.03	-.01	.08	-.04	-.01	.05	-.05	.17*	.18*	.20**	.31**	.03	1		
TS	.02	.11	-.12	.30**	.03	.02	.02	-.06	.00	-.02	.21**	.05	-.06	.02	.10	.03	-.05	-.10	.04	-.08	.11	.06	.01	-.03	.18**	1	
PE	.34**	.33**	.03	.31**	.01	-.05	-.04	-.02	.08	-.02	-.09	.05	.05	.01	.05	-.06	-.01	.07	-.05	.03	.09	.36**	.11	.20**	.32**	.15*	1

= 75; *p < 0.05; **p < 0.01

Table 12. Checking multicollinearity by calculating variance inflation factors

Model	Dependent variable	Independent Variable (IVs)					
		IV1		IV2		IV3	
		Variable	VIF	Variable	VIF	Variable	VIF
1	Openness to change (OC)	OP	1.002	AM	1.036	TS	1.036
2	Optimism (OP)	OC	1.106	AM	1.144	TS	1.037
3	Ambition (AM)	OC	1.005	OP	1.006	TS	1.001
4	Team Size (TS)	OC	1.111	OP	1.007	AM	1.006

Table 13. Assessing the reliability of scales

Variables/ sub-variables		Items	α	
Performance	General	New employees growth speed	64.6	80.3
		Meeting project schedule		
		Staying on budget		
		Meeting operational and technical performance of the product/service		
		Learnings and expertise that can be leveraged in other business activities		
		Generation of new ideas as starting point of potential future business activities		
		Enhancement of competencies and capabilities		
	Financial	Net profit rate	79.3	
		Investment return rate		
		Market share rate		
		Sales growth speed		
		Market shares growth speed		
	R&D	Perceived value of the R&D output	77.0	
		Opportunities to market R&D output		
		Quality and performance of the R&D output		
Causation		We analyzed long run opportunities and selected what we thought would provide the best returns	86.9	
		We developed a strategy to best take advantage of resources and capabilities.		
		We designed and planned business strategies.		
		We organized and implemented control processes to make sure we met objectives.		
		We researched and selected target markets and did meaningful competitive analysis.		
		We had a clear and consistent vision for where we wanted to end up.		
		We designed and planned production and marketing efforts.		

Table 13. Assessing the reliability of scales (continued)

Variables/ sub-variables		Items	α	
Effectuation	Experimentation	We experimented with different products and/or business models.	60.3	77.4
		The product/service that we now provide is essentially the same as originally conceptualized (reversed).		
		The product/service that we now provide is substantially different than we first imagined.		
		We tried a number of different approaches until we found a business model that worked.		
	Affordable loss	We were careful not to commit more resources than we could afford to lose.	84.0	
		We were careful not to risk more money than we were willing to lose with our initial idea.		
		We were careful not to risk so much money that the company would be in real trouble financially if things didn't work out.		
	Flexibility	We allowed the business to evolve as opportunities emerged.	80.0	
		We adapted what we were doing to the resources we had.		
		We were flexible and took advantage of opportunities as they arose.		
		We avoided courses of action that restricted our flexibility and adaptability.		
	Pre-commitments	We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty.	71.1	
		We used pre-commitments from customers and suppliers as often as possible.		
Product/service disruptiveness		The product/service that we develop is original.	83.5	
		The individual or team behind this business activity suggests radically new ways of doing things.		
		The individual or team behind this business activity is a good source of highly creative ideas.		
		The individual or team behind this business activity demonstrates originality in his/her/its work.		
		There are no other product/service like what we develop on the market right now.		
		Our product/service is radically new.		
Optimism		In uncertain times, I usually expect the best.	88.6	
		If something can go wrong for me, it will.		
		I am always optimistic about my future.		
		I hardly ever expect things to go my way.		
		I rarely count on good things happening to me.		
		Overall, I expect more good things to happen to me than bad.		

Table 14.a. Regression analysis (Ordinary Least Squares)- Dependent variable: performance, model 1

Category	Models	Constant (Unstandardized)	Control variables												adjR^2	df	F	STD Error
			EX	IN.1	IN.2	IN.3	IN.4	IN.5	IN.6	IN.7	IN.8	IN.9	VA	VS				
High disruptiveness	1	4.277****	.05	.01	.02	-.09	.00	.13	.01	-.12	-.05	-	.22**	.41****	.126	11	2.374**	.89
Low disruptiveness	1	4.202****	.09	-.06	-.23**	-.08	-.04	-.14	-.19*	-.19*	-.18*	-	.04	.32***	.074	11	1.671*	.85

*p<.1, **p<.05, ***p<.01, ****p<.001

In.9 is omitted from model because In.1 to In.9 are dummy variables representing the industry category and In.9 is dependent on In.1 to In.8

Table 14.b. Regression analysis (Ordinary Least Squares)- Dependent variable: performance, models 2,3, and 4

Category	Constant (Unstandardized)	Models	Independent variables		adjR^2	df	F	STD Error
			Effectuation	Causation				
High disruptiveness	1.828**	2	.32***		.219	12	3.460****	.84
	3.849****	3		.11	.127	12	2.272**	.89
	1.831**	4	.32***	.03	.211	13	3.160***	.84
Low disruptiveness	3.311****	2	.13		.077	12	1.651*	.85
	2.611****	3		.37***	.174	12	2.630***	.80
	2.612***	4	.02	.37***	.163	13	2.397***	.81

*p<.1, **p<.05, ***p<.01, ****p<.001

Control variables: EX, IN.1, IN.2, IN.3, IN.4, IN.5, IN.6, IN.7, IN.8, VA, and VS

In.9 is omitted from model because In.1 to In.9 are dummy variables representing the industry category and In.9 is dependent on In.1 to In.8

Table 14.C. Regression analysis (Ordinary Least Squares)- Dependent variable: Three different dimensions of performance, model 4

Category	Dependent Variables	Constant (Unstandardized)	Independent variables: Effectuation	Independent variables: Causation	adjR^2	df	F	STD Error
High disruptiveness	Growth	1.190	.387****	.010	.201	13	1.775*	1.00
	Financial performance	1.326	.352***	-.222	.304	13	2.656***	1.12
	R&D output	2.878	.226	-.006	-.070	13	.698	1.24
Low disruptiveness	Growth	3.764****	-.146	.418***	.212	13	2.920***	.990
	Financial performance	2.495**	-.177	.573****	.272	12	3.520****	1.05
	R&D output	1.686	.391	.136	.091	12	1.335	1.00

*p<.1, **p<.05, ***p<.01, ****p<.001

Control variables: EX, IN.1, IN.2, IN.3, IN.4, IN.5, IN.6, IN.7, IN.8, VA, and VS

Table 15. Regression analysis (Ordinary Least Squares)- Dependent variable: effectuation/ causation

Dependent Variables	Models	Constant (Unstandardized)	Control variables: VA	VS	Ind.1	Ind.2	Ind.3	Ind.4	Ind.5	Ind.6	Ind.7	Ind.8	St1	St2	St3	St4	St5	UN	EX	DI	AdjR^2	df	F	STD Error
Effectuation	1	4.07****	-.04	.15**	.09	.06	-.02	-.08	-.06	.00	-.06	.03	-.06	-.08	-.02	.00	-.01	.25***	-.02		.044	17	1.543**	.66
	2	3.43****	.00	.12	.07	.08	-.01	-.07	-.10	.00	-.09	.01	-.05	-.05	-.02	.03	-.01	.15**	-.03	.37****	.173	18	3.307****	.61
Causation	1	4.023****	.02	.25***	.02	.10	-.01	-.05	.03	-.10	-.01	.04	.01	-.09	-.02	.01	-.02	.16**	.03		.063	17	1.789**	1.03
	2	3.051****	.06	.22***	-.01	.12	.00	-.04	.00	-.10	.02	-.06	-.02	.04	-.03	.07	-.03	.07	.01	.36****	.183	18	3.469****	.97

*p<.1, **p<.05, ***p<.01, ****p<.001

Table 16.a. Regression analysis (Ordinary Least Squares)- Dependent variable: effectuation/ causation. Model 1

Dependent variables	Models	Constant (Unstandardized)	Control variables																adjR^2	df	F	STD Error
			EX	IN.1	IN.2	IN.3	IN.4	IN.5	IN.6	IN.7	IN.8	St.1	St.2	St.3	St.4	St.5	VA	VS				
Effectuation in high disruptiveness category	1	4.961****	.10	.15	.03	-.07	-.06	-.01	-.06	-.19**	-.05	-.11	.14	.01	.03	-.09	.11	.17	-.024	16	.848	.61
Causation in low disruptiveness category	1	4.724****	-.02	-.21**	.13	.02	-.17*	-.16	-.33***	-.06	-.12	-	.03	-.13	-.05	.21	-.04	.28***	.200	15	2.546***	.85

*p<.1, **p<.05, ***p<.01, ****p<.001

In.9 and St.6 are omitted from model because In.1 to In.9 and st.1 to st.6 are dummy variables representing the industry and stage category respectively and In.9 and st.6 are dependent on In.1 to In.8 and st.1 to st.5 respectively.

Table 16.b. Regression analysis (Ordinary Least Squares)- Dependent variable: effectuation/ causation. Models 2 to 6

Dependent variables	Models	Constant (Unstandardized)	Independent variables				adjR^2	df	F	STD Error
			OC	OP	AM	TS				
Effectuation in high disruptiveness category	2	4.930****	.33***				.043	17	1.276	.59
	3	4.341****		.23**			.018	17	1.116	.60
	4	4.813****			.42***		.044	17	1.284	.59
	5	4.724****				.21*	.008	17	1.049	.60
	6	4.100****	.29**	.17*	.28*	.20**	.140	20	1.852	.56
Causation in low disruptiveness category	2	5.139****	.26**				.245	16	2.883***	.83
	3	4.906****		-.04			.191	16	2.373****	.86
	4	4.662****			.19**		.201	16	2.459****	.85
	5	4.718***				.01	.189	16	2.356***	.86
	6	4.780***	.27**	-.07	.19**	.08	.233	19	2.489***	.84

*p<.1, **p<.05, ***p<.01, ****p<.001

Control variables: EX, IN.1, IN.2, IN.3, IN.4, IN.5, IN.6, IN.7, IN.8, St.1, St.2, St.3, St.4, St.5, VA, and VS

In.9 and St.6 are omitted from model because In.1 to In.9 and st.1 to st.6 are dummy variables representing the industry and stage category respectively and In.9 and st.6 are dependent on In.1 to In.8 and st.1 to st.5 respectively.

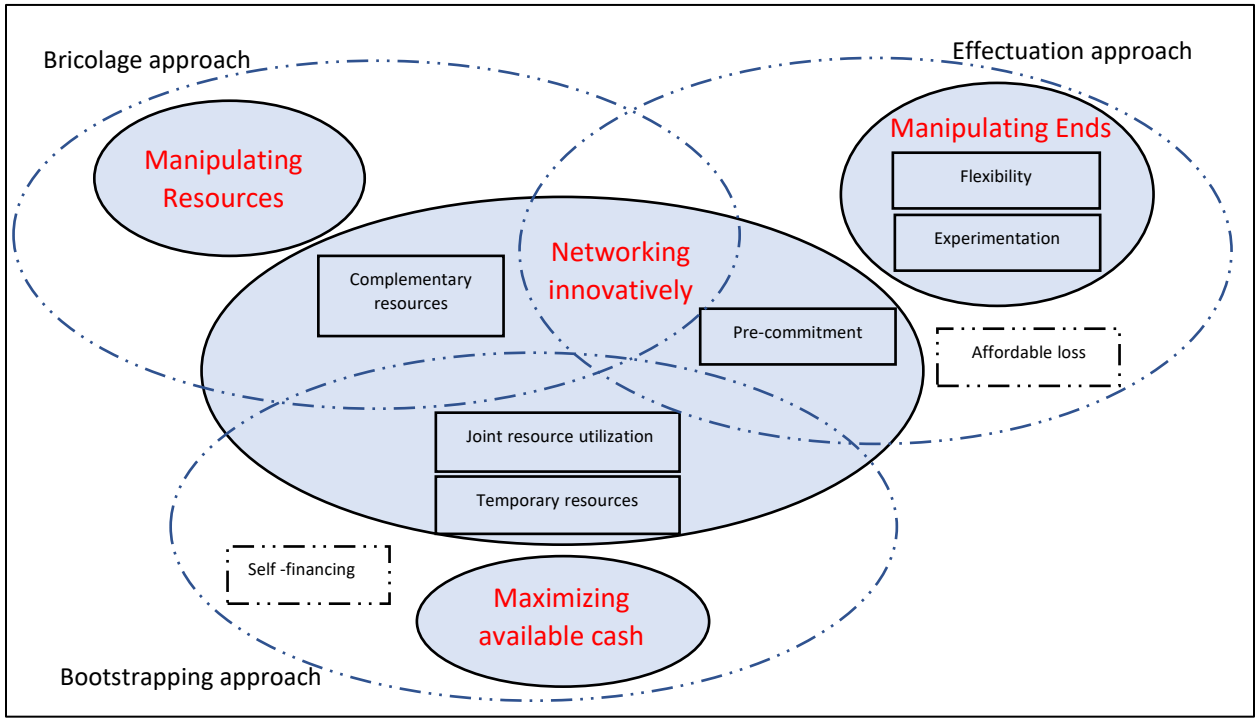

Figure 1. Innovative courses of action to overcome resource scarcity

* Self financing is a conventional way of gaining resources. Also, affordable loss is not an action to overcome resource scarcity, but the mindset of effectuators to think of how much they can lose instead of thinking how much profit they can make. Therefore, the mentioned two factors are omitted from the model

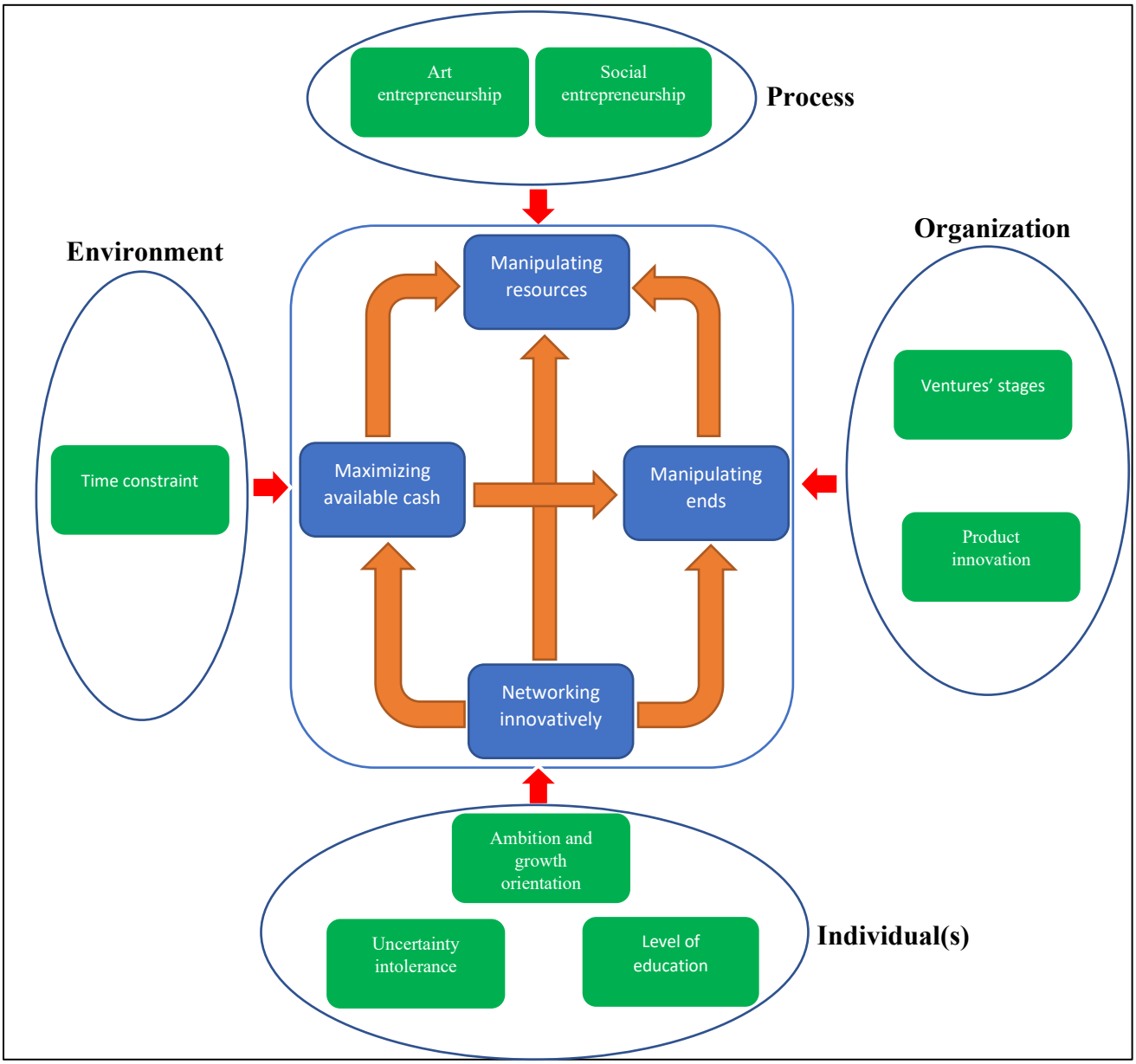

Figure 2a: The general model, introducing different factors that affect entrepreneurs' decision on prioritizing some innovative courses of action over the others

* An orange arrow strating from action X and ending to action Y represents the decision of entrepreneurs to priritize action Y over action X.

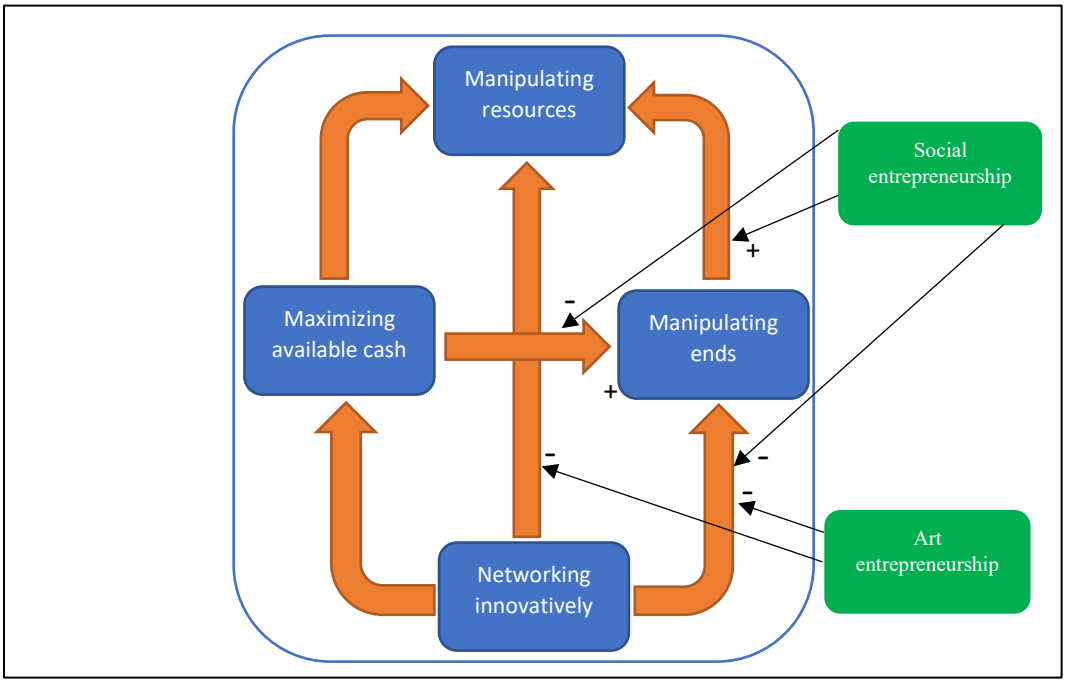

Figure 2b: The way process-related factors affect entrepreneurs' decision on prioritizing some innovative courses of action over the others

* An orange arrow strating from action X and ending to action Y represents the decision of entrepreneurs to priritize action Y over action X.

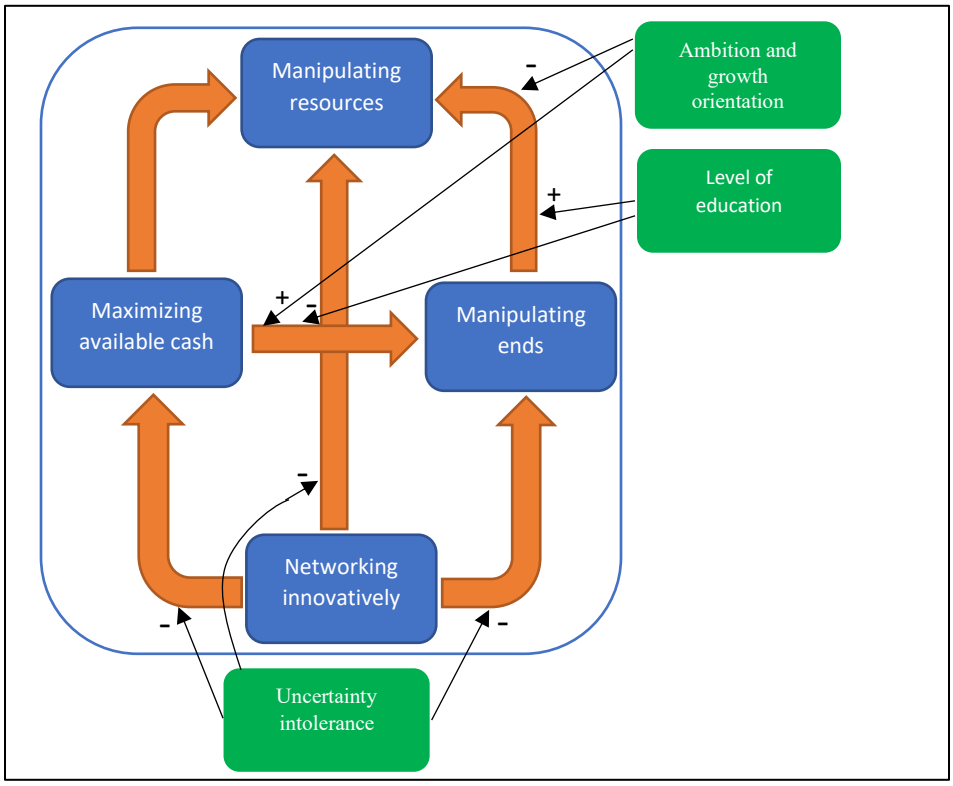

Figure 2c: The way individual factors affect entrepreneurs' decision on prioritizing some innovative courses of action over the others

* An orange arrow strating from action X and ending to action Y represents the decision of entrepreneurs to priritize action Y over action X.

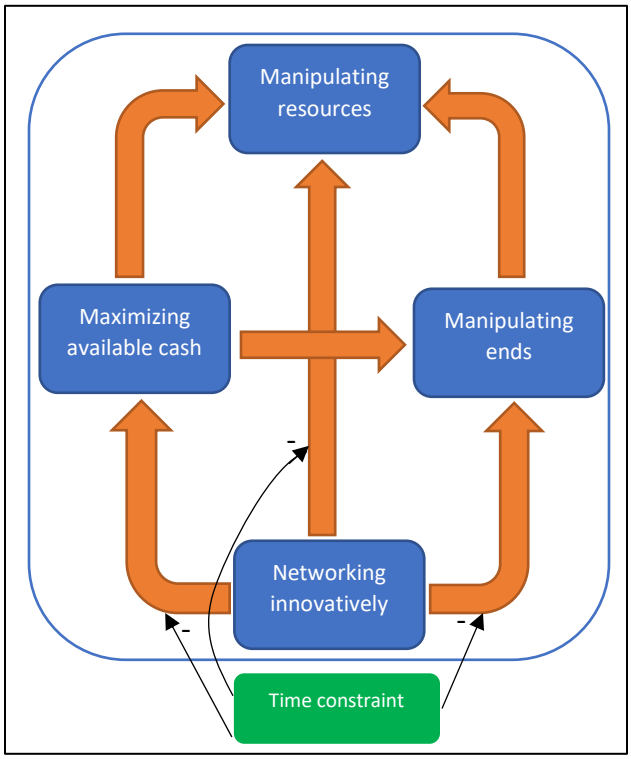

Figure 2d: The way an environmental factor affects entrepreneurs' decision on prioritizing some innovative courses of action over the others

* An orange arrow strating from action X and ending to action Y represents the decision of entrepreneurs to priritize action Y over action X.

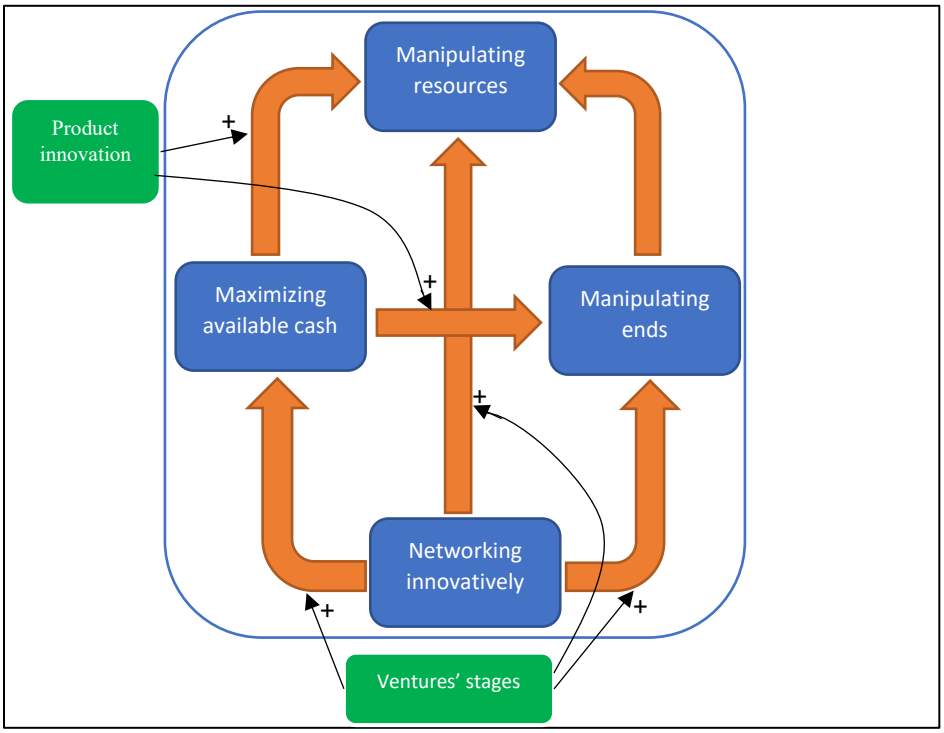

Figure 2e: The way organizational factors affect entrepreneurs' decision on prioritizing some innovative courses of action over the others

* An orange arrow strating from action X and ending to action Y represents the decision of entrepreneurs to priritize action Y over action X.