THESIS

THREE ESSAYS ON EFFECTUATION

by

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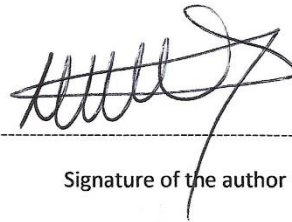
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Hereby I testify that this thesis contains no material accepted for any other degree in any other institution and that it contains no material previously written and/or published by another person except where appropriate acknowledgement is made.

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ABSTRACT

My dissertation aims at understanding the process of entrepreneurial decision making, especially the non-predictive approaches, such as the effectuation logic. This dissertation explores every level of the entrepreneurial decision – making, from micro to macro in three separate essays. In the first essay I explore Construal levels as potential antecedents to the selection of meta – cognitive strategies such as effectuation and causation. I use experimental methods to induce the selection of one of the decision-making logics via mindset activation (concrete or abstract). By combining Construal level theory with the Effectuation theory, I facilitate a deeper understanding of these processes on the micro level.

In the second essay, I look at the effects of the choice of the decision-making logic by the entrepreneur on the creation of new markets and the evolution of existing ones. By combining the aspects of complexity theory and effectuation, I first develop topology of the market-space, and then a conceptual model. The interactions of the firms and the coevolution of the market based on dissipative structures and complex adaptive system (CAS) offer insights into market evolution. Additionally, I propose explanation of how the position of the agents in the market-space and the type of decision- making they use affect the market evolution.

The aim of Essay 3 is to understand the internationalization processes of multinational corporations and how their choice of decision – making logic affects the outcomes in the new markets. It continues the discussion from the second essay by using an abductive approach to follow a practical case of an EMNE entering multiple new markets. I incorporate internationalization and entrepreneurial dimensions by combining entry mode choices, market and country characteristics, with individual level conditions. Finally, I evaluate the combined effect of these conditions on firm performance by using set theory method, fsQCA.

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During this entire period, I've continuously relied on my wife Sabrina, who was always there for me either as a first responder in my many PhD related frustrations and self-doubts or as a sounding board for my ideas. Her support, love, and unwavering confidence in me kept me going, and gave me strength and joy through some of the toughest times for me personally, and for the world facing a global pandemic. For that, I'm deeply indebted.

Finally, I want to give a public recognition to my son Josip for his belief in me and the inspiration to push myself to the limit of my abilities in the pursuit of a better version of myself -as he has so often done on and off the tennis courts. His interest in my work gave me the courage and self-confidence to trust the process even without having a clear goal from the beginning, or a conclusion now at the end. IDEMOOO!

At the end, I hope that this dissertation will inspire a sense of wonder in someone else and serve as an inspiration to enact their dreams.

INTRODUCTION

My dissertation aims at understanding the process of entrepreneurial decision making, especially the non-predictive approaches, such as the effectuation logic. Effectuation is a widely accepted non-predictive entrepreneurial decision–making logic. It offers a theoretical framework describing how expert entrepreneurs utilize resources within their control in conjunction with commitments and constraints from self-selected stakeholders to fabricate new artifacts such as ventures, products, opportunities, and markets (Sarasvathy, 2001). It is based on the premise that as long as we can control it, we don't have to predict the future (Read, Dew, Sarasvathy, Song, & Wiltbank, 2009). This dissertation explores every level of the entrepreneurial decision – making, from micro to macro in three separate essays. In the first essay, by looking at the micro side, I explore the potential antecedents that lead to the selection of meta–cognitive strategies such as effectuation and causation. I use experimental methods to induce the selection of one of the decision–making logics via mindset activation (concrete or abstract). By combining theories from Social Psychology with the theories of Entrepreneurial Decision–making, I facilitate a deeper understanding of these processes on the micro level.

In the second essay, I look at the effects of the choice of the decision – making logic by the entrepreneur on the development of new markets and evolution of existing ones. This essay looks at firms' mutual interactions through the information processing perspective, and the potential effects that effectuation and causation may have on the marketplace in general. By combining the aspects of complexity theory relevant to entrepreneurship, I develop new understanding on the processes that lead to new market creation. With this essay I build new theoretical propositions that are relevant for several fields including strategy, entrepreneurship, and international business.

In the third part of my dissertation, I continue with the exploration of the insights from micro and macro level and testing the propositions from Essay 2 in the context of international business. The aim of Essay 3 is to understand the internationalization processes of multinational corporations and how their choice of decision–making logic affects the outcomes in the new markets. It continues the discussion from the second essay by using an abductive approach to follow a practical case of an MNE from an emerging market entering multiple new markets. I incorporate internationalization and entrepreneurial dimensions by combining entry mode choices, market and country characteristics, with individual level conditions. Finally, I evaluate the combined effect of these conditions on firm performance by using an innovative method from set theory, fuzzy set Qualitative Comparative Analysis (fsQCA). Below I provide the conceptual model of the dissertation where I connect the research of all three essays in one framework. Then, I continue with more details on each essay.
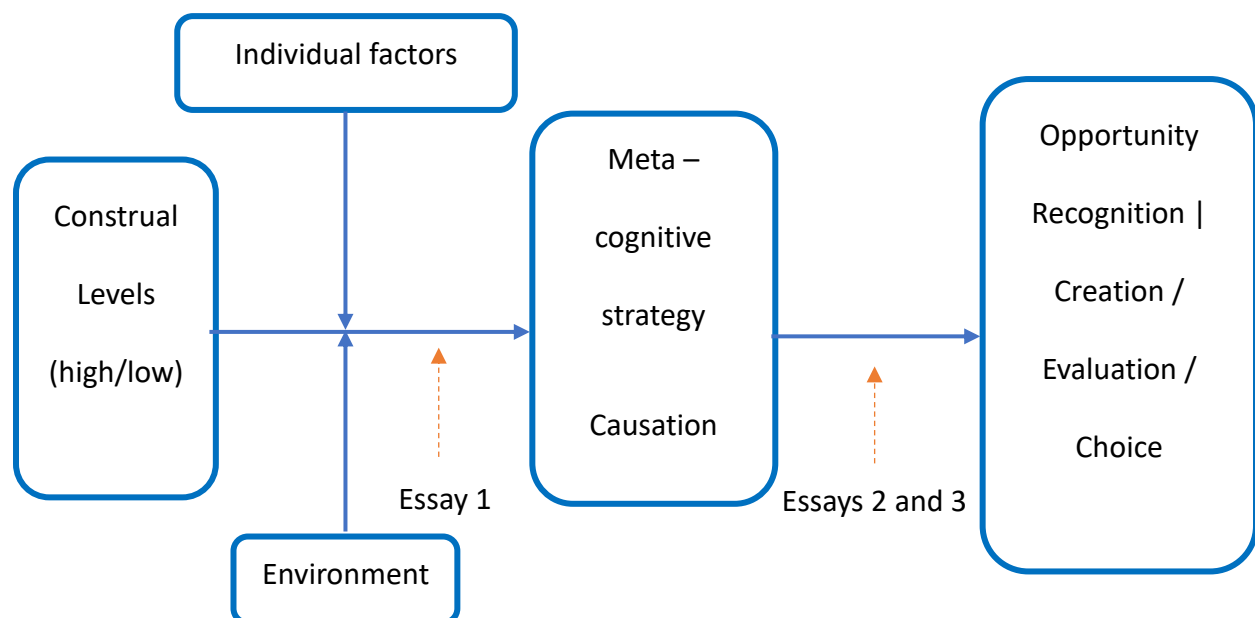
Figure 1 Conceptual model of the dissertation

Essay 1: The role of mental horizons in the choice of entrepreneurial meta – cognitive strategies

Entrepreneurs need to constantly adapt their decision-making strategy in the face of uncertainty and dynamism inherent to their environment. The meta-cognitive processes involved in the choice of a decision-making strategy are unclear and need to be understood in more depth. In this essay I look at the antecedents to entrepreneurial decision-making from a social psychology perspective. Building on Construal Level Theory, this study explores the choice between predictive and non-predictive decision-making strategies (causation and effectuation).

Different construal levels affect the decision – making in four different ways:

- central versus peripheral features of the outcome,

- desirability (the value of the action's end state) and feasibility concerns (the means used to reach the end state),

- the arguments in favor of and against an action (our pros and cons logic), and

- through alternatives and attributes in choice matrices.

The effectuating entrepreneur is focused on who they are, what they know, and whom they know, and is concerned about selecting among possible effects that can be created with the given set of means. Thus, they are concerned more about the here and now, to the more proximal about which we have a lot more available information. The cons are more salient as temporal distance decreases that is in line with the affordable loss principle. The actions coming out of the effectuation cognitive processes are in more low-level terms such as how one performs them.

The causation cognitive processes are focused on the future that is abstract, more distal, with less available information. Pros of an entrepreneurial action are more salient as temporal distance increases in the form of maximizing expected return. Thus, the causal actions tend to be more high – level such as why one performs them.

Therefore, I hypothesize that different construal levels lead to different meta-cognitive strategies.

> H1: Low – Level construals lead to more effectuation meta – cognitive strategy

> H2: High – Level construals lead to more causation meta – cognitive strategy

By using a randomized experiment, I test the hypothesis that participants who are put in the more abstract construal mindset are more likely to use causation. Consequently, the participants put in the more concrete construal mindset are expected to more likely use effectuation.

The current high failure rates of new ventures makes entrepreneurship seem abstract. Also, effectuation as a decision – making strategy may seem a hard skill to acquire and reserved for expert entrepreneurs. With this study I shed light into the cognitive underpinnings of entrepreneurial thinking and use construal levels to essentially trigger and practice different decision – making strategies. If this is incorporated in entrepreneurship curricula to teach effectuation, we could potentially overcome the expertise barrier to entrepreneurship. With the incorporation of construal levels as antecedents to the choice of meta-cognitive strategies we can enable novice entrepreneurs to use the appropriate decision-making strategy. Also, by shifting the mindset to the proximal, we can make the outcome more contingent on one's action, and make one be involved in entrepreneurial action immediately. With that, the motivation for entrepreneurship will increase.

Essay 2: Microfoundations of market evolution and new market creation

This essay proposes a microfoundations perspective on market creation and market development through entrepreneurial action. We provide an explanation for a "macrobehavior" as emergent from the interactions of decisions of individuals and firms at the micro level. As a special case, we provide explanation of how firms' individual actions can create new markets. With this we answer a call for research to build a micro-to-macro theory in entrepreneurship research (Townsend et al., 2018). We also answer the call to study the dynamic interactions between mind and environment across levels of analysis (Gregoire et al., 2010: p.1461). In particular, we focus on the question of how entrepreneurial decision – making heuristics influence and are influenced by the information environments they take place in, specifically their levels of uncertainty and innovativeness (Gregoire et al., 2010: p.1459).

We base our propositions on complexity science (Prigogine's 1955 theory) to create a metaphor for market emergence and development. It is based on co-creation evolution that is different from equilibrium – based theories such as population ecology and evolutionary theory. In our view, entrepreneurship is about creating blind variation and new species, before the selectionist evolution and population ecology take over in the second – phase dynamics (McKelvey, 2004: p. 330).

We create a metaphor for a market filled with information and agents that interact among themselves. Basically, our metaphor depicts an agent-based model of a complex adaptive system (CAS) where agents are the firms, consumers, and other stakeholders. Additionally, we differentiate between two types of agents based on the principles they act upon, namely effectuating and causating agents. The two types of agents interact in the market by exchanging information. The result of these interactions is a new combination of knowledge from both the

agents and the surrounding fluid that is partly retained within the agents (tacit knowledge) and partly released in the fluid (explicit knowledge).

This metaphor captures the three main characteristics of the entrepreneurial problem space: Knightian uncertainty, goal ambiguity, and information isotropy (Sarasvathy, 2008). Additionally, we propose a new measure of uncertainty, namely the construct of Entropy defined as the information which is required by someone to "know" the market (Saviotti, 1988). The more uncertainty, the higher the entropy, and vice versa. We propose that the interactions of the effectuating and causating agents have effect on the entropy of the market space they are in.

Furthermore, we consider the position of the agents in relation to the market and the outcomes of these interactions in relation to their position and type. This positioning in the market space leads to markets having areas with different dynamics. Thus, the edges of the market will exhibit more non-linear dynamics (power law distributions) that are more difficult to predict due to the increased entropy. The future pivoting and interactions of these effectuating agents can lead to a change in the state of the market, such as creating market niches, new markets or rendering the extant market obsolete. Finally. we make five propositions on the likely point of entry of the firms in the market, their number, pivoting performance and new market creation potential.

Essay 3: Entrepreneurial decision – making in internationalization: A configurational approach

Prior literature suggests that our understanding of international market entry is mixed and inconclusive. Anchored in contingency theory, this essay aims to resolve the challenge of complex interactions by employing a configurational approach. Using fuzzy set Qualitative Comparative Analysis (fs/QCA) we analyze the constellations of different entry modes, decision making logics (effectuation and causation), and environmental contingencies that yield superior internationalization performance. We use a unique dataset consisting of the internationalization efforts of a leading South African multinational, Smollan Group, in 16 new markets. Our findings suggest multiple pathways to high performance in conditions of high, medium, and low uncertainty. We provide the initial empirical evidence that effectuation in combination with causation in high uncertainty situations leads to higher performance. In conditions of medium uncertainty, we show that the use of high equity as a control mechanism paired with a causal decision-making logic is key to success. When facing low uncertainty, our empirical evidence suggests that the entry mode choice has no bearing on the performance of the subsidiary as long as they follow causal decision-making logics. Our results have implications for effectuation theory by offering empirical evidence about the relationship and the consequence of the coexistence of effectuation and causation on firm performance.

ESSAY 1: THE ROLE OF MENTAL HORIZONS IN THE CHOICE OF

ENTREPRENEURIAL META – COGNITIVE STRATEGIES

1. INTRODUCTION

Entrepreneurs need to continuously choose a decision-making strategy in the face of uncertainty and dynamism inherent to their environment. In the extant literature, effectuation theory is one of the more established theories that provides a framework for analyzing how entrepreneurs make decisions (Sarasvathy, 2001). It posits two distinct logics, effectual (control-oriented) and causal (prediction-oriented). These two logics are orthogonal, empirically overlap and entrepreneurs predominantly combine them or shift between them (Chandler et al., 2011; McKelvey et al., 2019; Koller et al., 2021; Reymen et al., 2015; Smolka et al., 2018). In an effort to understand the underlying mechanism that leads to the choice of effectuation and causation, several individual and venture-level antecedents to effectuation have been studied.

Yet, contradictory evidence of potential antecedents and the heterogeneity in the use of both logics has led to confusion over what drives the entrepreneurial decision–making process (Gregoire and Cherchem, 2020). One way to solve this confusion is by looking at decision-making microfoundations. Exploring the microfoundations of entrepreneurial decision-making has proven useful in untangling complex processes in both entrepreneurship and management research (e.g., Bryant, 2014, Helfat and Peteraf, 2015). Another way to understand the underlying mechanism that leads to effectuation or causation is to go back to its theoretical foundations in cognitive science. Indeed, despite extensive research devoted to effectuation (Welter and Kim, 2018; Gregoire et al., 2020), research on its cognitive microfoundations remains somewhat limited in scope (Emami, Packard and Welsh, 2020). Yet, another way would be to use insights from another discipline such as Social Psychology. The Construal Level Theory (Trope and Liberman, 2010) from Social Psychology is especially relevant for entrepreneurial decision-making since it's focused on the cognitive processes that shift one's perception between abstract and concrete.

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Thus, the core purpose of this essay is to test the construal levels as antecedents to decision making and consider factors that drive the shifts in the use of effectual and causal decision making. In order to do that, I extend the metacognitive model of the entrepreneurial mindset by incorporating insights from Construal Level theory which I test empirically. This study contributes to effectuation theory through the positioning of entrepreneurs' mental construals as one of the individual antecedents of effectuation. Furthermore, it adds an experimental approach to the body of research on entrepreneurial strategic decision-making under uncertainty. With that approach, I provide initial evidence for the causal link between the mental construals of the entrepreneur and the choice of an entrepreneurial decision–making strategy. Lastly, I answer the call from Haynie et al., (2010) to use their metacognitive model of the Entrepreneurial Metacognition to empirically investigate when and why entrepreneurs use effectuation and causation. I extend the situated metacognitive model of the entrepreneurial mindset with a new antecedent to the selection of metacognitive strategy called metacognitive framing. On the micro level I explain this framing through Construal Level theory.

My paper is organized as follows. First, I give an overview of effectuation theory and extant research on its antecedents. Second, I delve into the theoretical foundations of effectuation in cognitive science and the research on entrepreneurial mindset with focus on its metacognitive model. Third, I consider the relevance of Construal Level theory from social psychology for effectuation. Fourth, I propose two hypotheses on the link between Construal levels and effectuation. Fifth, I propose an updated metacognitive model of the entrepreneurial mindset.

2. EFFECTUATION THEORY

Effectuation is a widely accepted non-predictive entrepreneurial decision–making logic. It offers a theoretical framework describing how expert entrepreneurs utilize resources within their control in conjunction with commitments and constraints from self-selected stakeholders to fabricate new artifacts such as ventures, products, opportunities, and markets (Sarasvathy, 2001: p. 245). It is based on the premise that as long as we can control it, we don't have to predict the future (Read, Dew, Sarasvathy, Song, & Wiltbank, 2009). The future is essentially unpredictable because of the third type of uncertainty, the unknowable (Knight, 1921).

Effectuation theory draws a distinction between two logics of entrepreneurial decision–making, effectual (control-oriented) and causal (prediction-oriented). Sarasvathy (2001; 2008) proposes four dimensions along which these logics differ:

- *The starting point of the venture*: Effectuators start with the means while causators start with the goals

- *Perceptions of risk*: Effectuators focus on affordable loss while causators focus on maximizing returns

- *The mindset towards unexpected events*: Effectuators leverage contingencies while causators try to avoid them

- *Attitudes towards outsiders*: Effectuators co-opt stakeholders while causators treat them as competitors

Even though it was initially considered that effectuation and causation are on the opposite sides of the decision – making spectrum (Brettel et al., 2012), and thus cannot occur simultaneously, more recent research has shown that they are orthogonal and empirically overlap (Chandler et al., 2011; McKelvey et al., 2019). In fact, extant research points to the prevalence of combined use or shifting

between effectuation and causation at different stages of venture development (Koller et al., 2022; Berends et al., 2014; Reymen et al., 2015; Smolka et al., 2018). This insight has important consequences on the choice of the measurement model and instrument that makes it more complicated, but nevertheless more realistic. I follow this assumption of orthogonality between effectuation and causation.

2.1. Antecedents of Effectuation

Extant research pursued several lines of investigations in hopes of unravelling antecedents of effectuation and causation. The results of this research stream on the possible relationships between individual characteristics and use of effectuation has remained somewhat inconclusive thus far (Koller et al., 2022). Early research proposed entrepreneurial expertise as a key individual variable associated with use of effectuation (Dew, Read, Sarasvathy & Wiltbank 2009; 2011; Read et al. 2009), but further studies showed that novice entrepreneurs also rely on effectuation (Politis et al., 2010) and that expert entrepreneurs do not always follow this logic (Newbert, 2012). Additionally, extant research showed no association between psychological traits and effectual decision–making, with the exception of entrepreneurial self-efficacy (ESE) (Engel et al., 2014). Further research looked at entrepreneurial identity as a potential antecedent (Gabrielsson & Politis, 2011; Sieger et al., 2016, Alsos, Clausen, Hytti, & Solvoll, 2016). Yang and Gabrielsson (2017) considered ambidexterity of the entrepreneur as a potential individual antecedent to effectual marketing decision–making process. Da Costa and Brettel (2011) looked at individual antecedents to corporate effectuation such as personal proactiveness, persistence, and internal locus of control.

In addition to individual antecedents, another research stream looked at the venture–level antecedents to effectuation and found constructs such as uncertainty and resource constraints to be

relevant (Sarasvathy, 2008; Berends et al., 2014; Karami et al., 2020; Nummela et al.,2014, Wiltbank et al., 2006). Interestingly, several recent studies have revealed contradictory evidence on the expected effect of uncertainty to the use of effectuation. This heterogeneity is apparent in the use of causation at the early stages of venture creation and effectuation in the later stages of its development (Newbert, 2012; Reymen et al., 2015; Jiang and Tornikoski, 2019). All of the above further adds to confusion concerning the underlying mechanisms that drive the entrepreneurial decision–making process (Gregoire and Cherchem, 2020).

Given the relative lack of systematic findings from extant literature streams on effectuation antecedents, a potential way to provide clarity over the antecedents of effectuation is through an emphasis on microfoundations[1] of cognitive processes underlying the decision–making process. Despite growing interest in effectuation scholarship, research on the cognitive microfoundations of effectuation remains limited (Gregoire et al., 2020). Recent efforts in developing microfoundations for effectuation theory have been focused on the choice between (and synergies of using both) a causal and/or effectual decision logic (Frese et al., 2020) or cognitive biases such as overconfidence and illusion of control (Zhang et al., 2021). They found that perceived uncertainty, entrepreneurial and management experience have an effect on effectuation but not on all of its dimensions. Also, the findings show that effectuation affects bias even though not necessarily increasing it. With the goal of better understanding underlying mechanisms that lead to effectuation, I turn to the theoretical foundations of effectuation grounded in cognitive science where effectuation is often referred to as "effectual reasoning" or the "logic of effectuation" (Sarasvathy 2001, 2008).

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[1] "Microfoundations" refer to the (often individual level) underpinnings of socioeconomic phenomena from or through which such phenomena emerge. (Emami, Packard and Welsh, 2020).

2.2.Entrepreneurial cognition

Behavioral economics has a long tradition of exploring cognitive processes associated with decision-making under uncertainty (Kahneman, 2011). However, there is a criticism that this literature is leaving the actual cognitive processes unattended (Emami, Packard and Welsh, 2020). For instance, Gigerenzer and Berg (2010:p133) point out that behavioral economists are using 'as-if ' arguments to account for biases and deviations instead of "specifying more realistic or empirically supported psychological processes that genuinely explain these data". Entrepreneurial cognition (EC) builds on the premise from behavioral economics that decisions are boundedly rational. It is defined as "the knowledge structures that people use to make assessments, judgements or decisions involving opportunity evaluation, venture creation, and growth" (Randolph-Seng et al., 2014, p. 1). However, early research followed the notion that EC was a "seemingly static representation of abstract cognitive structures. " (De Winnaar & Scholtz, 2020: p.1291). Further research introduced socially situated cognition (Smith & Semin, 2004) that posits that EC is dynamic and is influenced by the social environment and the individuals in it. This development paved the way for the development of a concept of an entrepreneurial mindset (EM) (McGrath & MacMillan., 2000; Haynie et al., 2009). Kuratko et al., (2021) proposed that there are three aspects of the EM: cognitive, behavioral, and emotional. I will follow the cognitive aspect and offer the following definition of the EM as "constellation of motives, skills, and thought processes that distinguish entrepreneurs from non-entrepreneurs." (Davis et al., 2016, p. 2)

2.3.A Metacognitive Model of EM

In addition to the ability of the EM "to sense and adapt to uncertainty" (Haynie and Shepherd, 2009; p.695), a new stream of research linked EM to the capacity of entrepreneurs to adapt their

cognition in the face of novel and uncertain contexts (Haynie et al., 2010). This new framework was centered around the concept of metacognition and its role in promoting cognitive adaptability. Haynie et al., (2012: p.239) proposed that metacognition "can extend our understanding of the cognitive factors that influence entrepreneurial decision making" (Haynie et al., 2010:p. 239). Metacognition has been defined in myriad ways, ranging from thinking about thinking (Flavell, 1979, 1987) to "the machinery for self-monitoring and error detection" (Fleming, 2021: p.98). I follow the definition of metacognition as "the higher-order cognitive processes responsible for the development and selection of cognitive strategies" (Haynie et al., 2010:p.217). This metacognition is not a dispositional trait but is something that we learn and develop as an ability. In the context of entrepreneurship, it is metacognition that oversees and controls the selection of a cognitive strategy to use when faced with an entrepreneurial task. This individual metacognitive ability can potentially offset a lack of knowledge and experience in the entrepreneurial process and adapt the decision-making process in a vein similar to expert entrepreneurs.

Since one of my goals is to use the metacognitive model of the EM to empirically investigate when and why entrepreneurs use effectuation and causation, I give an overview of the model next. A team of researchers developed a situated model of the entrepreneurial mindset centered around metacognition that integrates entrepreneurial motivation and the external context, toward the development of metacognitive strategies (Haynie et al. 2010). In this metacognitive model of entrepreneurial mindset authors prescribed five separate steps[2](Haynie et al. 2010):

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[2] Even though the sequence of the steps is linear, the process is iterative similar to sensemaking (Weick, 1979).

- Step 1) *the conjoint effect* of the environmental context and entrepreneurial motivation,

- Step 2) *the activation of metacognitive awareness*: the level of awareness controls how much of the two resources, experience and knowledge will be engaged

- Step 3) *the critical metacognitive resources* (metacognitive knowledge and metacognitive experience).

- Step 4) *metacognitive strategy formulation*, and

- Step 5) *metacognitive monitoring and performance feedback* mechanisms.

The authors of the model offer several possible distinctions/extensions to it (Haynie et al., 2010: pages 224-225). In one of them they propose to use this metacognitive model for an empirical investigation into why and when entrepreneurs select effectual versus causal cognitive strategies. I accept that distinction as my starting point and build on the model above to empirically answer the question of 'how' entrepreneurs decide between effectuation or causation.

3. CONSTRUAL LEVEL THEORY (CLT)

CLT posits that the choices we make and the ways we set our preferences are based on the construals we form of the events and objects rather than the events and objects themselves. It further claims that people form more abstract representations, or higher level construals[3], of psychologically distal objects than psychologically proximal objects. (Trope et al., 2007; Trope and Liberman, 2010) leading to the main construct of Psychological distance that is defined as "subjective experience that something is close or far away from the self, here, and now." (Trope

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[3] High – level construals are "abstract, schematic and decontextualized representations that extract the gist from the available information" (Liberman & Trope, 2008, p. 1202) while low- level construals are mental representations that are "concrete, relatively unstructured, contextualized representations that include subordinate and incidental features" (Liberman & Trope, 2008, p. 1201).

& Liberman (2010: p.440). CLT describes the relation between psychological distance and the extent to which people's thinking about objects and events is abstract or concrete. As this distance grows, construals become more abstract. The opposite is also true, so when levels of abstraction increase, psychological distance grows too (Trope & Liberman, 2010). Further, Trope and Liberman (2010) argue that construal levels expand and contract one's mental horizon that in turn influence predictions, behavioral intentions, self-regulation and evaluations and choices of decision makers. We can compare this process of expanding and contracting one's mental horizon to the process of zooming in and out of a digital map (e.g., Google Maps). When we zoom in to the fullest, we enter the street view, where we lose the general and more abstract view of our environment. However, we encounter details such as street names, cars, height of buildings, and other people that are unavailable at the high level of the map. This zooming in and out of the map effectively changes our mental horizons, that affects our planning, evaluation, and decision making.

CLT proposes four dimensions of Psychological distance: (1) Temporal distance (time), (2) spatial distance (physical space), (3) social distance (interpersonal distances), and (4) hypothetical distance (imagining that an event is probable or not) (Trope and Liberman, 2010). Wakslak and Trope (2009) showed that hypothetical distance also affects the perception of the other distances. In other words, people expect unlikely events to happen in those situations that are more distant in time, space, and social distance.

Whilst deriving its origins in social psychology, CLT has been examined in various domains and disciplines, including consumer psychology, behavioral economics, marketing and organization studies (Fiedler, 2007; Wright et al., 2012; Weisenfed et al., 2017; Trautmann, 2019). Below I give

an overview of the extant literature that uses CLT in different areas including entrepreneurship and then I make the case for its relevance in explaining entrepreneurial decision-making.

3.1. CLT and Entrepreneurship

CLT has been previously used to explain strategic perspectives (Barreto & Patient, 2013) and to model strategy formation in entrepreneurial settings (Ott and Eisenhardt, 2020). Yet, CLT only recently began to permeate into the entrepreneurship literature offering a social psychological lens for studying various aspects of the entrepreneurial process such as opportunity evaluation, entrepreneurial intentions (EI), and entrepreneurial action. As one of the key aspects of opportunity evaluation in entrepreneurship is the probability assessment under uncertainty. By conceptualizing probability as a psychological distance in the form of hypothetical distance, CLT offers a framework to better understand entrepreneurial decision-making Extant research in social psychology, found that construal levels have a widespread influence on probability judgment (Wakslak et al., 2006; Wakslak and Trope, 2009). Thus, despite its recent inclusion in entrepreneurship research, CLT has proven its value for explaining previous empirical inconsistencies (Tumasjan et al., 2013).

Probably the first effort in including CLT in entrepreneurship research was when Tumasjan et al., (2013) looked at how psychological distance can affect desirability, feasibility and risk perception in opportunity evaluation. Tumasjan et al. (2013) demonstrated that the temporal aspect of psychological distance plays a key role in opportunity evaluation through the differential influence of opportunity's desirability and feasibility. Along this line, Marks and Bated (2021) experimentally found that timewise more proximal opportunities are more highly evaluated than more distal opportunities. Further research found that "greater psychological distance attenuates

perceived risk, which elicits a more positive evaluation of potential entrepreneurial opportunities" (Duan et al., 2022:p.10). Also, research in external actor engagement used this temporal aspect to "assess the likelihood of sustaining actor engagement, depending on how actors perceive the time lag" (Snihur et al., 2017:p.11).

Further research connected CLT with entrepreneurial intentions (EI). Bazzy et al. (2019) proposed a theoretical model in which tendencies for abstract thinking were positively associated with higher EIs and had counteracting effect on low self-efficacy. However, this model was static without the inclusion of a temporal dimension. Donaldson et al., (2021) proposed a more dynamic model that applies CLT and links entrepreneurial intentions, new venture creation (NVC), and the abstractness of an action. Later, Santos et al., (2021) found that students perceive EIs with both commercial and social foci as high-level construals.

Another research stream showed that connections between an entrepreneur and their venture changes over time and space from abstract thinking to concrete doing (Branzei et al., 2018; Hallam et al. (2015);). Hallam et al. (2015) showed a significant mediating effect of temporal distance on the relationship between entrepreneurial self-efficacy (ESE) and entrepreneurial intent. Branzei et al. (2018) considered another dimension of the psychological distance, namely the social distance, and how its stretching or compressing can transform opportunities from ego-centric into more pro-social.

On another side, Van Gelderen et al., (2015) called for further research to connect perceptions such as psychological distance to entrepreneurial actions. Other entrepreneurship research has shown that the conceptualization of entrepreneurial action in abstract terms is a function of the perceived distance from action in time and space. For example, Chen et al., (2018) found that psychological

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distance shapes the concreteness of the actions of entrepreneurs over time through social distance and hypotheticality: the closer the events are hypothetically, the more likely the action. Bendell et al., (2020) theorized that psychological distance affects the entrepreneur's activity rates in the context of "looming megacatastrophes" through their perception of risk. Recently, Rose et al., (2021) looked at how mental representations of products affect the success of crowdfunding campaigns and funding decisions, and found that psychological distance inhibits individual campaign contributions and cumulative campaign success.

As presented above, extant literature highlights the usefulness of integrating the concepts from CLT in entrepreneurship research. Next, I discuss the relevance of CLT to Entrepreneurial decision–making.

3.2. Integrating Effectuation and CLT

In order to make a clear connection between the construal levels and the choice of metacognitive strategy, I will look at four aspects of CLT and their relationship to entrepreneurial decision–making. The aspects are as follows: central versus peripheral features, feasibility versus desirability concerns, arguments in favor versus against an action, and attributes versus alternatives in choice matrices (Trope and Liberman, 2010).

The first aspect I explore is the CLT aspect of *central versus peripheral features*. Trope and Liberman (2010) posit that central, goal-related features of outcomes are part of high – level construals, while peripheral features are part of the low – level construals of outcomes. In the case of entrepreneurship, we can find the similar logic in the case of resources. What is for a resource a central feature leads to its valuation and further usability in the causal decision-making. If we however look at the same resource from the perspective of effectuation, we can find some of its

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peripheral features applicable to a current need. This approach to 'make do' with the resources at hand (Levi–Strauss, 1967; Baker and Nelson, 2005) shifts the attention from the central properties of any resource or capability to the unlimited realm of possible uses. Thus, when we shift from the underlying assumption that "the nature of resources is largely given and unproblematic" (Baker and Nelson, 2005: p.331) we unlock our attention to the peripheral properties that lead to alternative usability (Sarasvathy, 2001). Consequently, I propose that shifting attention from the central towards peripheral features of outcomes, and in effect decreasing the psychological distance of the same, leads entrepreneurs to make effectuation decisions more frequently.

The second aspect of CLT that affects decision-making is *desirability versus feasibility concerns*. As previously elaborated, desirability versus feasibility concerns have been studied in the context of entrepreneurship through opportunity evaluation and EIs. I expand their relevance to the entrepreneurial decision-making process. Desirability concerns involve the value of an action's end state (a high-level construal feature), whereas feasibility concerns involve the means used to reach the end state (a low-level construal feature). Namely, in the causal frame, this end state is the basis for entrepreneurial action since causation is goal oriented. In the effectuation frame, the basis for entrepreneurial action is means. In the causal frame, the goals determine what resources we bring aboard such as potential partners. In the effectual frame, goals emerge as we imagine possible actions with the given means such as the people we have on board. Thus, decreasing the psychological distance increases feasibility concerns (low–level construal) that leads to effectuation decisions, while increasing the psychological distance leads to more desirability concerns (a high-level construal) that in turn increases causal decision making.

The third aspect of how construals affect decision-making is the *arguments in favor of and against an action* (pros and cons logic). The main insight of the research on this issue is that in deciding

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whether to undertake an action, '*cons*' are subordinate to '*pros*' (Trope and Liberman, 2010). Also, *pros* are more salient as temporal distance increases and *cons* are more salient as temporal distance decreases (Herzog, Hansen, and Wänke, 2007).

When we translate the concepts of *pros* and *cons* in entrepreneurial terms, we can connect *pros* to the expected return in the causal framework, while we link the *cons* to the affordable loss principle in the effectual framework. The focus of the former is on the upside potential, meaning that we will pursue the opportunity that maximizes our risk–adjusted return and assemble means accordingly. The focus of the latter is on limiting the downside potential, that will guide us to pursue the adequately satisfactory opportunity without investing more than we can afford to lose (Sarasvathy, 2001). Once more, decreasing the psychological distance will put more focus on the *cons*, that will lead to more effectual frame of decision making where we are guided by affordable loss.

The fourth aspect of construal levels that affects decision making is through *alternatives and attributes in choice matrices*. To better explain this aspect, I'll refer to a typical experiment that studies choice among multi-attribute alternatives (Payne, Bettman, & Johnson, 1988). In this type of study, participants are presented with a matrix of information in which rows represent alternatives and columns represent attributes. The cells in this matrix are initially covered, but when selected, they uncover the values they have (the value of each alternative for each corresponding attribute). Participants search this matrix by exposing the information in each cell, one at a time. Let's say that this matrix is populated with data on apartments. Then each row would represent a different apartment and each column separate attribute of the apartment (e.g., for example number of bedroom, location and rent). As Trope and Liberman (2010: p.452) explain it, CLT proposes that "searching attributes within alternatives reflects a lower level construal of the

choice situation than searching alternatives within attributes. This is because attributes are instantiated in specific objects and when detached from specific objects they become abstractions. Attributes are general, whereas objects are unique and variable manifestations of specific combinations of attributes. I thus expect that within-alternative search would characterize processing of proximal decision situations, whereas within-attribute search would characterize processing of distal decision situations." (Trope & Liberman, 2010: p.452). In other words, CLT, based on experimental evidence (Borovoi, Liberman, and Trope, 2010), posits that participants in a proximal construals scenario would search the matrix (open individual cells) more within alternatives and across attributes, while the participants in a distal construal scenario would more likely search within attributes and across alternatives. If we turn to an entrepreneurial context and try to connect the effectuation principles with the *alternatives and attributes in choice matrices* aspect of CLT. The process described above closely follows the principles of effectuation and causation. In the effectuation process, an entrepreneur would be searching within the attributes of the committed stakeholder or available means to find an attribute that could be used in the venture, thus adding to the "crazy quilt" (Sarasvathy, 2008). In the causation scenario, we would follow our business plan where the attributes of our potential partners are already prescribed. Thus, we would be interviewing multiple candidates or searching for specific means across this set of attributes to find the unique one that matches them. Therefore, searching alternatives within attributes represents a higher-level construal (causation) while searching attributes within alternatives reflects a lower-level construal of the decision–making process (effectuation). Again, the more proximal psychological distance triggers a more effectual frame, while the more distal psychological distance triggers a more causal frame.

In sum, theory suggests that changing the construal of the objects and events affects our decision making and consequently, the use of effectuation or causation. Based on the discussion above and the relevance of all the four aspects of CLT to effectuation, I propose that different construal levels lead to different meta-cognitive strategies, high levels to effectuation and low levels to causation.

Hypotheses

H1: Low–level construals lead to more effectual decisions

H2: High–level construals lead to more causal decisions

4. METHODOLOGY AND RESULTS

Entrepreneurship, as a "noisy" phenomena, consists of a complex mesh of causal relationships (Grégoire et al., 2010; McMullen et al, 2016). To untangle this web of relationship I am employing experimental methodology that is the golden standard for establishing causality (Williams et al., 2019). Experiments allow for real time observations of phenomena in a controlled environment, that is especially relevant for entrepreneurial cognition since it resolves issues with recall bias (Acs et al, 2010; Hsu et al, 2017; Frigotto and Valle, 2018).

I experimentally tested the effect of construal levels on the selection of effectuation and causation decision-making logic through three studies. In Study 1 I checked whether our manipulation of the construal levels results in a meaningful variation of the theoretical construct of interest. This was done in line with the recommendations to use an accepted manipulation check in experimental studies involving CLT (Trautmann, 2019) and enables us to establish the construct validity of our experimental findings. In Study 2 I test the hypotheses in a one-factor between-subjects experiment. Here I measure effectual and causal decisions after manipulating the participants' construal levels. In Study 2 I also measure the Metacognitive resources (Metacognitive knowledge and Metacognitive experience). I selected participants from the general population so that the heterogeneity in their perceptions of the entrepreneurial task is minimal. Additionally, this approach makes the findings of our study more generalizable since participants are sampled from general population. In Study 3 I replicate Study 2 on a sample of entrepreneurs. In all three studies I collect a suite of demographic variables as controls (age, gender, education, entrepreneurial experience, startup experience, management experience, Student status, work status).

4.1. Study 1

The objective of Study 1 is to test the success of our manipulation of construal levels. I therefore conducted a one-factor between-subjects experiment utilizing random assignment of participants that were either put in a low-construal or high-construal condition. Participants were then presented with an instrument that measured their construal level.

4.1.1. Sample

I recruited the participants from Prolific (Palan and Schitter, 2018), an online crowdsourced data collection platform. Extant research has used Prolific samples to conduct similar experiments in entrepreneurial and managerial decision-making (e.g., Collewaert et al., 2021, Engel et al., 2020; Van Balen et al., 2019; De Cremer et al., 2018). Prolific requires fair compensation to participants that further enhances response quality (Peer et al., 2017). I offered compensation for the participation in the study.

After checking the results, five participants that failed the attention check were removed. The final sample was N=115[4] with average age of 34.69 years, and 2/3 female participants.

4.1.2. Experimental design and procedure

The participants first provided informed consent to take part in the study. Those that agreed were randomly assigned to one of the two treatments conditions: a low-construal level or high-construal level condition. After the instructions, participants proceeded to the first part of the study which contained the experimental manipulation followed by a manipulation check. The manipulation was designed to induce either a high or low construal level depending upon the treatment group. The manipulation check and the rest of the experiment were identical across treatments.

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[4] We used the following prescreening: US Nationality, English as a first language, No prior experience in entrepreneurship, Minimum Approval Rate of 95% on Prolific.

4.1.3. Measures

4.1.3.1. Experimental conditions

Participants were randomly assigned to the high or low construal conditions. For the priming I used the Why vs. How instrument (Freitas et al., 2004; Wakslak and Trope, 2009; Liberman et al., 2007) to manipulate the participants into abstract (high-construal) or concrete (low-construal) mindset. I did that by asking the participants to either explain the reasons behind an activity (high construal level condition) or describe how that activity is performed (low construal level condition). See Appendix 1 for details.

Both groups were given the same activity "improving and maintaining one's physical health." Participants in the high level- construal condition connected this activity to increasingly abstract goals by answering three rounds of ''why?'' questions, whereas participants in the low-level-construal condition connected this activity to increasingly concrete activities by answering three rounds of ''how?'' questions. After the completion of the manipulation, I checked whether the manipulation was successful.

4.1.3.2. Manipulation check

To establish the construct validity of our experimental findings, in this study I checked whether our manipulation resulted in a meaningful variation of the theoretical construct of interest, in our case construal levels. For that purpose, I used the well – established Behavior Identification Form (BIF) measure (Vallacher & Wegner, 1987) as a manipulation check to assess participants' construal levels after the manipulation (10-Item version from Slepian et al., (2015) (see Appendix 2 for details). The reliability of this scale was at acceptable level (Cronbach's alpha = 0.73).

In this section, the participants were asked to choose one identification (a or b), that best describes a behavior for them. For example, they were offered to choose between a) Saying hello and b)

Showing friendliness, as a description that best fits in their opinion the behavior "Greeting someone". The order of the two response options per action was counterbalanced across participants.

4.1.3.3. Control variable

At the end of Study 1, I collected a suite of demographic information such as country of residing, age, gender, education and employment status.

4.1.4. Results

I conducted independent samples T test to check whether there are significant differences between the high-construal and low-construal groups. The composite BIF score was obtained by summing up responses to all 10 items in the BIF form (for each item, 1=high level construal, 0=low level construal) and then dividing it by the number of items (10). Participants in the high construal level group (abstract mindset) described the actions from the BIF more often at a higher level (M = .57, SD = .26) than the participants in the low construal level group (concrete mindset) (M = .47 SD = .25). The statistics of the T – test are as follows: t(115) = - 2.147, p = .03. This result provided the evidence that my manipulation had succeeded in creating statistically significant differences in construal level between treatment groups. As predicted, the construal levels of the High construal condition group (why question) were higher than the construal levels of the Low construal condition (how questions). Therefore, I can conclude that my manipulation is successful and can be used in the next studies.

4.2. Study 2

The objective of Study 2 is to test my hypotheses that manipulating the construal level would influence the decision-making logic in an entrepreneurial scenario. I therefore conduct a one-factor

between-subjects experiment utilizing randomization to place participants in either low-construal or high-construal condition. I then present them with a realistic business scenario in which they need to make a series of decisions and I measure the levels of using effectuation and causation decision–making logic.

4.2.1. Sample

I collected the data using the same online platform (Prolific) and procedure as in Study 1. I recruited 240 participants with the same prescreening as Study 1. Additionally, I excluded participants from Study 1 from taking part in Study 2. After checking the results, I removed the participants that either failed the attention checks or spent excessively short or long time in the experiment. The final sample was N=192 with an average age of 40.59 years, and 61% female participants.

4.2.2. Experimental design and procedure

Study 2 is designed as a single-factor between-subjects experiment and follows the procedure of Study 1.[5] After the manipulation (same as in Study 1) the participants proceeded to a decision task where I measure my dependent variables, effectuation and causation decisions. I then collected the data for the measures of participants' Metacognitive knowledge and Metacognitive experience, and demographic data.

4.2.3. Measures

4.2.3.1. Experimental conditions

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[5]Here we proceeded to the measurement of our dependent variable immediately after the manipulation (no manipulation check) to counter any potential time sensitivity of the effects of the manipulation and avoid any possible contamination of the treatment.

Participants were randomly assigned to the experimental conditions. I used the same Why vs. How instrument (Freitas et al., 2004; Wakslak and Trope, 2009; Liberman et al., 2007) to manipulate the participants into abstract (high-construal) or concrete (low-construal) mindset as in Study 1.

4.2.3.2. Decision-making

I measured the decision-making of the participants by using a scenario adapted from Wiltbank et al., (2009) and Murnieks et al., (2011). Briefly, participants were presented with a realistic business situation and were asked to put themselves in the position of an entrepreneur and make decisions (the details of the scenario are shown in Appendix 3). The decisions were measured on a 5-point Likert scale using 12 items (6 items for Effectuation and 6 items for Causation) items adapted from Murnieks et al., (2011). The decision to use this instrument follows the recommendation by McKelvie et al., (2020) for studies that measure logic and look at effectual and causal decision – making. An overview of the exact wording of the items can be found in Appendix 3. Unlike the previous practice, the decision-making preferences of my participants were kept as separate effectual and causal variables rather than calculating a preference for effectuation in a single variable (Murnieks et al., 2011). I decided to do this having in mind that my sample coming from general population could possibly not have a strong preference of one over the other logic as expert entrepreneurs would. Additionally, this operationalization gives us the ability to look at the effects of the construal level on each decision-making logic separately and account for potential differential effect of my independent variable. Finally, I could see if there is an overlap between the constructs as is suggested in extant research (McKelvie et al., 2020).

The scores for the effectuation and causation measures were calculated as the sum of a respondent's responses (1 – strongly disagree to 5 – Strongly agree) for each respective item divided by the total possible score (30 for each measure). The Cronbach's alphas for effectuation

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and causation measures were 0.69 and 0.68 respectively, that is considered acceptable in terms of reliability.

4.2.3.3. Metacognitive resources

I measured Metacognitive knowledge and Metacognitive experience using 11-items and 8-items instruments from Haynie and Shepherd (2009). I calculated the internal reliability measures (Cronbach's alpha) for the Metacognitive knowledge and experience scales. Overall, both scales showed acceptable reliability scores (Cronbach's alpha = 0.76 and 0.70 respectively).

4.2.3.4. Control variables

To ensure that potential confounds are properly randomized across the experimental groups, I controlled for a range of demographic variables: age, gender, education level, entrepreneurial experience, management experience, student status.

4.2.4. Results

I first compared the two experimental groups on all control variables. The results showed no significant multivariate effects on any of the controlled variables. Therefore, I can conclude that the randomization into the experimental conditions was successful. Next, I proceeded to analyze the differences between the two groups. Since there are only two levels in my Construal level variable, I conducted an independent samples T test that compares the means between the two groups (low construal vs. high construal). Please see Table 1 for the mean values and test statistics on all variables . Results show that the construal level manipulation had a significant effect on the level of causation decision – making. The level of causal decision-making in the high-construal condition (M=0.86, SD=0.10) was significantly higher than the level of causal decision-making in

the low-construal condition (M=0.82, SD = 0.11) [t(190) = -2.31, p=.02, d=0.34][6] (Cohen, 1988).

These results provide evidence to support Hypothesis 2 that high-level construals lead to more causal decision-making. However, the results don't provide evidence for Hypothesis 1 that the low-construal levels will lead to more effectuation decision-making.

Additionally, I constructed a bivariate correlation table (details shown in Table 1). From that table we can notice several significant correlations of interest. Namely, both metacognitive knowledge and metacognitive experience are significantly correlated with both causation and effectuation measures. This suggests that my decision to include the metacognitive resources in the design of the experiment was well founded in theory (Haynie et al., 2010). Additionally, there was no significant variance in the metacognitive resources between the two groups to explain the significant difference in the levels of usage of causation.

4.2.5. Discussion

Overall, the results in Study 3 give support to the Hypothesis 2, but not Hypothesis 1. To address these challenges, and in order to further test Hypothesis 1 and to test the robustness of Hypothesis 2 (Crano and Brewer, 2002; Gregoire et al., 2019), I conducted Study 3, mobilizing a sample of entrepreneurs. Additionally, the results point to the need to update the metacognitive model of entrepreneurial mindset to account for the results that differ from the earlier predictions (Haynie et al., 2010).

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[6] A commonly used interpretation is to refer to effect sizes as small (d = 0.2), medium (d = 0.5), and large (d = 0.8) based on benchmarks suggested by Cohen (1988)

4.3. Study 3

The aim of Study 3 is to confirm the findings of Study 2 that high construal levels positively affect Causation decision-making (Hypothesis 2) on a sample of entrepreneur. Furthermore, I aim to find support for Hypothesis 1, that low construal levels positively affect Effectuation decision-making. Therefore, in Study 3 I seek to follow the same design from study 2.

4.3.1. Sample

For this study I recruited from Prolific a sample of entrepreneurs[7] (N=120) from the USA with English as a first language. Similarly, to Study 2 after checking the results I eliminated the participants that failed the attentions check or spent excessively short or long time in the experiment. That left us with 88 participants in the finals sample with an average age of 42.42 years of which 58% were male.

4.3.2. Experimental design and procedure

Study 3 is designed as a single-factor between-subjects experiment and follows the procedure of Study 2. After the manipulation, the participants proceed to a decision task where I measure my dependent variables, effectuation and causation decisions. Finally, I collect the demographic data.

4.3.3. Measures
4.3.3.1. Experimental conditions

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[7] Answered the question "Have you engaged in entrepreneurship/run your own business?" with "I am currently doing this"

After randomization, participants were shown either the Why or the How instrument (Freitas et al., 2004; Wakslak and Trope, 2009; Liberman et al., 2007). Thus, they were randomly put in either abstract (high-construal) or concrete (low-construal) mindset similar to Study 2.

4.3.3.2. Decision-making

The decision-making measures were replicated from study 2.

4.3.3.3. Control variables

I collected a range of demographic variables similar to Study 2 (age, gender, education level, management experience, student status). In addition, I collected information on the length of their workweek and organizational tenure to control for potential difference between more experienced entrepreneurs and novices.

4.3.4. Results

Once again, I started by verifying that my randomization was successful. The results of my multivariate analysis with control variables as dependent and experimental condition (construal level) as independent variable, showed no significant effects on any of the controlled variables, thus confirming the assumption. Again, I conducted an independent samples T test to compare the means between the low construal and high construal conditions. Please see Table 3 for the mean values and test statistics on all variables, and Table 4 for the correlations between variables. Results show that the construal level manipulation had a significant effect on the level of causation decision – making. The level of causal decision-making in the high-construal condition (M=0.84, SD=.10) was significantly higher than the level of causal decision-making in the low-construal condition (M=0.79, SD = 0.12) [t(88) = -2.15, p=.03, d=0.47]. The results confirm Hypothesis 2 that high-level construals lead to more causal decision-making. Again, the results don't provide

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evidence for Hypothesis 1 that the low-construal levels will lead to more effectuation decision-making.

4.3.5. Discussion

Following potential limitations identified in Study 2, I undertook study 3 to test the robustness of my experimental findings in Study 2 on a sample of entrepreneurs and test hypothesis 1 on a more typical (entrepreneurial) sample. The results provided additional support to the hypothesis that high level construals lead to more causal decisions including entrepreneurs and non-entrepreneurs. Further, and similar to Study 2, I again found no support for Hypothesis 1.

I now discuss possible reasons for this outcome and provide an alternative explanation for the results and the mechanism through which the construals operated.

First, the vignette (hypothetical scenario) I used for the measurement of effectuation and causation might have introduced a confounding effect through the increase in the hypothetical and social distance of the participants that triggered more high level construals of the business opportunity depicted in the scenario.

Hypothetical distance as one of the dimensions of psychological distance, affects the way people experience probability (Wakslak and Trope (2009) and that probability influences a set of distinct but related variables such as the identification of ends vs. means. Thus, improbable events are represented in a more high-level, abstract fashion than are probable events, which are instead construed in terms of their concrete and detailed features (Wakslak, Trope, Liberman, & Alony, 2006). The use of a vignette in our studies could have increased the hypothetical distance of the participants to the scenario, thus essentially cancelling the effects of the low construal priming.

Also, the scenario vignette I used in the measure is a high-level overview of a business opportunity. In the vignette of the scenario, I ask the participants to put themselves in the context of the scenario by using their imagination. Extant research had pointed out that if a hypothetical scenario is difficult to imagine for the participants, they form abstract higher-level construals that lack important contextual details (Kardes et al., 2006). Additionally, the more socially distant the participant feel from the hypothetical scenario, the more abstract their enactment of the scenario will be. According to CLT, when the reference points move from self to others, people would perceive a greater social distance and use higher levels of mental construal to process the information. (Huang et al., 2021). Thus, all these factors could contribute to the unintended effect of creating high level-construal of the vignette thus turning it into another high-level construal manipulation. When this happened for the participants in my low-construal level condition, it essentially cancelled out the effect of the manipulation and lead to the same scores on effectuation in both conditions. Based on the above, I can conclude that one plausible explanation for the lack of evidence for Hypothesis 1 is that by using a hypothetical entrepreneurial scenario I have introduced another high – level construal manipulation that cancelled out the effects of the previous low-level construal manipulation.

Alternatively, there could be an issue with the instrument for measuring effectuation. Based on the extant literature, I selected the appropriate measure of effectuation that has been used for measuring the logic of effectuation and causation as opposed to measuring behavior (McKelvey et al., 2020). Additionally, my results provide evidence of stable significant positive correlation (0.36) between the effectual and causal scales across two studies (Study 2 and 3). As McKelvey et al., (2020) pointed out that there could be an issue with the explanatory power of the measures. This points out that potentially there could be a need to further clarify the items in each of the

measures. As a future alternative, I could use a different measure that better differentiates between the dimensions of the effectuation construct.

Finally, even though I used standard construal level manipulations that have successfully been employed in other studies of decision making there is the possibility that the effect size of the effectuation priming is significantly smaller than the causation priming in our decision-making context. To test the assumptions that the effect size could become significant I propose for further research to conduct a study with a larger sample size. Alternatively, there could be another variable that I haven't controlled for that affects the treatment's effect on effectuation.

Table 1 Means, Standard deviations, and differences between the experimental groups in Study 2

| Variables | Low-level construal (N=97) | | High-level construal (N=95) | | T-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
	M	SD	M	SD	Test statistic	df	Significance (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Effectuation	.86	.10	.86	.10	-.11	190.00	.91	.00	.01	-.03	.03
Causation	.82	.11	.86	.10	-2.31	190.00	**.02**	-.03	.01	-.06	.00
Meta knowledge	.82	.10	.83	.09	-.47	190.00	.64	-.01	.01	-.03	.02
Meta experience	.81	.11	.81	.10	-.38	190.00	.71	-.01	.02	-.04	.03
Age	40.91	15.33	40.27	14.83	.29	190.00	.77	.63	2.18	-3.66	4.93
Education	4.13	1.41	4.04	1.34	.46	190.00	.64	.09	.20	-.30	.48
Entrepreneurial exp.	.44	.50	.46	.50	-.27	190.00	.78	-.02	.07	-.16	.12
Startup experience	.30	.46	.35	.48	-.71	190.00	.48	-.05	.07	-.18	.09
Mgmt. experience	.42	.50	.45	.50	-.42	190.00	.68	-.03	.07	-.17	.11
Student	.18	.38	.12	.32	1.17	190.00	.25	.06	.05	-.04	.16
Gender	.39	.49	.38	.49	.18	190.00	.86	.01	.07	-.13	.15

Table 2 Descriptive statistics and correlations in Study 2

	Variables	Low construal (N=97)		High construal (N=95)		Correlations (N=192)											
		M	SD	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	High -Low construal	0	0	1	0	-											
2	Effectuation	.86	.10	.86	.10	.01	-										
3	Causation	.82	.11	.86	.10	.165*	.359**	-									
4	Meta knowledge	.82	.10	.83	.09	.03	.397**	.383**	-								
5	Meta experience	.81	.11	.81	.10	.03	.420**	.396**	.671**	-							
6	Age	40.91	15.33	40.27	14.83	-.02	.00	.00	-.07	.06	-						
7	Education	4.13	1.41	4.04	1.34	-.03	-.09	-.06	.04	.01	.186**	-					
8	Entrepreneurial exp.	.44	.50	.46	.50	.02	.00	-.03	.08	.10	.10	.09	-				
9	Startup experience	.30	.46	.35	.48	.05	.09	.03	.179*	.11	-.07	.142*	.155*	-			
10	Mgmt. experience	.42	.50	.45	.50	.03	.13	.11	.13	.10	.248**	.173*	.252**	.267**	-		
11	Student	.18	.38	.12	.32	-.08	-.03	-.02	.04	-.05	-.403**	-.11	-.02	-.03	-.13	-	
12	Gender	.39	.49	.38	.49	-.01	.168*	-.04	.05	-.03	-.01	-.07	.01	.254**	.186**	.01	-

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 Means, Standard deviations, and differences between the experimental groups in Study 3 – Entrepreneurs sample

	Low-level construal (N=49)		High-level construal (N=39)		t-test for Equality of Means					95% Confidence Interval of the Difference	
Variables	M	SD	M	SD	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Effectuation	0.86	0.10	0.88	0.09	-0.95	86.00	0.34	-0.02	0.02	-0.06	0.02
Causation	0.79	0.12	0.84	0.10	-2.15	86.00	**0.03**	-0.05	0.02	-0.10	0.00
Tenure	1.49	0.77	1.44	0.79	0.32	86.00	0.75	0.05	0.17	-0.28	0.39
Startup	0.61	0.49	0.51	0.51	0.93	86.00	0.36	0.10	0.11	-0.11	0.31
Age	43.37	11.55	41.23	11.37	0.87	86.00	0.39	2.14	2.46	-2.76	7.03
Gender	1.49	0.51	1.33	0.48	1.48	86.00	0.14	0.16	0.11	-0.05	0.37
Mgmt. experience	0.92	0.28	0.87	0.34	0.71	86.00	0.48	0.05	0.07	-0.08	0.18
Education	4.65	1.23	4.31	1.30	1.27	86.00	0.21	0.35	0.27	-0.19	0.88
Part-time	0.20	0.41	0.18	0.39	0.29	86.00	0.77	0.02	0.09	-0.15	0.19
Student	0.14	0.35	0.05	0.22	1.41	86.00	0.16	0.09	0.07	-0.04	0.22

Table 4 Correlations table in Study 3

	Variables	Low construal (N=49)		High construal (N=39)		Correlations (N=88)												
		M	SD	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	High -Low construal	0	0	1	0	-												
2	Effectuation	0.86	0.10	0.88	0.09	0.10	-											
3	Causation	0.79	0.12	0.84	0.10	.226*	.354**	-										
4	Tenure	1.49	0.77	1.44	0.79	-0.03	-0.09	-0.03	-0.04	-								
5	Startup	0.61	0.49	0.51	0.51	-0.10	0.15	0.06	0.07	-0.07	-							
6	Age	43.37	11.55	41.23	11.37	-0.09	0.12	0.20	-0.10	.347**	0.03	-						
7	Mgmt. experience	0.92	0.28	0.87	0.34	-0.08	.212*	-0.07	.232*	0.20	.311**	.236*	-					
8	Education	4.65	1.23	4.31	1.30	-0.14	-0.15	-0.14	0.02	0.02	0.18	0.08	0.10	-				
9	Part-time	0.20	0.41	0.18	0.39	-0.03	-0.05	-0.02	-0.02	-.297**	-0.04	-0.09	-.215*	-0.01	-			
10	Student	0.14	0.35	0.05	0.22	-0.15	0.17	0.09	0.05	-0.20	-0.01	-.246*	-0.01	-0.10	0.02	-		
11	Gender	1.49	0.51	1.33	0.48	-0.16	0.06	0.02	0.03	-.217*	-.233*	0.09	-0.17	0.01	0.17	0.02	-	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

5. GENERAL DISCUSSION

I complement past research that looked at why entrepreneurs use effectual and causal logics to answer the question how entrepreneurs select one over the other (Koller et al., 2022). I further develop the cognitive microfoundations of effectuation theory by explaining the mechanism that leads to the selection of effectuation vs. causation logic. To do that I integrate CLT and Effectuation theory and introduce a new construct, construal levels, as a potential antecedent to entrepreneurial decision-making.

Based on three experimental studies varying in samples I obtain initial evidence that entrepreneurs' mental construals affect decision-making by changing the metacognitive framing. The mechanism works through changes in the level of abstractness and concreteness of the objects and events they cognitively process. The evidence from my research proposes a causal link between the mental construals of the entrepreneur and the choice of effectuation and causation logic. These findings have several theoretical and practical implications that I discuss below. Finally, I present several directions for future research.

5.1. Theoretical Implications

First, I add to effectuation theory by developing better understanding of its cognitive microfoundations. Although extant research has looked at the antecedents of effectuation, prior research has been inconclusive in terms of the potential cognitive antecedents. My study is an attempt to do this by introducing the construct of Construal level from Social Psychology. Construal levels have been studied in the domain of entrepreneurship as antecedents to opportunity evaluation, entrepreneurial intentions and entrepreneurial action (Tumasjan et al., 2013; Snihur et al., 2017; Marks and Batev, 2021; Duan et al., 2022). By integrating CLT and effectuation theories

this study represents the first step in establishing the causal link between construal levels and effectuation and causation. The results from my experimental studies offer initial evidence that the construal levels are relevant antecedent to the entrepreneurial decision – making logic.

Second, I add to the understanding of the entrepreneurial mindset and connect the choice of the decision-making logic to the entrepreneur's metacognition literature. I answered the call from Haynie et al., 2010 to use their metacognitive model of the EM to empirically investigate when and why entrepreneurs use effectuation and causation. I used that model to test their predictions, but also empirically answer the question of "how" entrepreneurs select effectuation or causation. My results show that the metacognitive resources did not predict the changes in the use of the decision-making logic between the groups. These results point to the direction that there is a need for another element in their metacognitive model to explain the results from my studies. I expand the situated metacognitive model of the entrepreneurial mindset (Haynie et al., 2012, 2010) with a new antecedent to the selection of metacognitive strategy called metacognitive framing.

Reymen et al., (2015) in their model of strategic decision-making on the venture level introduce an intermediary between the external and venture conditions on one side and the strategic decision – making (effectuation and causation) on another. This intermediary and an antecedent to the effectuation and causation logic in that model is called venture scoping. They proposed that widening the venture scope leads to more effectuation while narrowing the venture scope leads to more causation. Following the notions from Reymen et al., (2015) dynamic model, I propose a similar addition to the Haynie's et al., (2012) Metacognitive model. However, contrary to Reyment's et al., (2015) notion, in my model the widening of the mental horizons through high – level (abstract) construals leads to more causal decision – making and narrowing of the mental horizons through the low – level (concrete) construals lead to more effectual decision -– making.

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Thus, I propose that metacognitive framing is a new and final step in the mechanism through which the decision – making strategies are selected on the meta level. In my update to the model, I add the metacognitive framing between the metacognitive awareness and the metacognitive strategy (See Figure 1).

Similar to the metaphor of zooming in and out inside Google Maps (or any digital map) we can imagine the metacognitive framing to act as a camera shutter that controls the size of the frame and amount of light that gets inside the mental camera. This mental "frame" is increased and decreased through the mental construals of the entrepreneur. These mental construals, that can be low-level (concrete) or high-level (abstract), govern the selection of decision strategies on the micro level.
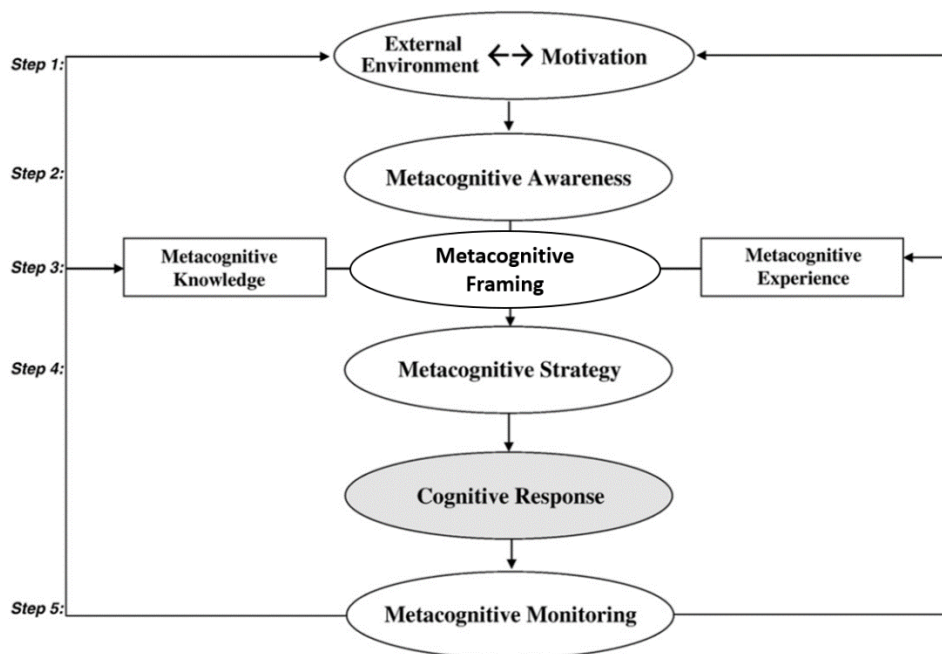

Fig 1. A situated metacognitive model of the entrepreneurial mindset adapted from Haynie et al., 2010

I believe that this updated framework may be helpful for future research on effectual and causal principles as it incorporates the insights from this research on the mechanism of how entrepreneurs choose their decision-making logic.

Third, I add to the literature on measurement of effectuation by providing insights that could improve its validity and reliability. In my experimental studies I used a hypothetical scenario vignette as an instrument to measure effectuation and causation (Wiltbank et al., 2009). My results point to the potential confounding effect of that measure with my independent variable, the construal levels. I proposed that the vignette, by being psychologically distant from the participants, actually primes them into a more abstract mindset.

We could utilize insights from CLT to extend the instrument in question by creating a low construal alternative that could be used to further test the findings of my research. The CLT proposes that people switch from pictorial to linguistic representations of objects as the distance (temporal, special, social and hypothetical) from the object increases (Liberman et al., 2011). The opposite is also true using pictorials will decrease the distance from the object compared to the linguistic representations. Therefore, one possibility would be to create a low – level construal scenario by including pictorials in the description. Additionally, I could increase the level of details in the low – construal vignette to make it even more concrete (e.g., "Tom is a 45-year-old engineer with two children in college. He is not afraid to lose his job to start a new business, etc.")

5.2. Limitations and further research

As with any method, experimental design has some inherent limitations. Even though due to their internal validity experiments are the golden standard to establish causality, the generalization of the results remains limited. In my study I tried to overcome these limitations by testing the results

on two distinct samples. This makes my results robust and give us more confidence in broader generalization of the results.

My one-factor experimental design didn't allow for testing the potential moderating and/or mediating effects between the variables. Further research should further investigate this possibility especially in light of the consistent significant correlations between metacognitive resources (experience and knowledge) and the cognitive logics (effectuation and causation).

Additional limitation stems from the potential concerns about the ecological validity of the experimental approach (Williams et al., 2019). In my experiments I was using a hypothetical scenario that did not assess an actual entrepreneurial behavior. This decision adds a level of abstraction from the real-world experience of making an entrepreneurial decision. Also, the intervention in my experiment is relatively short and could limit the effect size. However, the short treatment provides a more conservative test of the effect, and further research may examine stronger treatments. Additionally, the duration of the construal level manipulation remains unknown beyond the scope of the measurement instrument.

Further research could test how the antecedents that were known to lead to uncertainty are related to the construal levels. For instance, one could examine the effect of uncertainty and different types of uncertainty (state, effect, response) (Milliken, 1987) on the construal levels. Additionally, my independent variable was binary (high or low construals) that poses limitation in terms of the analysis. Further research could quantify the construal level on a scale thus providing more nuanced information on the strength of the construal (Kaleta et al., 2019).

Finally, further research could test the notion that the instruments using hypothetical scenarios could prime the subjects based on the psychological distance of the scenario from the subjects. By

creating a hypothetical scenario that is higher on psychological distance one could test if the more abstract conceptualization of the situation will lead to increased causation logic. The opposite goes for a scenario lower on psychological distance to empirically establish whether the more concrete conceptualization of the situation is leading to more effectuation logic.

5.3.Practical implications

The practical relevance stems from the use of experimental methods due to its immediacy and direct look inside the causal links. This study has implications for both entrepreneurial practice and teaching. The current high failure rates of new ventures make entrepreneurship seem hard and abstract. Also, effectuation as a decision – making strategy may seem like a hard skill to acquire and something reserved only for expert entrepreneurs. With this study I shed light into the cognitive underpinnings of entrepreneurial decision-making and potential use of construal levels to shift between different decision – making strategies. By providing the microfoundations I lay the ground for better understanding of possible mechanisms to use to teach students the practice of entrepreneurship through effectuation. One approach would be to introduce more experiential learning approaches in the entrepreneurship curricula (Schindehutte and Morris, 2016). These real-life experiences in concrete contexts would enable the students to be involved in entrepreneurial action immediately and thus decrease the temporal, spatial and hypothetical distance to entrepreneurship (Santos et al., 2021). This decrease in the psychological distance will lead to lower construal levels and thus more usage of effectuation logic (Santos et al., 2021). With this effort I could potentially overcome the expertise barrier to entrepreneurship and therefore increase the motivation for entrepreneurship.

Additionally, metacognition can be enhanced through training (Schmidt and Ford, 2003; Nietfeld and Schraw, 2002). Therefore, we could include several practices to develop better metacognition and have more control on the shifts in the decision-making logics. For instance, one could introduce mindfulness as metacognitive practice "that informs how people adjust their information processing to their current situation" (Kudesia 2019). Another set of potential practices stems from the experiences of verticality such as "walking up or down a flight of steps, standing atop a hill, looking out a window, or admiring a large monument or building from below" (Slepian et al., 2015:p.14). Extant research on verticality found that this experience of verticality is connected to the way people construe the world around them. It additionally proposes that there is a bidirectional influence between this experienced verticality and construal levels (Slepian et al., 2015). Practically, this means that a simple walk up (or down) the stairs can induce high-level (low-level) construals, that in turn triggers more causation (effectuation) logic.

APPENDIX 1 WHY VS. HOW PRIMING

Based on random assignment, participants completed either the abstract or concrete versions of the mindset manipulation described below. All participants next learned of and answered questions about a high school social-intelligence assessment, described below.

Mindset induction

Participants were assigned randomly to plan how they could implement an activity or to consider why they would engage in the activity. Participants in the abstract condition considered **why** they would improve and maintain their health, while the participants in the concrete condition considered **how** they would improve and maintain their health.

Participants in the high level- construal condition connected this activity to increasingly abstract goals by answering three rounds of ''why?'' questions, whereas participants in the low-level-construal condition connected this activity to increasingly concrete activities by answering three rounds of ''how?'' questions.

Each of their answers in the previous round was then followed by another round of "why?" questions for the abstract group and "how?" question for the concrete group. There were four iterations in total that drilled down to the more concrete or more abstract answers.

As an introduction to this exercise, these participants read the passage below describing why a person might want to complete a mundane action, participating in a psychology experiment.

For every thing we do, there always is a reason why we do it. Moreover, we often can trace the causes of our behavior back to broad life-goals that we have. For example, you currently are participating in a psychology experiment. Why are you doing this? Perhaps to satisfy a course requirement. Why are you satisfying the course requirement? Perhaps to pass a psychology course. Why pass the course? Perhaps because you want to earn a college degree. Why earn a college degree? Maybe because you want to find a good job, or because you want to educate yourself. And perhaps you wish to educate yourself or find a good job because you feel that doing so can bring you happiness in life. Research suggests that engaging in thought exercises like that above, in which one thinks about how one's actions relate to one's ultimate life goals, can improve people's life satisfaction. In this experiment, we are testing such a technique. This thought exercise is intended to focus your attention on why you do the things you do. For this thought exercise, please consider the following activity: 'improving and maintaining one's physical health.'

APPENDIX 2 BEHAVIORAL IDENTIFICATION FORM (BIF)

The BIF presents participants with a list of 10 actions and activities, along with two descriptions of each and participants are asked to choose the description that they prefer. One of these two descriptions always describes how one can perform this action or activity while the other always describes why one would perform this action or activity.

Items From 10-Item Behavioral Identification Form (Slepian et al., 2015)[8] are given below:

1. Picking an apple

   - **Getting something to eat**

   - Pulling an apple off a branch

2. Painting a room

   - Applying brush strokes

   - **Making the room look fresh**

3. Locking a door

   - Putting a key in the lock

   - **Securing the house**

4. Voting

   - **Influencing the election**

   - Marking a ballot

5. Filling out a personality test

   - Answering questions

   - **Revealing what you're like**

6. Greeting someone

   - Saying hello

   - **Showing friendliness**

7. Taking a test

   - **Showing one's knowledge**

   - Answering questions

8. Resisting temptation

   - Saying "no"

   - **Showing moral courage**

9. Traveling by car

   - Following a map

   - **Seeing countryside**

10. Talking to a child

    - **Teaching a child something**

    - Using simple words

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[8] Items in bold represents High level construal (abstract)

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Scenario: Wearable Computing

During your 12-year tenure as an engineer at a major computer manufacturer, you work on your own time to invent a device that recognizes and responds to eye movements. You imagine it might make a great alternative to the computer mouse. You can make it rest on the user's head much like headphones and set it up so that point-and-click navigation is accomplished with even the most minor head and eye movements. You are convinced there is a huge potential for change in the way things are currently done, but when you attempt to interest your current company in licensing the idea from you, they are uninterested. There are no firms currently offering anything close to this, and you possess all of the technical skills to create the product effectively and efficiently. You quit your job to further develop this idea.

Please use your imagination to put yourself in the context of the scenario, answering the questions below as if you were in the situation.

1. As you assemble information, you will:

    No Somewhat Yes

    1 2 3 4 5 Talk with people you know to enlist their support in making this become a reality.

    1 2 3 4 5 Study expert predictions of where the market is 'heading'.

2. As you develop a marketing approach you will:

    1 2 3 4 5 Forecast which segments will be most valuable and focus on them.

    1 2 3 4 5 Focus on customer segments you can reach through your existing relationships.

3. When you think about the uncertainty of the market, you move forward anyway because:

1 2 3 4 5 Your expertise allows you to influence that uncertainty.

1 2 3 4 5 Your actions can create a future you value.

4. As you manage product development, you will measure success against:

1 2 3 4 5 The performance of your competitors' products.

1 2 3 4 5 The vision you and partner businesses create for the product.

5. Predictions of trends and demand in this market are:

1 2 3 4 5 Useful to create forecasts of what your business might accomplish.

1 2 3 4 5 Misleading, as they do not incorporate the impact of your firm.

6. In situations like this, it is important to base strategy on:

1 2 3 4 5 Forecasts of customer demand.

1 2 3 4 5 What you are capable of.

7. As you learn about the expectations other people have for this industry, you:

1 2 3 4 5 Discount their projections, as they have not accounted for the impact of your venture.

1 2 3 4 5 Form updated predictions of likely outcomes for the business.

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ESSAY 2: MICROFOUNDATIONS OF MARKET EVOLUTION AND NEW

MARKET CREATION

1. INTRODUCTION

Entrepreneurial opportunities have been the focus of entrepreneurship research for more than two decades (Shane and Venkataraman, 2000). There is an ongoing debate on the nature of opportunities, whether they exist in the markets independent of the entrepreneurs or they are created by the entrepreneurs. This debate, through the closely related concept of uncertainty continues and translates into a debate on the ways entrepreneurs make decision under conditions of uncertainty. Effectuation theory has provided insight into this process and proposed a duality between goal – driven and non-goal driven strategies of decision making (Sarasvathy, 2001).

However, the macro effects of these decision-making strategies considering the different nature of opportunities is unclear. Thus, there have been calls to build a micro-to-macro theory in entrepreneurship research (Townsend et al., 2018) and to analyze across levels "the dynamic interactions between mind and environment" (Gregoire et al., 2011: page 1461). More specifically, the question of how entrepreneurial decision-making heuristics influence and are influenced by the information environments they take place in, in relations to their levels of uncertainty remains unanswered (Gregoire et al., 2011).

This paper proposes a microfoundations perspective on market creation and market evolution through entrepreneurial action. We offer an explanation for a "macrobehavior" as emergent from the interactions of decisions of individuals and firms at the micro level. Building on the notion of effectual networks as a Complex Adaptive Systems (CAS) (Galkina and Atkova, 2020) we create a conceptual model of the market as a CAS where entrepreneurial ventures are agents that act effectually and/or causally (Sarasvathy, 2001). This connection of entrepreneur-level actions of agents with the system level outcomes allows us to propose micro-to-macro theory that links the

entrepreneurial decision-making to the outcomes for the market. In a way, the use of the CAS perspective in our model allows us to zoom into the microdynamics of the market space (effectual networks as CAS) and zoom out to see them as a part of a bigger system (market as CAS).

To complement our model of the market with the notion of (co)evolution we incorporated insights from complexity science. By using a metaphor for market represented by complexity science we captured the three main characteristics of the entrepreneurial problem space, Knightian uncertainty, goal ambiguity, and information isotropy (Sarasvathy, 2008). In addition to the model, in this paper we propose how the dynamics of the ventures from the moment they decide on a point of entry (POE) into the market space through their growth and the possible creation of market artifacts unfold. We propose different outcomes for the ventures and market in general based on their use of decision-making logic and place in the market space.

The paper is organized as follows. First, we built the topology of the market based on uncertainty. Then we continue with the explanation of the different dynamics in the market space based on complexity science. Finally, we discuss the coevolution of the ventures and the market, and the possible outcomes of their coevolution.

2. UNCERTAINTY BASED TOPOLOGY OF THE MARKET-SPACE

One of the main concepts in entrepreneurship is the concept of opportunity (Shane & Venkataraman, 2000). The nature and sources of entrepreneurial opportunities have been the focus of significant debate in the extant literature. Two broad views emerge from that debate. One view is that the opportunities already exist in the market and the role of the entrepreneurs is to recognize them or discover them (Casson, 1982; Kirzner, 1973). Another view is that the entrepreneurs create opportunities through their actions (Sarasvathy, 2001; Alvarez and Barney, 2007). Connected to those views, extant research has used three distinct processes relevant for entrepreneurial

opportunity to describe markets; namely, market as an allocative process, market as a discovery process, and market as a creation process (Sarasvathy et al., 2003).

The first view of the market as an allocative process is connected with opportunity recognition. This is the zone where both supply and demand are known, and the market is considered an allocative process. The allocative view is a part of the Neoclassical economic theory that also includes productive, coordinative, and informational. The main concern of this view is the optimal utilization of scarce resources and opportunity is represented by any possibility of putting resources to better use. At equilibrium, there are no opportunities, because resources have been optimally allocated. The focus of this view is the system and considers all firms to be homogeneous. Thus, ex ante, all firms have the same probability to detect a given opportunity and the process is purely random. What is also important to note here is the assumption that the market is in a competitive equilibrium and any disequilibrium is temporary and will be quickly resolved. In this view the supply and demand in the market are known in advance, and the role of the entrepreneur is to recognize them and bring them together through arbitrage and franchising within a firm. In this view, "…arbitrage exists when the generation and appropriation of economic rents requires no economic organization, entrepreneurship exists when the generation and appropriation of economic rents requires economic organization, and entrepreneurial organization can take hierarchical (i.e., firm) or nonhierarchical (i.e., market or intermediate market) forms." (Alvarez and Barney, 2004: page 629) As a main approach to managing uncertainty in this view is diversification.

The second view of the market as a discovery process, considers that either the supply or the demand exists in the market, but not both. The role of the entrepreneur is to discover the missing side (whether supply or demand) through exploration of existing or latent markets. This view is

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described by the notion that information is not evenly distributed, often tacitly accumulated, hence the notion of it being "sticky". Additionally, new information is not enough on its own to generate opportunities but requires complimentary resources such as "absorptive capacity" (Cohen & Levinthal, 1990; Shane, 2000). Another important resource for the entrepreneur in this view is entrepreneurial alertness (Kirzner, 1997) that enables them to give attention to surprising information as a source of opportunity. The diffusion of information about an entrepreneur pursuing an opportunity and the realization of the resource values based on it, soon attracts competition that brings the market back to equilibrium. Alvarez and Barney (2007) describe this discovery view of entrepreneurship as a general model of action leading from search and planning to execution under a risky context and clear motivational goals (Alvarez and Barney, 2007; Alvarez et al., 2013). In contrast to the allocative view, the discovery view is more dynamic as it assumes continuous supply of new information and adapting the expectations of the market based on it (Sarasvathy et al., 2003). Here, the uncertainty is managed through experimentation. In the view of the market as a discovery process, "barriers to entry, speed, and secrecy are more appropriate tools for sustaining competitive advantages" (Alvarez and Barney, 2007: page 21).

The third view of the market as a creation process is based on the notion of opportunity creation. This approach moves away from the deterministic view of the market and the telos towards the concept of "free will" rooted in the philosophy of pragmatism (James, 1907; Dewey, 1917). In this view, "ends emerge endogenously within a process of interactive human action (based on heterogeneous preferences and expectations) striving to imagine and create a better world (Sarasvathy et al., 2003:page 91). In this view neither the demand nor the supply exists, and the entrepreneur needs to create either one or both. The entrepreneurial action is performed under the context of Knightian uncertainty, and the goals are ambiguous. In this view the emphasize is on

the decisions and actions of the agents, making both origins and final effects contingent. This view is congruent with the creation theory of entrepreneurial action (Alvarez and Barney, 2007) where opportunities are not assumed to be objective phenomena but are created, endogenously, by the actions, reactions, and enactment of entrepreneurs exploring ways to produce new products or services (Baker and Nelson, 2005; Sarasvathy, 2001; Weick, 1979). The entrepreneurs in this view of the market can rely "on path-dependent tacit knowledge as a more appropriate tool for sustaining competitive advantage in creation settings (Alvarez and Barney, 2007). The general logic of action in this view would be bricolage (Baker & Nelson, 2005), exaptation (Andriani and Cattani, 2016; Dew and Sarasvathy, 2016) and effectuation (Sarasvathy, 2001).

What is important to clarify at this stage is that the concepts of risk and uncertainty are essential to the above three views of entrepreneurial opportunity. Therefore, we clarify these constructs first.

All three views on the market share one common aspect, and that is the understanding of uncertainty. Knight (1921) made an important distinction between risk and uncertainty, where the former is characterized as the ability to assign a probability distribution to the potential outcomes, while the latter is irreducible to probability and essentially unknowable. Hayek was among the first to point to dispersed knowledge as a root cause for uncertainty. Entrepreneurship scholars have defined uncertainty in variety of ways (McKelvie et al., 2011; McMullen and Shepherd, 2006; Milliken, 1987). For example, Milliken (1987) proposes three types of uncertainty: state, effect, and response uncertainty, based on the source of missing information, while McMullen and Shepherd's (2006) are looking at the impact missing information has on entrepreneurial action regardless of the source. "the creation view of entrepreneurial action embraces uncertainty as its distinguishing characteristic (Alvarez and Barney, 2007; Alvarez et al., 2013; Welter et al., 2016). As uncertainty about the future is often exacerbated by the novelty intrinsic to the creation of new

products, services, ventures and even markets, it is of no surprise that "uncertainty constitutes a conceptual cornerstone for most theories of the entrepreneur" (McMullen and Shepherd, 2006: 133).

Even though there is a debate on whether some of these views are better than others, they all have their merits depending on the context as defined by differences in the problem space. Additionally, the fact they stem from different philosophies of science doesn't preclude their coexistence. So, we concur that "each of the three views of entrepreneurial opportunity is empirically valid at different stages of market creation" (Sarasvathy et al., 2003: page 93).

Based on the three views on opportunity and the concept of uncertainty, we propose the following unified topology of the market-space consisting of three zones:

- The Allocative zone of the market - the area where both supply and demand are known;

- The Discovery zone of the market - the area where either the supply or the demand is known, but not both;

- The creation zone of the market - the area where both supply and demand are unknown.

In our topology of the market above, knowledge of the supply and demand decreases from the allocative view towards the creation view. Therefore, we can conclude that the uncertainty will be increasing in that direction. Thus, we can reduce the above view of the markets to the concept of uncertainty. In our topology of markets, we are going to use the concept of uncertainty of the supply and demand to demarcate the market-space. We propose a topology of uncertainty based on unknowability of Demand and Supply (Sarasvathy et al., 2003) that creates three zones in the market: Known Demand and Supply (low uncertainty), Unknown Demand or Supply (Medium uncertainty), and unknown Demand and Supply (High uncertainty).

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The borders between the zones are defined by different levels of information entropy. The concept

of entropy has been characterized in different ways including uncertainty, randomness, chaos, etc.

(Davis, 2011) We define entropy as the information which is required by someone to "know" the

market (Saviotti, 1988). The more organized markets with more available information on the

supply and demand will have lower entropy. The more nascent markets will have less available

information and consequently, higher entropy. However, entropy is not homogenous across the

market since the information is not uniformly distributed. In our market view, the allocation zone

has the lowest entropy. In this zone there is a wealth of information (signified by the height of the

bell curve in Figure 1) and each additional information will bring only a little value to what we

already know. As we move away from order to chaos, the entropy increases. The zone of creation

has very high entropy because there is no information on either demand or supply, and thus each

new information brings a new insight.
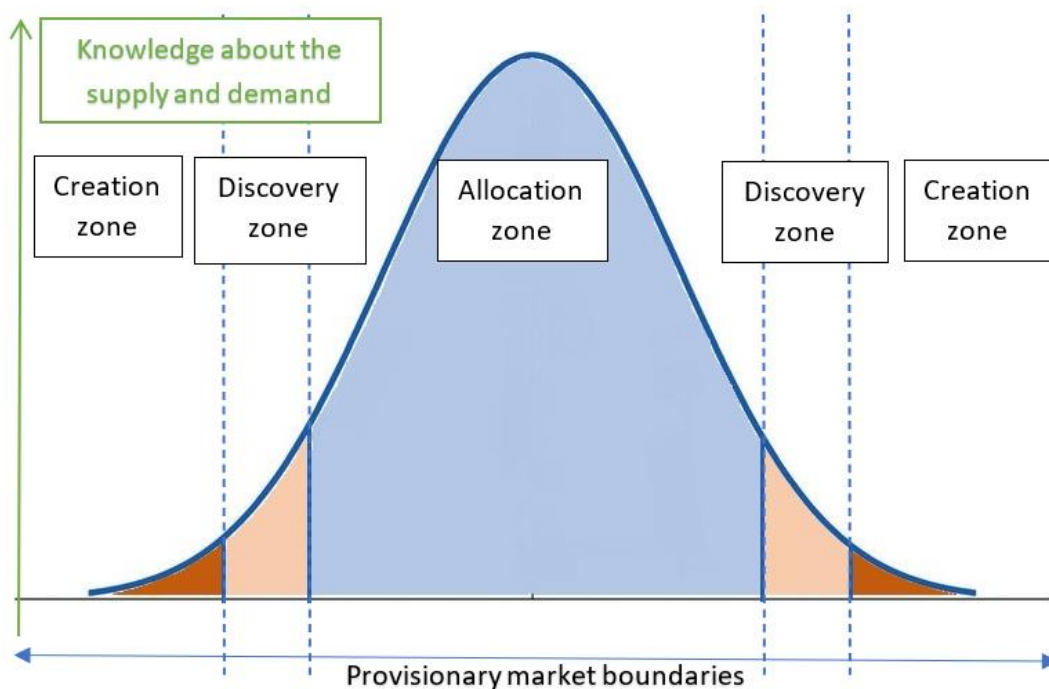
Figure 1 Side view of the market space
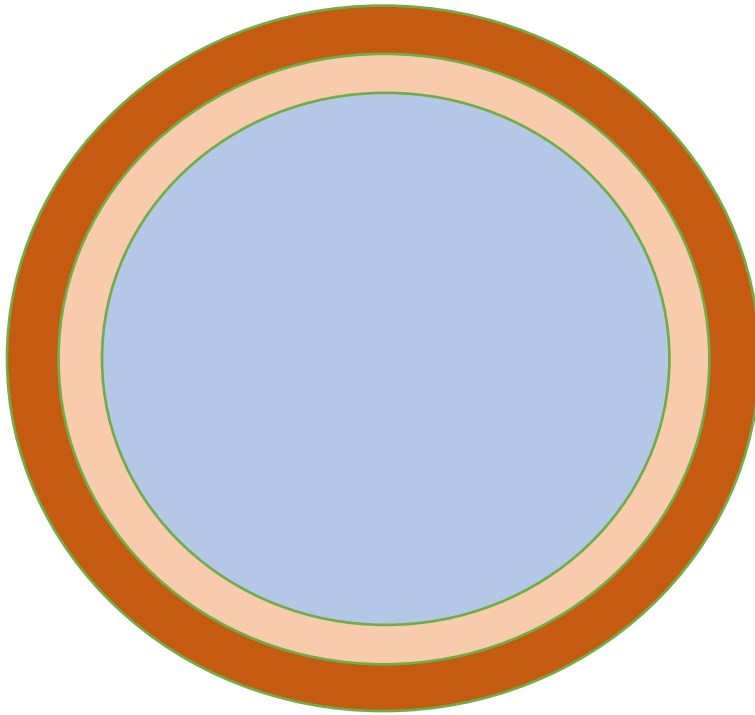
Figure 2 Top view of the Market space

We could visualize the three market zones as concentric circles with the Allocative circle in the middle, the Discovery around it and the Creation at the edges (Figure 2). Additionally, we can portray this topology with the side view of the market where the Allocative zone is in the middle, and the discovery zone next to it, and the creation zone on the fringes (Figure 1).

We understand that in our topology subjectivity plays a big role on the concept of uncertainty and knowledge. Thus, we acknowledge that these zones could look different for different entrepreneurs based on their idiosyncratic knowledge and resources. However, we believe that for each market we can draw a general map of the uncertainties based on the available information on the supply and demand.

This generalization, as discussed later, could be a pragmatic choice in the pursuit of the tool to use for the analysis of the markets in general and their evolution/ transformation. We believe that this approach will yield richer analysis with more insights for the study of markets.

For some well-established extant markets, the majority of the market – space would be Allocative with a smaller area of discovery and even the smallest areas with the Creation zone. The market for an established product like Coke could be an example (Sarasvathy and Dew, 2005). On the other side, there could be other markets that are not so well established and could have bigger areas in the Discovery and Creation zone. Such would be the case for the "nascent markets" defined as the "business environments in an early stage of formation" (Santos and Eisenhardt 2009: page 644).

What is very important to note is that the markets don't exist in isolation, but they are connected. This means that some areas in the market space overlap between different markets. The areas that overlap are the less defined zones of the markets space, the Creation zone. As the markets evolve these boundaries can change and the areas covered with different zones with them. From the macro level we turn next to the micro level where we make the distinction between entrepreneurial ventures.

Effectuators vs. Causators

We define the entrepreneurial firm with the concept of knowledge as central, following the notions from (Alvarez, 2003: page 258) where they propose the firm to be " a repository, isolating mechanism and coordinating vehicle for new knowledge". To distinguish between the entrepreneurial firms in the market-space we are going to use their decision-making logic as a main factor. We define two broad categories of decision-making, namely effectuation and

causation (Sarasvathy, 2001). Effectuation research since its inception more than twenty years ago has provided a shift in understanding the ways we make decisions (Alsos, Clausen, Mauer, Read, & Sarasvathy, 2019) by providing insights into how uncertainty affects information processing and use of planning heuristics. This is especially relevant in the context of "Knightian" uncertainty that cannot be reduced to risk and where consequences of one's actions and the factors of success are ex ante unknowable (Knight 1921; Townsend et al. 2018).

This context is especially relevant for entrepreneurial efforts (such as new product introduction) since their environment is plagued with this type of uncertainty. The previously accepted concept that entrepreneurs can achieve control through prediction was shifted by acknowledging that in an effectual approach the decisions are made with information plagued with uncertainty and susceptible to subjective interpretation (Sarasvathy, 2001). Therefore, the effectuation approach moved towards achieving control under uncertainty through the creative transformation of available means (Wiltbank et al., 2006).

It's base in cognitive science and psychology has enabled effectuation theory to define a set of heuristics around a decision-making logic (Sarasvathy, 2001) that contrasts effectuation to prediction-based decision-making dubbed causation. Causation processes start with a goal based on targeting the upside potential and focus on accumulating means necessary to achieve that goal while avoiding contingencies.

The four heuristics of effectuation are:

1.   Means-driven action (rather than goals)

2.   Affordable loss heuristic

3.   Networking principle based around the centrality of stakeholder interactions[9]

4.   Leveraging contingencies

These four principles are manifested in a dynamic process of entrepreneurial action (Read et al., 2015; Sarasvathy, 2008). This process begins with the means, i.e., what entrepreneurs have immediately available in terms of who they are, what they know, and whom they know (Sarasvathy, 2001). This provides an inventory of resources (knowledge, identity, and network access) with which they envision possible ends. As a filter for possible ends the effectuators use a threshold of possible loss called the affordable loss. This affordable loss principle guides them towards goals only up to the threshold of what they are willing to lose (Dew, 2009). In the next step of the process, effectuators through networking with potential stakeholders (partners, suppliers, clients) redraw the goals based on their mutual commitment. Stakeholders in the effectuation process include "early partners, customers, suppliers, professional advisors, employees, or the local communities" (Sarasvathy & Venkataraman, 2011, p. 126),

This networking expands the means of the effectuators and converges the goals. Throughout this iterative process they are open to leverage contingencies that arise in the environment. The iterative process with committed members of their expanding network could lead them to the creation of an opportunity or another artifact (Read et al., 2009; Sarasvathy, 2008). Fig. 3 below pictures this iterative process in what Sarasvathy and Dew (2005) label a 'dynamic model of effectuation'. In this dynamic model of effectuation, we can see two counter-balancing cycles. One that expands the means and resources and with it the possible opportunities and the other that is a constraining

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[9] "Incorporating other people's inputs via stakeholder interactions introduces diversity, new connections, and new means into the effectual process. The self-selected stakeholder heuristic in effectuation therefore introduces a 'garbage can' process in which the local context varies according to the contingent set of stakeholders who choose to get involved" (Dew and Sarasvathy, 2016: page 172)

cycle of convergence towards one negotiated artefact such as a "new market" (Kerr and Coviello, 2020).
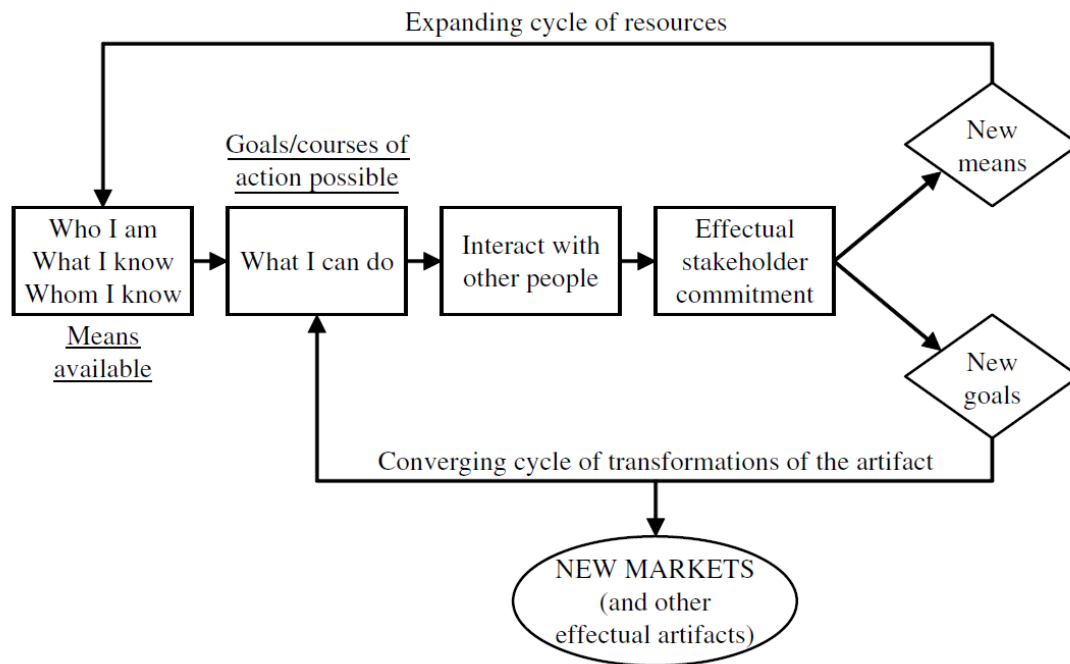
Figure 3 Dynamic model of Effectuation from Sarasvathy (2007: page 101)

Thus, effectuation positions opportunities in line with the creation view (Alvarez and Barney, 2007), so they are created rather than waiting to be discovered. Additionally, this has consequences on the cognitive representations of market spaces that become entrepreneur's individual "business conception as a tacit frame that is adopted by others" (Gregoire et al., 2011:page 1461)

Now, that we have established the topology of the market we need to understand how the markets evolve and change. In order to do that, we will use a metaphorical approach that will link two domains, the complexity science and market evolution. First, we look at the metaphors in general, and then we continue with incorporating them into our topology of the market.

Why Metaphors?

Metaphors are an inescapable part of human language and using them nurtures creative thinking (Dahl and Moreau 2002). Their vividness directs attention and stimulate action (Sillince et al. 2012) by transferring relations from one domain to another (Ocasio 1997). Through this mapping between concepts and creating relationships across domains, meaning emerges (Cornelissen, 2006). By creatively using metaphors we can efficiently transfer complex ideas between two domains and discover new perspectives of the domains (Seidel and O'Mahony, 2014). Thus, they are "powerful tools for sensemaking, sensegiving, and theory development" (Lundmark and Westelius, 2014:p.575)

Metaphors have been used in entrepreneurship research for several reasons, such as to describe the entrepreneur, the entrepreneurial venture, or the market where they compete (Lundmark et al., 2019). They are used to represent concepts when creating novel products (Seidel & O'Mahony, 2014) together with stories and prototypes. Often the metaphors used for entrepreneurship theorizing have tended to draw on biological metaphors such as "parenthood" (Cardon, Zietsma, Saparito, Matherne, & Davis, 2005), "growth" (Clarke, Holt, & Blundel, 2014), elixir and mutagen (Lundmark & Westelius, 2014). In a recent review of the use of metaphors in entrepreneurship literature, the authors made the distinction between "surface-level" metaphors (e.g. "engine"), that merely embellish the language, and "root" metaphors "which represent deeper thought patterns that characterize a research stream" (Lundmark et al., 2019:p.140). They listed the following root metaphors as predominant in extant entrepreneurship literature: Parenthood, Mutagen, Method, Mindset, Networking, Conduit of Knowledge, Exploration and Politics.

In this paper we use a conceptual metaphor (Lakoff and Johnson, 1980) that uses an analogy in addition to an insight to compare the two domains. Licthenstein (2014) has proposed and analyzed

a rigorous analogy between dissipative structures and social organizations. Our metaphor is complex and multilevel. It encompasses the aggregate level to explain industry level processes, but also micro- (firm level) and meso-levels (groups of firms) to explain the coevolution of the venture and the market. We are following the notions from complexity theory to model the interactions in a complex adaptive system (CAS). Complex adaptive systems have been used to model markets (Choi et al., 2001) and are "characterized by the interplay among the behaviors of individual actors and those of the whole system across indeterminate boundaries" (Beltagui et al., 2020: page 3).

3. COMPLEXITY SCIENCE

As we established earlier, in this paper we are interested in the evolution of the market-space and the processes and conditions that lead to the emergence of new markets. McKelvey (2004: 336) argued 'that evolutionary theory is a poor choice of theoretical approaches to apply to the study of entrepreneurship' and that it provides little insight into emergence." Additionally, Sarasvathy et al., (2003: page 88) proposed that "[o]ne of the traits of complex adaptive systems such as market processes is level differences: observed patterns of behavior differ dramatically between the micro- and macro-levels. In other words, macro-level phenomena are often indeterminate from micro-level observations." Therefore, we propose a complexity science perspective on the market's topology and evolution to capture these traits.

So, in the next section we are going to introduce the complexity science and the two distinct schools of thought in it. Then, we are going to use complexity science to create another perspective on our market topology. Finally, we'll continue with a multilevel perspective on the evolution of

the markets with an explanation for the agents' behavior in the market based on their decision-making logic.

Schools of Complexity Science

For more than thirty years the complexity science has informed a range of work across the social sciences (Byrne and Calaghan, 2013). There are diverse schools of complexity thinking, and authors have used these ideas in topics ranging from innovation (Saviotti & Mani, 1998; Chiva-Gomez, 2004) to the strategic organizational design (Anderson, 1999; Brown and Eisenhardt, 1997; Dooley and Van de Ven, 1999; Eisenhardt and Bhatia, 2002; Garud & Van de Ven, 2002). Complexity science has been used to model economies (Arthur 1983, 1988; Anderson et al., 1988; Allen et al., 2007) and markets (Sornette et al., 2004). However, complexity theory is not a unified domain as it encompasses multiple theories under its umbrella. To understand them better we need to look back at their creation that comes from two distinct schools, namely the European and the North American school.

The European school of complexity science is grounded more in the natural sciences and focuses on the emergence and order creation, such as "far-from-equilibrium" conditions and self-organization (Nicolis and Prigogine, 1977), dissipative structures (Prigogine, 1955) and adaptive tension at the "edge of order." European school emphasizes the causal tension dynamics of shocks from the environment that in Schumpeter's view through "creative destruction" leads to new order creation (McKelvey, 2004). Inside the dissipative structures research stream Prigogine's (1955) and Nicolis and Prigogine (1989) looked at phase transitions (qualitative changes of the system) inside a thermodynamic system when energy is added from the outside (thus making it an open system). The phase transition happens when the energy levels tip over what is called the '1st

critical value', Rc1[10] (also known as the 'edge of order '). When this happens, "'dissipative structures' form as an "emergent 'self-organized' structures that speed up the dissipation of imposed energy differentials, by creating new intra-system order" (McKelvey, 2004: page 108). Essentially, this externally imposed energy created an energy difference, that generates an 'adaptive tension' (McKelvey, 2008) in the system. Thus, the system is internally driven to dissipate this tension (Wicken, 1986). McKelvey et al., (2012: page 108) give an example of such process as when "a technical or process innovation (Schumpeter, 1934; Tushman and Anderson, 1986) can set up disequilibrium between the entrepreneur and the current market; these innovations drive the self-organised emergence of new firms and new industries (Binks and Vale, 1990; Foster, 2000). Slevin and Covin (1997, p.56) describe this process by suggesting that 'successful entrepreneurial firms act as energy conversion systems'."

The dissipative structures have been used in management research to explain the emergence of order in high-growth entrepreneurial ventures (Lichtenstein, 2000a, 2000b), the emergence of a new dominant logic for strategy (Bettis & Prahalad, 1995), and organizational changes (Leifer, 1989; Goldstein, 1994). Additionally, it has found applications in research on group dynamics (Smith & Comer, 1994), emergence of industry-level collaborative ventures (Browning, Beyer, & Shetler, 1995), the emergence of economic regions (Chiles, Meyer, & Hench, 2004) and economics in general (Georgescu-Roegen, 1971; De Vany, 1996). From a philosophy of science aspect, the European school of complexity is focused on the forces behind the search for order, that makes it teleological.

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[10] The critical values Rc1 and Rc2 that mark the phase transitions come from the Reynolds number from fluid flow dynamics (Lagerstrom, 1996). They represent the transition when the flow becomes turbulent and are different for every fluid

As a contrast, the focus of the North American school of complexity is on answering the question how order emerges from a disorganized world. The research in this school is focused on the interaction of heterogeneous agents at the '2nd critical value', "the edge of chaos" (defined by Rc2) above which tension drives systems into chaos (Lewin, 1999). The North American School emphasizes complex adaptive systems (CAS) behavior such as spontaneous coevolution of agents, especially in biology and the social sciences (Gell-Mann, 2002). Holland (1996, p. 10) defines complex adaptive systems as "systems composed of interacting agents described in terms of rules. These agents adapt by changing their rules as experience accumulates. In CAS, a major part of the environment of any given adaptive agent consists of other adaptive agents, so that a portion of any agent's efforts at adaptation is spent adapting to other adaptive agents". The behavior of the CAS is determined by the nature of the relations between the agents inside of it. In another words, CAS is not a sum of its parts. Additionally, it's relationship with the external environment is co-adaptive and co-evolving meaning that the CAS is continually evolving and adapting to the changes in the environment while at the same time the environment evolves and adapts to the changes in the CAS (Durie et al., 2018). This makes it difficult to predict the behavior of the system, especially when it is at the edge of chaos. When in that state, the systems are able to explore the "adjacent possibles" that enable new creative behaviors to emerge (Kauffmann, 2000).

In terms of emergence, CAS is a good approach for understanding computational and social emergence. CAS became enacted in a variety of computational disciplines, including cellular automata, genetic algorithms, and NK landscape models. However, the general model provides insights into the properties and mechanisms that lead to emergent patterns and levels and as such, it forms a very useful link between computational emergence and all the social fields of emergence. CAS was therefore used in various management domains such as strategic organizational design

(Anderson, 1999; Brown and Eisenhardt, 1997; Dooley and Van de Ven, 1999; Eisenhardt and Bhatia, 2002; McKelvey, 1999), supply chain management (Choi, Dooley, and Rungtusanatham, 2001), New Product Development (McCarthy et al., 2006) and innovation (Fleming & Sorensen, 2001; Chiva-Gomez, 2004; Cunha and Gomes, 2003). More importantly, CAS has been used as a model for the behavior of markets (Maubossin, 2002) and effectuation networks (Galkina and Atkova, 2020). The main aspect of the CAS's view lies in the notion that organization's complexity arises from the adaptive behavior of the agents (Morel & Ramanujam, 1999). In another words, agents follow a few "simple rules" that lead to unpredictable collective behavior (Dooley, 1997; Choi et al., 2001). In CAS, emergent outcomes can be explained qualitatively as a result of "co-evolution" and "self-organization".

The behavior of the CAS on the other side of the edge of chaos is chaotic governed by the deterministic chaos theory. Deterministic chaos theory is one of the mathematical approaches to the evolution of dissipative nonlinear dynamic systems. It is focused on the state of the system (that can be stable, periodic or chaotic) and attractors around which these states are created. The system transitions from one state to another based on small changes that are coupled with positive feedback (instability force) and negative feedback (stability force) mechanisms (i.e., "butterfly effect"). When the system transitions in a chaotic state, the outcomes are impossible to predict even though they are deterministically driven. This theory has been used to study organizational change (Cheng & Van de Ven, 1996; Marion, 1999) and the nature of economic and other social processes (e.g., Coleman, Vallacher, Nowak, & Bui-Wrzosinska, 2007; Matilla-Garcia & Marin, 2010).

The research from both the European school of complexity (based in far-from-equilibrium dynamics and dissipative structures) and the North American school of complexity (based in CAS

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and chaos theory) challenged the notion of stability-seeking, 'object-oriented' view of organization in the 1990's (Boisot and McKelvey, 2011). However, for a full explanation of emergent phenomena in complex systems, such as a markets, requires reference to concepts from both schools, the European School to look into the system-environment processes and the North American School to look into the intra-system processes (Maguire, 2011).

4. COMPLEXITY TOPOLOGY OF THE MARKET

We use the insights from the complexity science to add another layer of explanation to the dynamics inside a market space. Markets in our view don't represent one system but a complex adaptive system of several zones that operate in three different modes, near equilibrium, far-from-equilibrium and chaos. In the words of Gell-Mann (2002: page 17), "complex adaptive system (CAS) may be an integral part of another CAS and it may, in turn, contain smaller complex adaptive systems". Different parts of the market operate dynamically in different modes of complexity. The zones change dynamically based on actions of agents.

McKelvey (2002) divided the complexity in three areas based on the two thermodynamics thresholds, Rc1 and Rc2: Newtonian for the area below Rc1, Emergent for the area between Rc1 and Rc2, and Chaotic for the area above Rc2. Similarly, we divide our market-space in three zones based on the thresholds of information complexity (See Figure 4). In our topology of the market space, the two thresholds, Rc1[11] (the edge of order) and Rc2 (edge of chaos), are defined in terms of information entropy. When the market's information entropy is below the edge of order (<Rc1), the market is near equilibrium and most of the disturbances are easily resolved by itself. When the

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[11] The critical values Rc1 and Rc2 that mark the phase transitions come from the Reynolds number from fluid flow dynamics (Lagerstrom, 1996). They represent the transition when the flow becomes turbulent and are different for every fluid

market's information entropy is above the first threshold Rc1, but below the Rc2, the market is in the Dissipative zone. When the market's information entropy is higher than Rc2 the market is in Chaos zone. We define chaos as a state which is intermediate between order and randomness in nonlinear dynamical systems. This is the zone in which the new order emerges 'out of chaos' (Prigogine and Stengers, 1984).

The edge of order denotes the border where the system moves from equilibrium into disequilibrium. The edge of chaos is the border where the system moves from disequilibrium into chaos. In the extant literature the edge of chaos has been used to represent many different things (sometimes negative, but often to denote randomness), that are inconsistent with its original idea. In our model the edge of chaos represents a border between two modes of complexity, chaos and dissipative. In the former, new order emerges out of chaos, while in the latter the dissipative systems bring system back to the original order. Thus, the Chaos zone corresponds to the Creation zone of the market while the Dissipative zone corresponds to the Discovery zone of the market. The zone of near equilibrium is the Allocative zone of the market.

The Creation zone is where new order emerges, and is prevalent with serendipities (Dew, 2009) and contingencies (Sarasvathy, 2001). This is the zone of the Knightian unknowable. Of course, this zone, like the others, is also dynamic, and each interaction and decision of the agents in there shifts it and shapes it. We need to emphasize that all three zones are acceptable places for a firm to be present, although they offer different potential to different types of decision-making.
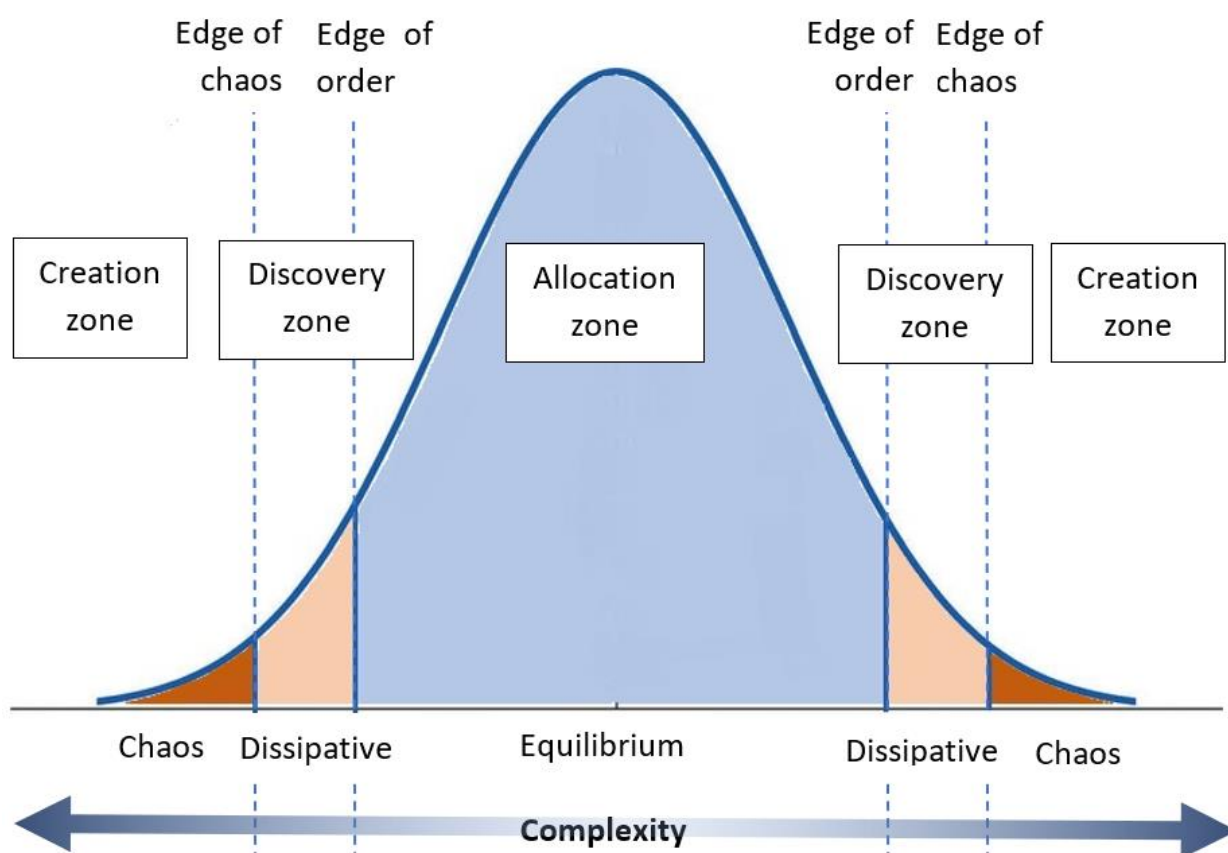
Figure 4 Complexity view of the market topology

MARKET DYNAMICS – COMPLEXITY PERSPECTIVE

When the market is in the allocation zone near-equilibrium condition any natural fluctuations in the system will be dampened by itself as the system "strives" for equilibrium. The homogeneity of information about the supply and demand makes the market itself very efficient in resolving potential tension between supply and demand. Thus, in the allocation zone there is no entrepreneurship in the Schumpeterian sense, but mainly arbitrage.

However, when in some parts of the market there is a lack of information on certain aspects of it, such as supply and/or demand, then those parts of the market are in disequilibrium. This increase

in entropy caused by the lack of information creates tensions that cannot be resolved by the market itself, but only by agents in the market space. Stemming from the notion that firms are better than markets in the sharing and transfer of the knowledge of individuals and groups within an organization (Kogut and Zander, 1992), we propose that these agents are represented by entrepreneurial ventures. Based on the complexity zone where they emerge (as defined by the different information entropy in the market space), we distinguish two types of agents:

- C ventures that emerge through opportunity discovery in the discovery zone. The C firm in the discovery zone will act as a dissipative system that operates through causation;
- E ventures that emerge through co-evolution in the Chaos zone. The E firm in the Chaos zone will acts as a CAS that operates according to effectuation principles.

How does the C firm operate?

The increased information entropy creates tension, that presents an opportunity for entrepreneurs to resolve this tension. The C firm is the most efficient way to dissipate the information entropy that exists in the discovery zone because a causator that searches for opportunity will eventually locate this opportunity. As soon as they acquire enough means the C firm will pursue that opportunity. Through the pursuit of the opportunity, the C firm will create information about the part of the market the opportunity is located in. Because of that, this part of the market space has now more information on the supply and/or demand that basically reduces the entropy and brings it closer to the equilibrium zone. Since there is more information and less entropy, more and more entrepreneurs will see the opportunity. That further dissipates the information entropy, and if that part of the market is left on its own it will soon go back into allocative zone. Thus, effectively the borders of the market zones have shifted and what was a discovery zone is now allocative zone.

With the capturing of the opportunity and acting upon it, the C firm dissipates the entropy at the maximal rate (everyone becomes aware of the supply/demand discrepancy) and soon the order in the system will be restored back to equilibrium. This coincides with the neoclassical economic theory where external forces drive entrepreneurship. Also, this is consistent with Prigogine and Stengers' (1984) teleological argument, according to which a determined order is found only because it was there to be discovered in the first place.

How does the E venture operate?

In the chaos zone the E venture is acting as a CAS based on effectuation principles. Galkina and Atkova (2020) proposed that Effectual networks are essentially CAS. They connected each of the principles of a CAS with the effectuation principles (given in parentheses): sensitivity to initial conditions (start with the means), nonlinearity (iterative feedback loops and co-created effects), adaptability (reacts to contingencies), non-predictability (cooperative and interactive control of the future rather than prediction), connectivity (connect with committed stakeholder to co-create the venture), self-organization (stakeholders are self-selected around new venture or an entrepreneurial idea that serves as an attractor), and coevolution (effectual asks grow into commitment and parts of the network coevolve through interrelated commitments). The notion of the attractor mentioned in the self-organization principle of CAS above, is stemming from the deterministic chaos theory (also known as Lorenz attractor) to describe the area or the "farthest edges" within which all the data will be found. Our use of attractor is metaphorical (Mackenzie, 2005) and denotes the entrepreneurial idea or the venture of the effectuators that acts as an attractor around which a critical mass of interactions with stakeholders evolves (Galkina and Atkova, 2020). These interactions can lead to a connectivity that further expands the CAS without any central controlling body. Each new interaction with a stakeholder, creates new information about the

supply and demand of that market area. The outcome of this process is creating an area in the Chaos zone around the attractor that has information on the demand and/or supply. Thus, over time this attractor will create increasing information around the effectuators network that slowly lowers the information entropy and could evolve in many different directions.

Next we explain the further evolution of the market with the C and E agents in different zones of the market.

5. MARKET (CO)EVOLUTION

In the previous section we explained how the different types of ventures C and E emerge and evolve inside the market. We now turn to the discussion of the coevolution of the ventures and the market and the possible outcomes of their evolution. As previously stated, we assume that the ventures are in their nascent form before they make the first decision, that is their point of entry in the market space.

POINT OF ENTRY (POE)

E firms' POE

When expert entrepreneurs were asked about their preferred place to enter with a new venture in a 2x2 typology (existing/new product x existing/new market) they selected the 'suicide quadrant' where the venture model is based on a new product in a new market (Sarasvathy, 2003; Sarasvathy, 2007). When they were asked why, their logic was that "…if the market was more predictable, someone smarter and with deeper pockets could easily colonize that space. It is only when the market is truly unpredictable that the small, lean and mean startup entrepreneur has a real chance of shaping it into something innovative and valuable" (Sarasvathy, 2007: page 94). The 'suicide quadrant' embodies the three main characteristics of the effectuation problem space, Knightian

uncertainty, information isotropy and goal ambiguity. We have already established that this place in our topology is represented by the Creation zone. Based on this we make the following proposition:

Proposition 1: E firms will most likely enter the market space in the Creation zone

C firms' POE

Causation problem space "is characterized by: (a) given, well-specified goals; (b) well-understood causes and past histories that enable reasonably reliable predictions about the future; and, (c) an independent environment (such as a ''market'')" (Sarasvathy, 2003: page 206). Causators are searching for opportunities using internal knowledge such as industry and technology experience, and external knowledge that is available on the market to locate an opportunity (Gruber et al., 2013). Therefore, Causators will look for areas of the market where there is an existing demand (Gruber et al., 2012, 2013)

Those C firms (being causators by nature) that base their business model around market-driven innovation "are likely to attack an existing profitable customer segment closer to the mainstream market from the beginning." (Habtay, 2012: page 4). All of these strategies are guided by existing market data and the areas with information about existing demand in our topology include the Allocative zone and the Discovery zone. Based on the small size of a new C venture, their chances of survival in the allocative zone would be lower as they can easily become prey for the bigger fish that are present there. Therefore, we make the following proposition:

Proposition 2: C firms will most likely enter the market space in the Discovery zone

Causators' primary goal with their emphasis on market research and competitive analysis is to find ways 'how best to fit' into existing market structures (Sarasvathy, 2008). However, even if the C firm found gaps in the discovery zone of the market, then it is much more probable that causators "will spend time evaluating market opportunities that they will likely never act on due to limited resources" (Deligianni et al., 2017: page 18). That leads us to the following proposition.

Proposition 3: Fewer C firms compared to E firms will enter a given market

PIVOTING

After entering the market space, the firms begin moving in the market space. The movement can be linear and follow one trajectory based on the predetermined goal of the firm, or they can change directions. The first step in changing the direction of the firm is pivoting, and the C and E ventures pivot differently. Pivoting is important because if done effectively "startups become resilient to both entrepreneurs' mistakes and to changes in the external environment" (Shepherd and Gruber, 2021: page 15).

E Pivoting

E firms, being an effectuator network pivot constantly. With each new addition to the effectuation network the E firm changes direction. Not only does the E firm change direction constantly, but the number of possible paths that the E firm can open are very high. Each new committed stakeholder that joins the network influences the direction of the firm and this influence cannot be predicted ex ante. The excess of possible options is resolved through a simple rule. The choice of which path to select when pivoting is governed by the notion to make fewer Type I errors at the cost of Type II errors (Karami and Read, 2021; Sarasvathy 2007). That means that the E firm is willing to forego a possibly viable path that is presented by a stakeholder that is not committed

than not to include in the effectuation network a stakeholder that is committed. For each new committed stakeholder, we do one converging cycle of new goal creation in the effectuation process (Figure 1). With that, E firms "minimize their commitment to ex ante plans and avoid much of the costs of altering those plans as new information is obtained" (Packard et al., 2017: Page 11). Similar to the way squids change direction using its jet propulsion, the E firms change direction instantly at low cost.

C Pivoting

The C firm on the other hand, already has a trajectory set out since the moment it entered the market space. Thus they face the dilemma of pivot-or-persevere or whether to change direction or keep going in the same direction (Ries, 2011). The decision to pivot depends on information from the environment it is in, in this case discovery zone. The C firm needs to analyze each information carefully for possible new direction, and that is costly. Additionally, Pivoting as a decision is more difficult to make for C firms because of the possible sunk costs or losing the resources previously committed to the original direction (Shepherd and Gruber, 2021)

If we assume that the E firm is in the Creation zone (Proposition 1) and the C firm is in Discovery zone (Proposition 2), then we can make the following conjecture:

Proposition 4: E firms pivot faster and cheaper than C firms

FURTHER EVOLUTION

Having the above propositions in mind and the growth of the ventures, we need to incorporate the aspect of dimensionality of the market and its zones in the further evolution of the firms. The size of the discovery zone and the Creation zone are important for the evolution of the C and the E firm

respectively. The sizes of these zones define the "runway" for the firms that are growing (Ries, 2011). Essentially, the bigger the Discovery and the Creation zone, the more pivots can the C and E firms respectively make before reaching the edge of their neighboring zones (Figure 5).
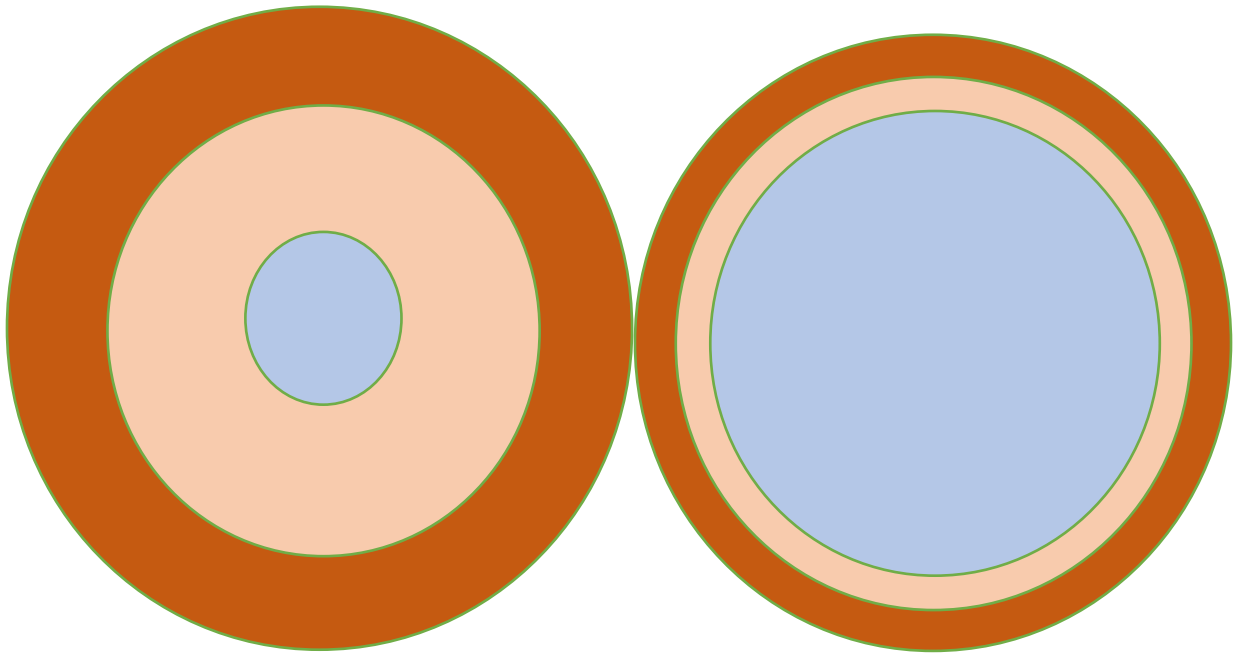
FIGURE 5 Topologies of markets: Nascent market (left) vs. Established market (right)

Next, we investigate what happens if their pivoting lands them in another zone. That brings us to the following 3 possible scenarios.

1. **The C firm reaches the Creation zone**

   Inside this zone there is no information on the supply and demand on the current market. Therefore, it would be difficult for the C firm to orientate itself and is possible to lose direction. Additionally, the C firm is looking for specific resources that could help it grow and sustain itself. Those resources are likely not available in the Creation zone. Therefore, the most likely outcome is that C's resources will soon run low, and the firm will most likely die.

2. **The C firm reaches the Allocation zone**

   The C firm can find its way around the Allocation zone and could potentially sustain itself in the direction it's taken. However, if the C firm hasn't grown big enough, it would be very difficult to avoid the predators in this zone. The most likely outcome for the C firm in this zone is to become a prey to a bigger predator.

3. **The E Firm reaches the Discovery zone**

   The topology of the market is also relevant for the E firm. If the E firm reaches the Discovery zone before it's grown big enough, it may run out of possible committed stakeholders to grow further. The stakeholders in the discovery zone already have strong preferences and is much harder to grow the effectual network in this zone. Thus, if they are not big enough, they could become a prey to a bigger fish in the Discovery zone. However, if the E firm is grown big enough and reaches the Discovery zone it may begin to attract even the stakeholders with already strong preferences. This phenomenon will effectively increase the Creation zone for the part of the Discovery zone where those stakeholders were. This process over time increases the overall entropy of the market as it creates more information uncertainty.

Alternatively, if the E firm has grown enough and matures, it can switch to causation. This is like what we noticed in the lifecycle of the squid. Even though it moves solely through jet propulsion in the fry phase, after the young squid reaches juvenile stage, it adds the fin movement to the repertoire. This is similar to what extant research has confirmed that most entrepreneurial firm do: using both causation and effectuation interchangeably and they combine them often. Thus, if the E firm is grown big enough it can continue moving through the Discovery zone using causation.

The two remaining scenarios cover the situations where both C and E firms stay in the Discovery and Creation zones respectively and keep growing. However, capturing the dynamics of each possible evolutionary path of the firms will be almost impossible. Therefore, we will investigate only the most plausible outcomes in each of the two scenarios next.

E firm stays in the Creation zone

There are several factors that affect the growth of the E firm in the creation zone. First, effectuation is cheaper than predictive rationality in nurturing new firms (Read et al., 2015) that gives E firms more time to grow with the existing resources. Second, aggregation through effectual networks increases the resource base fast and enables the E firm to grow much faster than the C firm. Third, the growth around an attractor in a chaos zone is exponential thus driving the growth of the E firm in the Creation zone by power law. All the above, gives the E firms chance to grow in the Creation zone. This growth of the E firm in the Creation zone can have several outcomes. As the Effectual network grows and the E firm with it, it needs more and more stakeholders to keep growing. If there are not enough stakeholders in the creation zone the effectual network will die out and the venture will fail. This is the case of running out of runway as elaborated before.

However, the market space for an E firm is not restricted to one market only, but similarly to the oceans of the worlds, markets overlap. They have areas where two or more Creation zones overlap (Figure 6) and where the information from several markets is being mixed. This overlap creates an easy way for E firms to transition from one market to another without leaving the Creation zone.

Further, Davidson (2001) introduced the concept of intersubjective knowledge that is cocreated between stakeholders in the effectuation network (Sarasvathy and Dew, 2005; Read and Sarasvathy, 2012). This intersubjective knowledge leads to "increased situational knowledge and stronger commitment to co-development of a not-yet-existent future" (Karami and Read, 2021: page 12). This strength helps the effectual network endure the growth longer and gives the E firm more time to enable the attractor from a seed for a nascent market to grow into a new market. As we mentioned earlier, the exponential growth of the seed into a market is only possible inside the Creation zone where the power law governs12. This gives the E firm enough time and enough runway, so its "continual effectual churn at its outermost edges tapers off and barriers get shored up around its key components" (Sarasvathy and Dew, 2005: page 549), that in effect coalesces the effectual network into a new market. This new market is a blue ocean (Kim and Mauborgne, 2005; Kim and Mauborgne, 2014) since it consists of the effectual network that dissipates information around it. However, the information from the new market will soon attract C firms from other markets to swarm into the blue ocean.

In the case when the Creation zone in the original market is big enough then there are two possible outcomes. One outcome is that the attractor creates a new market that overlaps with an existing market. This is the case similar to the effectuation-driven disruptive technological innovation that

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[12] The attractor doesn't work in Discovery zone because the stakeholders in that zone already have strong own preferences, so they are less persuadable toward the views of others.

was proposed by Habtay (2012). Another possible outcome is for the E firm in the creation zone to create a market niche through exaptation[13] (Andrianni and Cattani, 2016; Dew and Sarasvathy, 2016).
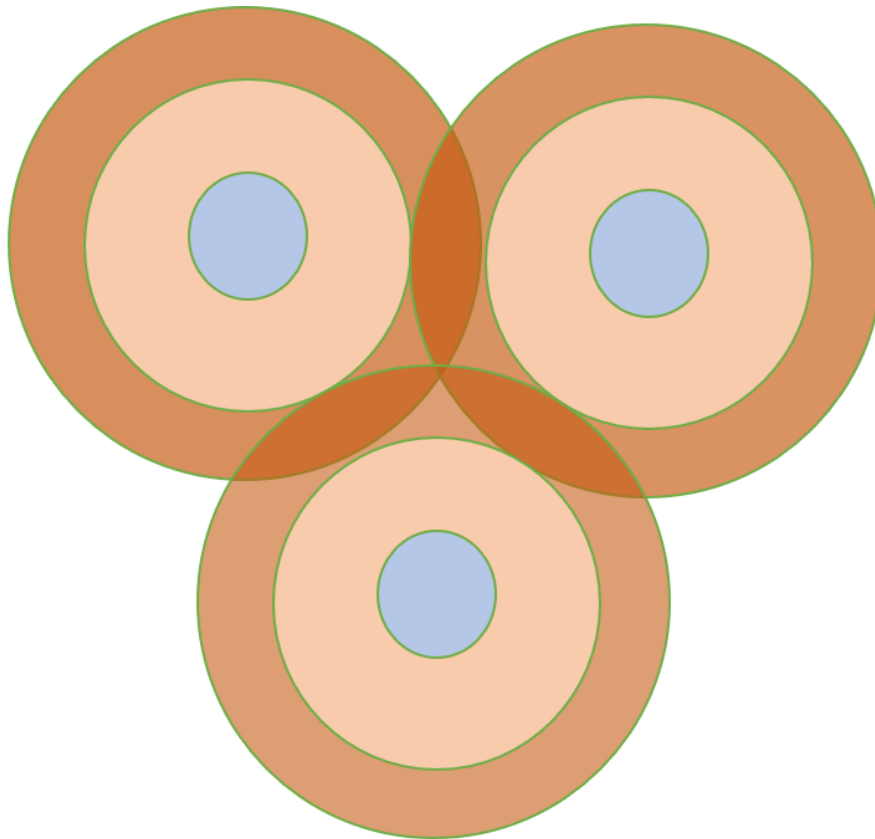
Figure 6 Three interconnected markets

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[13] Exaptation is a process of "repurposing of artifacts, technologies, processes, skills, organizations, and resources for emergent uses that they were not (initially) designed for " (Dew and Sarasvathy, 2016: page 167).

C firm stays in the Discovery zone

C firms similar to E firms, have to grow to survive. However, there are several factors that impede the growth of C firms in the Discovery zone. First, unlike the E firms, the C firms looks at other firms as rivals. Therefore, causators protect their knowledge by creating boundaries when partnering with others that lowers the knowledge transfer between them (Shu et al., 2014).

Second, the C firm need specific resources to grow. Therefore, "the exploitation of opportunity provides information to resource providers about the value of the resources that they possess, leading them to raise resource prices over time to capture some of the entrepreneur's profit for themselves" (Sarasvathy, 2003: page 90). This leads to either stifling its growth or making it more expensive, and thus rendering the opportunity unresolved.

Third, each interaction of the firms in the market releases information back into it. One of the externalities of exploiting an opportunity in the Discovery zone is that information about the opportunity is released back into the market. This information can be picked up by other C firms. Thus, the activities of the C firm around a potential opportunity that they discovered will over time lead to that opportunity being recognized by more firms. This can enable the competing firms to imitate the C firm[14] and thus appropriate some of its potential growth (Sarasvathy et al., 2010).

Therefore, in order to give themselves more time to exploit the opportunity, the C firm needs some sort of an isolating mechanism (e.g., patent, exclusive contract) that will slow the release of

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[14] Although the entry of imitating entrepreneurs may initially validate the opportunity and increase overall demand, eventually competition begins to dominate (Hannan & Freeman, 1984). When the entry of additional entrepreneurs reaches a rate at which the costs from new entrants exceeds the benefits, the incentive for people to pursue the opportunity is reduced because the entrepreneurial profit becomes divided among more and more actors (Schumpeter, 1934) (Sarasvathy et al., 2010: Page 90)

information out. If this protection lasts long enough and is paired with some reinforcing advantages (e.g., adoption of technical standards or learning curves) it can lead to the creation of new market or a new product in the existing market.

As the C firm grows in the discovery zone it may soon reach a point where growth is no longer possible. Contrary to the E firms most C firms are confined to one market during their nascent phase. One possible way to cross across markets is in a distant diversification scenario. However, the C firms would need to have access to information from a distant market and then make the journey across the Creation zone to reach it. As we proposed earlier that journey for a small C venture would most likely be fatal.

That leaves the C firm the option to pursue diversification in other areas of the current market. Gruber et al., (2013) found that the "extent and nature of the firm's pre-entry opportunity set" of the firms have a significant effect on their growth potential. Firms that had a constrained opportunity set had a more limited growth potential than those that had a more extensive opportunity set (Gruber et al., 2013). If we assume the best case scenario for an C firm, then they can continue growing through diversification in later stages of ventures evolution.

Another possibility for an C firm to create a new market is through disruptive innovation. As we mentioned earlier in the discussion of the POEs, C firms can base their business model around market-driven innovation (Habtay, 2012). However, this type of disruptive innovation often ends in a bottleneck before actually disrupting the market (Habtay, 2012).

Extant research had also elaborated on the creation of new markets of effectuators and causators (Kerr and Coviello, 2020; Dew et al., 2009). We now offer an adapted version of those conjecturers to include the insight from our topology

Proposition 5: When in creation zone, E firms create more new markets relative to C firms in discovery zone

DEATH OF A MARKET

New Market Creation wouldn't be complete if we don't look at the opposite end of its lifecycle, the death of a market. We can isolate several factors that could potentially lead to a decline and potential demise of parts of the market.

First, and one of the most important ones is the disruption of the primary knowledge production of the inventors and its commercialization though innovators. From that primary production the entrepreneurs "through the start-up of a new venture,… serve as conduit of knowledge spillovers" (Audretsch and Keilbach, 2007:page 1242). If for some reason the initial knowledge production was disrupted, each new knowledge spillover will lower the entropy of the market around it, and consequently grow the allocation zone at the cost of the Discovery and Creation zone. Thus, over time, without primary knowledge production, the market will get more and more depleted and over time by continuously lowering the entropy in the market it will turn into one big allocative zone. That is a static market with no entrepreneurship in it that will be equal to its death.

Second, the human factor can cause disruptions through the role of the government in the market space. Governments regulate the markets with its tax policies, legal systems, and other instruments that can affect the markets. Some of those policies could be detrimental and disrupt certain markets, that could potentially lead to their deaths. Researchers are realizing that individual communities and ecosystems are not isolated from each other but rather are connected by exchanges of individuals (through dispersal) and materials (through spatial fluxes) (Leibold et al., 2004).

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One way to keep markets healthy is by supplying fresh knowledge into it through a process similar to the flow of the currents in the ocean. These currents would represent industry trends and/or marketing activities that could change the topology of the market and create new Discovery and Creation zones in the market, and thus revive it. However, as we know from complexity science, the changes in the ecosystem are not reversible. So, in a way the currents from other markets would essentially create a new market in the place of the old.

8. CONTRIBUTION

In this paper we offer an integrative view on entrepreneurial opportunities in one market topology based on the concept of information uncertainty. With this topology we provide the context for the entrepreneurs need to make decisions. As Alvarez and Barney (2007: page 21) pointed out "[w]hen entrepreneurs act to sustain their competitive advantages in a context appropriate way, they will more effectively form and exploit opportunities than when they sustain their competitive advantages in context inappropriate ways." This adds more pragmatic and holistic view on the debate on the entrepreneurial opportunity.

Additionally, our market topology offers a framework to analyze the entrepreneurial strategies based on the market information and the tacit knowledge on the market.

We add to effectuation theory by offering deeper understanding of the differential effects of decision-making logic in the context of new venture strategic decision making under different conditions of information uncertainty. Also, we posit that even though until recently the concepts of complexity and decision-making strategy were not connected (Galkina and Atkova, 2020), effectuation with its non-predictive approach is congruent with the ideas of complexity science (Lichtenstein, 2014). Thus, we contribute to effectuation theory by providing an explanation of

how the decision process unfolds from the complexity science perspective. It serves as another stepping-stone to advance the connection between effectuation and complexity theory. We also, contribute to complexity science by offering insights on the nature of knowledge limitation given the unpredictable, nonlinear outcomes of coevolving agent processes. (McKelvey, 2002).

Our model proposes that the use of decision-making strategies "is influenced by characteristics of the information environments where entrepreneurial efforts are taking place" (Gregoire et al., 2011: page 1459). But even more importantly, we propose that the characteristics of the information environment are also influenced by the use of effectuation or causation. The different heuristics used by entrepreneurs effectively change the uncertainty of the information in the market (its entropy).

We propose a spatial component to the new market development literature and posit that the point of entry and location of the venture in the market space makes a difference on the outcomes of different strategies. With this we contribute to the entrepreneurial strategy literature by adding another dimension based on information uncertainty in addition to the low-end vs. the mainstream market decision.

On the macro scale, we propose that the investments in primary knowledge producers is key for the long-term health of the market as an ecosystem. This also adds insights to the policy makers on potential interventions in stagnant markets.

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ESSAY 3: ENTREPRENEURIAL DECISION – MAKING IN

INTERNATIONALIZATION: A CONFIGURATIONAL APPROACH

1. INTRODUCTION

More than fifteen years ago, when reflecting on the extensive research on international market entry Zhao et al. (2004: 525) observed that "our cumulative understanding is mixed and inconclusive, as the existing literature has documented disparate results and yielded inconsistent findings with a wide range of methodologies employed". Fifteen years on from this original observation, inconclusiveness remains. Verbeke et al. (2019: p.1287) concluded that "simplistic predictions based on the presence of a single antecedent should make way for a configurational approach whereby a set of conditions must be in place for opportunism to materialize." This has been further underlined by other scholars: "International business (IB) researchers have been slow to embrace a configurational approach in hypothesis formulation and empirical analysis. Yet, much of what IB scholarship considers is inherently configurational: various explanatory factors and their interplay simultaneously determine the outcome(s) studied, such as governance choice or firm-level performance. The mismatch between the nature of the empirical phenomena studied on the one hand, and hypothesis formulation and empirical methods deployed on the other, explains why many quantitative IB empirical studies are overly reductionist, relying on hypotheses that assume linear (or simple, curvilinear), unifinal, and symmetrical effects." (Fainshmidt et al., 2020: p.455).

In the light of these criticisms, our paper answers the call to resolve the challenge of complex interactions by using a set–theoretic model to explain internationalization and market entry decisions. Set-theoretic methods are different compared to conventional variable-based approaches in that they do not separate cases into independent, analytically discrete aspects. Rather set-theoretic methods treat configurations as different types of

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cases (Fiss, 2007, 2011) and they provide a new way of conceptualizing the relationship between the characteristics of a configuration, which in our case is sets of different decision-making strategies, levels of entrepreneurial experience, environmental contingencies and market entry choice. Our paper employs an emerging and novel methodology - fuzzy-set Qualitative Comparative Analysis (fsQCA) to address the determinants of market entry strategy. We adopt a configurational approach, considering two sets of decision-making strategies (effectuation and causation) and how they are used in the context of four other conditions: choice of market entry, entrepreneurial experience, and two measures of environmental uncertainty, market dynamism and psychic distance. As a preliminary observation, we concur with Munoz and Dimov (2015: p.634) who stated that "that factors that are normally attributed piecemeal importance are in fact intertwined with others and not sufficient conditions by themselves in explaining given outcomes." We thus position our research in this paper as an important complement to the extensive literature that has hitherto used more traditional market entry studies.

Our paper makes three specific contributions to the extant literature. First, we reveal causal mechanisms that lead to high internationalization performance by undertaking a detailed analysis of market entry and subsidiary performance through a single case, a leading South African multinational, Smollan Group. The choice to focus on a single organization allowed us to exploit the fact that the structural characteristics of the organization (firm structure, resource base, product/service offering and entrepreneurial orientation) are identical for all the different outcome conditions. Furthermore, this permits a closer examination of causal mechanisms that explain both market entry choice and subsequent

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performance in terms of the environmental contingencies faced by Smollan and the nature of strategic choices made by the firm.

Second, we extend the scope of contingency theory to managerial decision-making logic as a salient contingency in decision-making. At the same time, we also extend effectuation theory by exploring its boundary conditions. We explore the inconclusive relationship between effectuation and causation, their compatibility and form. We offer empirical evidence about this relationship and the consequence of their coexistence as explanations for firm performance.

Third, our results reveal several important insights on how to deal with environmental contingencies when entering a new market through a focus on *both* the market entry choice and the strategic decision-making logic employed by the firm. Our solution provides pathways to high performance in conditions of high, medium and low uncertainty. There are two strategies that lead to high performance in high uncertainty conditions. One strategy is through the inclusion of effectuation decision-making combined with entrepreneurial experience. Even though the use of effectuation in circumstances of high uncertainty is in line with the expectations of entrepreneurship theory (Sarasvathy. 2001; Harms and Schiele, 2012), its extension that argues that it leads to higher performance in high uncertainty situations has not been empirically tested.

Our paper provides the initial empirical evidence that effectuation in combination with causation in high uncertainty situations leads to higher performance. Even more interestingly, subsidiaries who choose this approach perform well irrespective of the chosen entry mode. This would appear to be at odds with a part of the extant research that

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put significant emphasis on the entry mode as a key to internationalization success (Brouthers and Nakos 2004).

The second pathway pursued by Smollan Group that leads to high performance in conditions of high uncertainty is to use a joint venture (JV) as an entry mode *in lieu* of effectuation. This is consistent with previous research which highlights the role of flexibility in JV arrangements, relative to wholly owned subsidiaries, in mitigating uncertainty and market risk (López-Duarte and Vidal-Suaréz 2010). These two pathways to success faced with high uncertainty led us to conclude that Smollan Group has the strategic choice of either using effectuation or JV as entry mode. In conditions of medium uncertainty (high psychic distance and low market dynamism), we show that the use of high equity as a control mechanism paired with a causal decision-making logic is key to success. In the case of low uncertainty, as long as subsidiaries follow causal decision-making logics, our empirical evidence suggests that the entry mode choice has no bearing on the performance of the subsidiary.

2. THEORETICAL CONSIDERATIONS

This paper synthesizes behavioral, contingency and market entry mode perspectives to consider how managerial action (conceived as entrepreneurial characteristics such as strategic decision-making logics in the form of effectuation or causal approaches) and market entry choice is impacted by the environment (the degree of uncertainty) as a contingency factor. Decision-making logics and market entry choices are thus evaluated in terms of their *congruence* with the environmental contingencies faced by the firm. The following section provides an overview of these considerations as the basis for our fsQCA

analysis. Our paper is organized as follows. The first part of our paper considers theoretical aspects relevant to our contingency analysis. The second part presents the research context of our paper, the data sample used as well as salient methodological considerations of empirical method. The third part extensively reports the results of the fsQCA analysis and in a fourth part, we evaluate the results and the specific pathways that our study uncovers. A fifth and final part is a discussion of the implications for internationalization and entrepreneurship research of our study as well as a brief discussion of managerial implications. It also discusses the limitations of our study and directions for future research.

2.1. Contingency in Managerial Decision Making

The explanatory balance between the structure of the business environment and managerial agency as determinants of organizational strategy and performance has been an ongoing and fruitful debate. It has resulted in the development of valuable theoretical perspectives. First is a perspective that regards the structure of the business environment, and industry structure specifically, as being the key determinant of a firm's performance (Rumelt 1991, McGahan & Porter 1997). Second, and an arguably competing perspective, is a focus on strategic choice (Child et al. 2003) that emphasizes the agency of the manager, and their ability to shape conditions both inside and (to a lesser extent) outside the firm.

Our paper embraces a third perspective associated with contingency theory. This perspective asserts that firm performance is neither determined by the environment nor by managerial agency (through strategic choice) uniquely by themselves. Rather, organizational performance is in fact determined by the *congruence* of structure and agency. Lawrence and Lorsch (1967) first coined the term contingency perspective arguing

that the degree of uncertainty and speed of change in a business environment impacts on the development of internal features in organizations (Scott, 2001). Contingency logic asserts that there is not one best way to structure or lead an organization implying there is logically no one best way to strategize, and no strategic choice is uniquely beneficial in all conditions (Lawrence and Lorsch, 1967; Ginsberg and Venkatraman, 1985; Donaldson, 2001, Raymond and St-Pierre, 2013). The contingency logic further asserts that any optimal course of action is contingent on combinations of internal and external situations. Much of the extant literature looks at how organizational structure is affected by changes in organizational size, task uncertainty, and task interdependence (Burns & Stalker, 1961). As firms evolve, changes in external structure in turn affect organizational performance. As further elaborated in the business and management literature, contingency theory developed a related idea: the concept of configurations of contingency and response variables. The better the fit of these configurations with the structure of the business environment, the better the performance of the firm.

By drawing on the tradition from the contingency literature above, we developed a configuration frame with causational and effectuation-based decision-making as two approaches to foreign market entry choice taken by managers. In doing so, we are considering the use of these two sets of decision-making strategies in the context of four other conditions: the extent of entrepreneurial experience of the managers, environmental contingencies (market dynamism and psychic distance) and market entry mode. Our ultimate goal is therefore to explore how different combinations of these conditions lead to the high performance of a subsidiary.

2.2. Research context (Emerging Market Multinational Enterprises (EMNE))

The need to develop contingency theories of international business (IB) became even more pressing for IB scholarship when existing theories did not fully predict the rise of Emerging Market Multinational Enterprises (EMNEs) (Oliveira et al., 2018). The arrival of EMNEs encouraged IB scholars to acknowledge and adapt to the changes in the global economy by incorporating a contingency theory approach in IB research (Aharoni, 2014; Banalieva and Sarathy, 2011). The literature offered two reasons for why EMNE development differed from their developed country counterparts. First, the structure of the home business environment for EMNEs is sufficiently different from the developed country business context and this influences their internationalization path in a way that is fundamentally different from their developed country counterparts. Second, EMNEs have evolved in a contemporary global economy that is also different from the world economy that developed countries MNEs evolved in in previous historical periods. Contingency theory argued that the wave of outward FDI could be explained as a firm-driven process by EMNEs to re-establish fit with their external context.

2.3. Market dynamism and Psychic distance

Achieving this fit in the context of internationalization adds another layer of complexity. Additional challenges for EMNEs stem from higher institutional distance between their home and host country creating a higher liability-of-foreignness (Gammeltoft et al., 2012; Panibratov et al., 2018). Banalieva and Sarathy (2011) argued that the industry context should be considered an important contingency for EMNEs internationalization success. In our case we use market dynamism and psychic distance to represent the industry context.

In terms of EMNEs foreign market entry mode strategy, Asmussen et al., (2009) introduced the concept of foreign operation mode (FOM) configurations to allow for EMNEs to have different entry mode decisions in different foreign markets, a very common scenario in practice.

One of the early notions in the internationalization literature is that cultural distance drives entry mode choices (Johanson and Vahlne, 1977). The construct of Psychic Distance is one way to gauge these cultural differences in terms of cultural, linguistic, and structural familiarity between the home and host country.

2.4. Market entry mode

A key contingency faced by internationalizing firms is the strategic choice of foreign market entry mode. Foreign market entry mode decision is a structural decision in the sense that it "deals with finding the appropriate institutional arrangement to facilitate the implementation of an international business strategy, given a firm's internal and external environments" (Gao, 2004: p.39). While much of the internationalization literature characterizes the foreign market entry decision as essentially a rational decision taken by a manager or entrepreneur (Kumar and Subramaniam, 1997), there have been attempts to incorporate a contingency approach into the foreign market entry research stream as well. Woodcock et al., (1994) developed a contingency model of foreign market entry mode-firm performance based on resource requirements and organizational control factors. Kumar and Subramaniam (1997) developed a contingency framework for the selection of foreign market mode of entry that included various endogenous factors that included a managerial decision method comprising both fully rational and boundedly rational

heuristics. They posited that the managerial choice of the decision-making logic was a function of both the task as well as the characteristics of the decision maker. Ekeledo and Sivakumar (1998) proposed a conceptual framework for optimal foreign market entry mode choice as a response by the firm to the interplay of three contingencies: product classification (hard and soft services, manufactured goods), organizational factors (product factors, corporate goals and objectives, and corporate strengths and weaknesses) and the external environment. Brouthers et al., (2000) looked at how perceived environmental uncertainty impacts directly on foreign market entry mode choice, indirectly through industry type, and fit to affect satisfaction with performance. Child, Chung, and Davies (2003) tested the predictive powers of the three perspectives mentioned in Brouthers et. al (2000) in the context of cross-border operations in a major transition economy. They found support for product type and the structure of the business environment as factors influencing managerial decision-making. Lastly, Zhou et al., (2007) tested the effects of customer and competitor orientations on performance and concluded that they are moderated by different environmental conditions (developed vs. developing markets).

A methodological challenge from much of this literature has been to incorporate interaction effects with several of the authors calling for further methodological development. Wilkinson and Nguyen (2003) developed a contingency model of entry mode performance of exporting Australian manufacturers based on transaction cost economics and production costs but found it too complex to test because of interactions between various factors in the model (cultural distance, geographic distance, uncertainty, asset specificity, firm scale and scope, duration of involvement, frequency and size of transactions). In light of these

shortcoming identified in the extant literature, our paper addresses this methodological challenge.

2.5. Entrepreneurship

Empirical operationalizations using contingency theory in entrepreneurship research have tended to use the environment and its uncertainty as a main variable on which behavior is contingent (Covin and Slevin, 1989; Chandler and Hanks, 1994; Lumpkin and Dess, 2001). Following Jones and Coviello (2005) who developed a model of internationalization as an entrepreneurial process, if we want more precise contingency models, the key constructs that should be included in the configurations (in addition to time and internationalization behavior) are performance, the firm, the environment and, specifically, the entrepreneur. The entrepreneur is the focus because they are "an imaginative actor who seizes contingent opportunities and exploits any and all means at hand to fulfill a plurality of current and future aspirations, many of which are shaped and created through the very process of economic decision making and are not given *a priori*" (Sarasvathy, 2001, p. 262). Furthermore Andersson (2011) suggests that analyses of internationalization efforts should not be carried out at firm-level alone since entrepreneurs have a major influence on global growth and survival decisions. When looking at growth and survival of International New Ventures (INV), Gabrielsson and Gabrielsson (2013: p.1371) found that "the decision-making logic of entrepreneurs as an important internal contingency factor that either mitigates or strengthens the influence of the anteceding factors." They propose effectuation as the decision-making logic INVs employ under uncertainty.

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2.6. Decision-making logics: Effectuation and Causation

The effectuation decision-making logic emphasizes co-creating opportunities with pre-committed stakeholders, such as customers and partners. Causation, on the other hand, refers to a set of thoughtful activities that emphasize prediction and strategic planning. (Sarasvathy, 2001). Effectuation is at its core a contingency theory. It assumes that contingent information is leveraged as a resource for constructing goals as opposed to more causal exploiting of pre-existing information and relying on predefined goals as determinants of resource acquisition and partner selection. In the presence of high levels of uncertainty, effectuation may also be associated with better outcomes. While being a logical and somewhat compelling argument, it has not been widely adopted in the extant literature nor has it been empirically tested exhaustively. Several studies have found that effectuation has a substantial and positive effect on firm performance (Chen et al., 2021, Read et al., 2009). In their meta-analysis of the effectuation–performance relationship, Chen et al., (2021) tested for the moderating effects of firms age, industrial and market context. They found that effectuation has stronger performance implications for firms in high-tech industries and emerging markets. However, contrary to expectations (Sarasvathy, 2001, 2008; Reymen et al., 2015) found effectuation to be more beneficial for more established firms. In a meta-analysis, Read et al., (2009) indicated that the effectual construct of Leverage Contingency (finding new possibilities from surprises – even negative surprises), was positively and significantly related to new venture performance.

Various scholars (Arend et al., 2015; Welter and Kim, 2018) have called for contextual understanding of effectuation to extend analytical rigor as well to explore the boundary conditions of effectuation theory (Chen et al., 2021). Although extant research has

highlighted the importance of contextual contingencies (Brinckmann et al., 2010; Stam et al., 2014; Thomassen et al., 2019) little empirical evidence of it exists. One of the recommendations of McKelvie et al., (2019) was to clarify the boundary conditions of effectuation by varying the contexts it is measured in. They include internationalization as an important contingency because whenever there are uncertain contexts, effectuation makes sense to study.

Extant research has also tested relationships between effectuation and export/internationalization (Harms and Schiele 2012; Kalinic et al. 2014). Andersson (2011) studied born-globals entering foreign markets who viewed effectuation as a tool to create opportunities together with network partners. Child and Hsieh (2014) used contingency theory to analyze SMEs' decision making on internationalization. They included both effectuation and causation in their typology of decision-making modes. The authors found the binary notion of planned vs. unplanned or causation and effectuation as prohibitive for their typology that aimed to be more nuanced. Additionally, the authors suggested that both individual and firm characteristics should be considered as complementary contingencies for their configurations of decision mode, information use, and network attachment among internationalizing SMEs.

While scholars have typically considered causation and effectuation as the opposite ends of a dichotomized construct (Brettel et al., 2012), more recent studies have emphasized that causation and some dimensions of effectuation are not negatively related, but instead display empirical overlap (McKelvey et al., 2019). An et al., (2019) looked at configurations of firm-level decision making logics (effectuation, causation), resourcing behavior (bricolage), and contextual factors (firm size and development stage) that lead to

high performance. We follow this conceptualization in which the two logics are not regarded as opposites but are seen as orthogonal in nature. This notion together with our configurational approach leads us to the important consideration of possible simultaneous use of causation and effectuation. We therefore include both effectuation and causation as conditions in our configurations with other contextual attributes and evaluate their effect on the firm. With our fuzzy set theoretic approach to effectuation and causation we overcome the challenge in Child and Hsieh (2014) as the modes of decision making can have partial membership in both effectuation and causation sets. We also go a step further in our study, and measure effectuation in a different context (internationalization) at different levels of uncertainty (low, medium and high). As we explain in further detail below, our results suggest that effectuation is enacted in the situations of high environmental uncertainty (high psychic distance and high market dynamism) and when combined with causation leads to high-performance outcomes.

2.7. Entrepreneurial Experience

Initially, research believed that effectuation decision-making was mainly used by expert entrepreneurs (Sarasvathy, 2001) defined as "founders of multiple companies with over 15 years of experience and proven superior performance" (Dew et al., 2009). Thus, entrepreneurial experience was considered as one among several potential antecedents of effectuation. Several efforts were made to test the direct relationship between entrepreneurial experience and different entrepreneurial outcomes with mixed results. Dew et al. (2009) looked at the direct relationship between novice/expert entrepreneurs and personal experience, partnership, and one of the key effectuation dimensions: affordable loss. Similarly, Krabel and Mueller (2009) analyzed the effect of entrepreneurial

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experience on nascent academic entrepreneurs. More recent studies have shown that effectuation is used by novice entrepreneurs as well (Engel et al., 2014; Stroe et al., 2018). Therefore. by moving away from prior research that have mainly analyzed entrepreneurial experience in isolation, our paper includes manager's entrepreneurial experience as another condition in our configurations. We hope that with this we will shed more light on this connection. Also, by completing our analysis within one case, we removed other structural contingencies and focused on the strategic choice of foreign market entry mode, managerial decision-making logic, and market uncertainty.

3. RESEARCH CONTEXT AND SAMPLE

Data for this paper was collected from one of the leading retail solutions multinational corporations headquartered in South Africa – Smollan Group. It has a presence in over sixty countries worldwide. Retail solutions firms provide a range retail support services including, retail analytics, pricing solutions, inventory planning, item pricing, product management in a retail environment. The choice of Smollan Group for our research was informed by the following reasons. First, Smollan Group is an EMNE which allows us to contribute to the existing literature on EMNE internationalization processes and outcomes. Second, Smollan Group is especially interesting to analyze because of its accelerated growth in more than sixty countries over a period of thirteen years. Third, Smollan Group's internationalization efforts are driven by regional managers with variety of backgrounds, and functional and internationalization/entrepreneurial experience. This research context affords us a rare opportunity to compare the simultaneous effects of individual and environmental contingencies on worldwide internationalization efforts under the umbrella of a single EMNE.

We collected two types of data to construct our data set. First, we conducted exploratory semi-structured interviews with the senior management team of the company. The interviews were conducted with three Managing Directors with regional responsibility in the Asia Pacific, Europe, and Middle East South Asia respectively as well as the Chief Growth and Innovation officer. The interviews, resulting in more than four hours of recorded data, were transcribed, and analyzed. Based on this exploratory analysis we developed a survey instrument that was distributed to Smollan Group country managers. We received full anonymous responses from eighteen country managers from the following countries: Australia, Belgium, China, Germany, Hong Kong SAR, India, Kuwait, Mozambique, Pakistan, Poland, Sweden, Taiwan, Thailand, Vietnam, Zambia, and Zimbabwe. The response rate of fifty-five percent (calculated as the ratio of fully completed surveys and all surveys that were started) was satisfactory as it represented accurately each of the three main regions that we discussed in our semi-structured interviews. After additional checks we dropped the cases for Zambia due to contradictions in the datasets and heavily skewed responses and finalized the number of cases to sixteen. This still works since QCA was conceived to work robustly with smaller numbers of cases (between 15 and 60) (Fiss, 2011; Munoz & Dimov, 2015).

The average age of the participants was 40.5 years old ranging from twenty-seven to fifty-three years of age. Two respondents were female and sixteen were male. Their experience ranged between four and thirty years with an average of 17.3 years. Half of the survey respondents had entrepreneurial experience with an average of 7.25 years. More than sixty percent of survey respondents had prior international experience with an average of 5.4 years ranging from one to sixteen years.

4. FUZZY-SET QCA PROCEDURES, METHODS, AND DATA PREPARATION

To analyze our empirical data, we used a set–theoretic configurational approach, namely fuzzy set Qualitative Comparative Analysis (fsQCA). This approach allows us to analyze the complexity that is at the core of both entrepreneurial and internationalization processes. It captures causal complexity through the principles of equifinality, conjunction and causal asymmetry (Misangyi et al., 2017). The principle of equifinality proposes that there are different paths that lead to the same outcome. These paths include different combinations of antecedent conditions that are called configurations that offer mutually non-exclusive explanations of the same phenomenon. The conjunction principle stipulates those antecedent conditions that exert their impact in combinations rather than in isolation as is the case with the linear additivity principle in symmetric quantitative methods. Finally, the principle of asymmetry specifies that the presence or the absence of the outcome can have different explanations. This is in contrast to symmetric causation common to linear statistical methods where an increase or decrease in the independent variable would lead to increase or decrease in the dependent variable.

Units of analysis can be chosen from different levels, from individual level to the micro level of firms to the macro level of countries (Wagemann et al., 2016) that are essential in IB research (Fainshmidt et al., 2020). In conclusion, FsQCA has the potential to add finer-grained detail about entrepreneurial and IB processes that can reveal surprising empirical findings. (Douglas et al., 2020; Fainshmidt et al., 2020). This approach enables us to test existing theories, explore mixed findings of previous studies and embark on new theory building efforts.

Measures and calibrations for set membership

Foreign subsidiary performance, our outcome condition, is an attitudinal construct controlled with data to avoid respondent bias. We asked respondents responsible for managing the subsidiary in the new market to evaluate subsidiary average performance using a five-point Likert scale. To control for potential subjective bias in the assessment of performance we also collected data on sales growth, market share growth, and profit growth in the new market in the first year after entry (in percentage terms). Adapted from Harms and Schiele (2012), we measure environmental contingencies, psychic distance, and market dynamism, using 5-item and 2-item scales respectively. Psychic distance items inquired about the managers' perceived cultural, linguistic, and structural familiarity with the target country. Dynamism assessed the managers' perception of uncertainty of the market of the target country based on the degree and magnitude of the expected changes in it (McKelvie et al., 2009).

We measured effectuation and causation following Chandler et al. (2011). We operationalized effectuation as a formative construct with five dimensions: experimentation, affordable loss, flexibility, pre-commitment, and alliances. Causation was measured with a five-item scale. The items for causation and each dimension of effectuation were measured using a seven-point Likert scale. Finally, we have two binary conditions, entrepreneurial experience, and Market entry mode. The former captures whether the manager has any prior entrepreneurial experience. The latter differentiates between JV and non-JV entry modes (greenfield, acquisition). A value of 1 was set for JV and 0 for non-JV entry modes.

Calibration

We used a direct method for transforming the original Likert scores into set membership scores. This was based on the judgment which Likert scale scores would represent cases being fully in the set, fully out of the set or at a cross-over point (Ragin, 2008). Based on both conceptual arguments and empirical evidence, for the seven-point Likert scale we use the anchor points of seven for full membership, one for full non-membership and 4.51 for the cross-over point. Assigning the crossover threshold to four in the seven-point Likert scale (or three in a five-point Likert scale) is problematic and should be avoided as explained below. Cases with a set value of 0.5 in one of the conditions cannot be unequivocally assigned to a truth table row which results in difficult interpretations and potentially excluding cases from the analysis. (Wagemann et al., 2016).

We based our decision for the cross-over point to be between 4 and 5 on the fact that by being indifferent ("Neither agree nor disagree", Likert value = 4), respondents failed to affirmatively agree with the item statement. Hence, it would be incorrect to put indifferent respondents on the maximum point of ambiguity, but rather in the non-members. As a result of our calibration, only respondents who agree with the statement are fully in the set (Likert values five, six and seven), while the others are fully not (Likert values four, three, two and one). The Likert values are then converted into fuzzy values using a logistic function. Later in the paper, as part of the robustness testing, we analyze the sensitivity of our anchor points.

Table 1. Calibration of Causal Conditions and Outcome

Conditions and outcome	Measure	Full non-membership anchor	Cross-over anchor	Full membership anchor
High performance (outcome)	5-point Likert scale	2	3.51	4
Entry mode	Binary (Joint venture = 1, everything else = 0); Crisp sets	0	NA	1
Effectuation	Formative construct of five dimensions; measured on a 7-point Likert scale (Chandler et al., 2011)	2	4.51	6
Causation	One dimension 5-item scale; measured on a 7-point Likert scale (Chandler et al., 2011)	2	4.51	6
Psychic distance	Adapted 3-item scale; measured on a 7-point Likert scale (Harms and Schiele (2012);	2	4.51	6
Market dynamism	Adapted 2-item scale; measured on a 7-point Likert scale (Harms and Schiele (2012);	2	4.51	6
Entrepreneurial experience	Binary variable (no experience = 0, any experience = 1); Crisp sets	0	NA	1

5. RESULTS

Results are obtained by using the *R* libraries "QCA" (Dusa, 2019) and "SetMethods" (Oana et al., 2020). We first run an analysis of necessity for the positive outcome and the negative outcome. We then create a truth table that enables us to run the sufficiency analysis. We continue with testing the robustness of our results by following a 7-step protocol as outlined in Oana, Schneider and Thomann (2021).

Necessary conditions analysis

A condition is necessary, if, whenever the outcome is present, the condition is also present. Formally, a condition is necessary, if $X \geq Y$ for all cases, or in a Venn diagram, Y is a subset of X. In an *XY*-plot, all cases fall below or onto the main diagonal. We first run the Necessity analysis for High performance as an outcome because of two reasons. Firstly, the results from the analysis of necessary conditions can be useful for the analysis of sufficiency and the treatment of logical remainders. In case a necessary condition can be identified, truth table rows (no matter if existing ones or logical remainders) that do not show this condition can be automatically excluded from the minimization process (Schneider & Wagemann, 2012, pp. 201 f.). Secondly, by analyzing necessity first, the pitfall of deducing a 'false' necessary condition from the analysis of sufficiency is avoidable**.** This refers to the possibility that a condition is part of every sufficiency solution term and risks being mistaken for a necessary condition. By being big enough the set encapsulates all cases, thus is trivial. Only analyzing necessary conditions at first can draw the attention to such a situation (Schneider & Wagemann, 2012, pp. 220 ff.).

We choose very high consistency levels (*inclN > 0.9*), coverage (*covN > 0.5*) and Relevance of Necessity (*RoN > 0.5*). We found two terms that satisfied the conditions (See Table 2). However, the further analysis of the *XY*-plots (Figures 1 and 2) revealed that these necessary conditions are trivial due to the skewed distribution of cases, meaning that all cases (except for Germany in the first and Sweden in the second term, that are deviant in kind) are members of the *X* set (to the right of the 0.50 vertical line). Thus, we can disregard these necessary conditions. (Wagemann et al., 2016)

Table 2. Necessary conditions analysis of the positive outcome

	inclN	RoN	covN
1 ~EFFECT+DYNA	0.920	0.543	0.742
2 ~CAUS+PSYD+~DYNA	0.904	0.524	0.726

Figure 1 – Necessity plot 1 for the positive outcome

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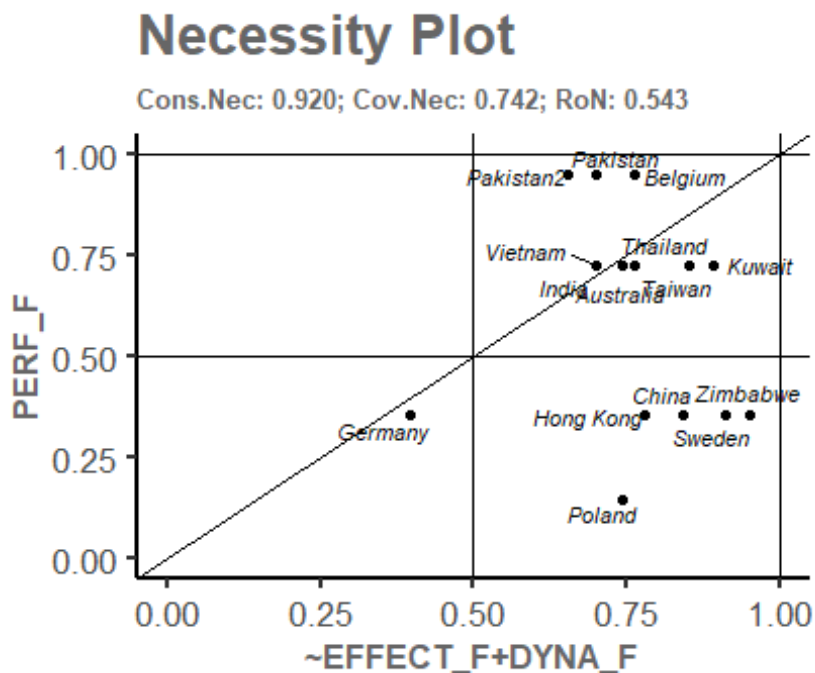
Figure 2 – Necessity plot 2 for the positive outcome
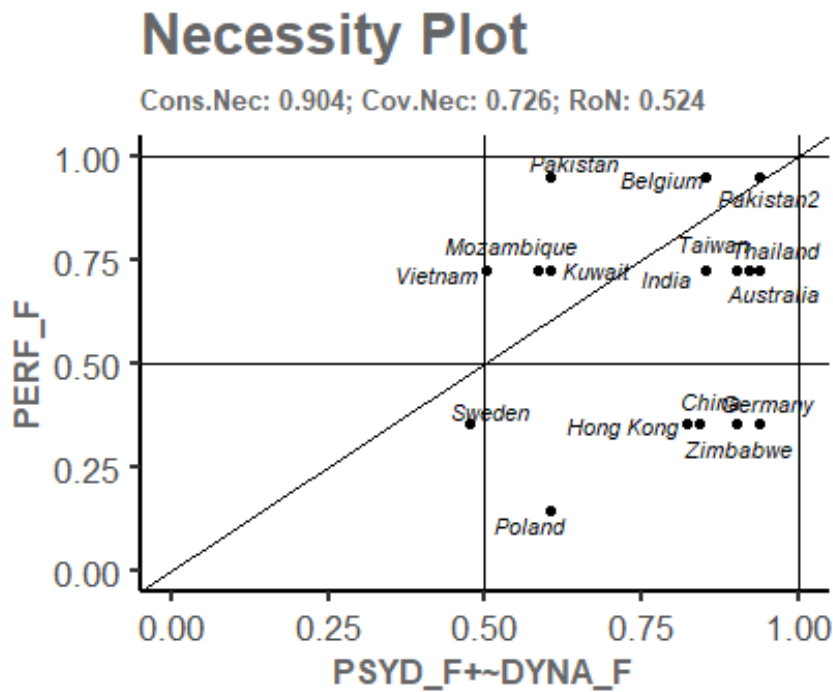
Necessary conditions analysis of the negative outcome

Based on the asymmetry principle, we then continue with the necessity analysis for the not high-performance outcome. This analysis reveals one necessary conjunction (Table 3). Even though the consistency level is above the 0.9 threshold, the rather low values of RoN indicate a potential triviality problem. Indeed, when we look at the *XY*-plot (Figure 3), we can see that there is skewness - 13 out of 16 cases are members of the ~PSYD_F+DYNA_F set. Therefore, we can again confidently claim that this is a case of trivial necessity where the set is big enough to incorporate most of the cases.

Table 3. Necessary conditions analysis of the negative outcome

	InclN	RoN	covN
1 ~PSYD_F+DYNA_F	0.952	0.525	0.547

Figure 3 - Necessity plot for the negative outcome

Necessity Plot
Cons.Nec: 0.952; Cov.Nec: 0.547; RoN: 0.525
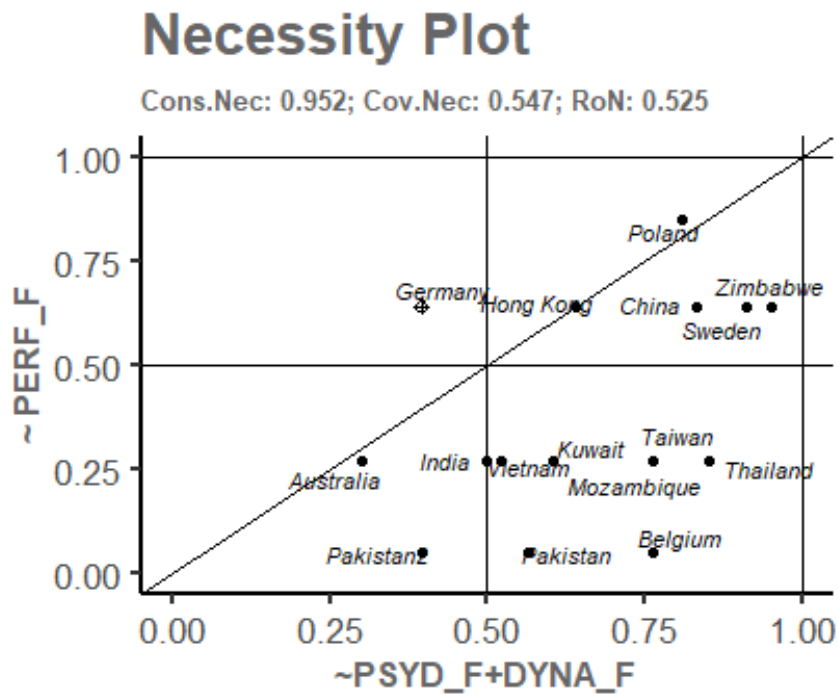
Sufficiency analysis

The first step in undertaking a sufficiency analysis is the generation of the truth table. The rows in this table represent all the possible configurations of our conditions. Since in our analysis we have six conditions, the truth table consists of $2^6 = 64$ rows. Each row is either assigned to the positive outcome (high performance in our case) or negative outcome (low performance). Each case has a membership (> *0.5*) in only one row. The full truth table is in Appendix A. Eighteen cases are distributed among fourteen rows of the truth table. Nine

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of the cases are part of the outcome set (first eight rows) and the other nice cases are not part of the outcome set (rows nine to fourteen). The remaining fifty rows in the truth table are the logical remainders i.e., the rows in the truth table without enough cases (depending on the frequency threshold this number can be 0 or more cases). The logical remainder rows are defined as logically possible *and* combinations of conditions for which not enough empirical evidence is at hand. This situation is common in all empirical comparative research and is known as 'limited diversity'. Before we move onto the minimization of the Truth table and create solutions, a strategy for dealing with the logical remainders is required.

There are three strategies of how to keep the influence of limited diversity on our inferences under control. The first is a conservative strategy where we don't include any of the logical remainders and we base the minimization of the truth table only on the rows with empirical evidence. This leads to a conservative solution, and this solution is a subset of all the other solutions. The second strategy is to let our software decide which logical remainders based on simplifying assumptions to use in the minimization process to make the solution less complex. The aim of this strategy is to create the most parsimonious solution. Logically, the conservative solution is a subset of the parsimonious solution. The third strategy is to let the researcher select some logical remainders based on extant theory. During this process we propose directional expectations about single conditions that we expect to have in a hypothetical case with that specific configuration of conditions. The goal is to make the solution more theoretically plausible and parsimonious. This process yields the intermediate solution that falls in – between the conservative and parsimonious solutions. (Oana et al., 2020; Ragin, 1987; Schneider and Wagemann, 2012).

It is important not to confuse limited diversity with some of the situations that occur in quantitative research such as missing values, lacking degrees of freedom or predicting outside the range of *X* or *Y*. The appropriate levels for consistency and coverage are research-specific and should not be automatically assigned based on convention. As an appropriate choice for the consistency value, we used the empirical gap between the high and low values in the truth tables for both high performance outcome and the absence of the high-performance outcome (Schneider and Wagemann, 2010). In our case, based on the suggested benchmark for the raw consistency $\geqslant 0.80$ (Greckhamer et al., 2018) and the additional check of the truth table for significant empirical break points, we chose the raw consistency threshold value to be $\geqslant 0.8$ and PRI to be $\geqslant 0.5$. Consistent with prior studies (e.g., Schneider et al.,2010), we use thresholds that correspond to a gap observed in the distribution of consistency scores (Munoz and Dimov, 2015). Based on the small number of cases (16), we kept the frequency threshold *n = 1*.

Conservative solution

The first strategy of dealing with logical remainders leads us to the creation of the conservative solution (shown below in Boolean notation).

$$CAUS\_F*\sim EFFECT\_F*\sim PSYD\_F*\sim DYNA\_F*\sim ENT\_F \qquad +$$
$$CAUS\_F*\sim EFFECT\_F*PSYD\_F*DYNA\_F*EMJV \qquad +$$
$$CAUS\_F*EFFECT\_F*PSYD\_F*DYNA\_F*ENT\_F \qquad +$$
$$CAUS\_F*PSYD\_F*\sim DYNA\_F*\sim EMJV*\sim ENT\_F \qquad +$$
$$\sim EFFECT\_F*PSYD\_F*\sim DYNA\_F*\sim EMJV*\sim ENT\_F \rightarrow PERF\_F$$

We can notice that it is rather complex and difficult to make sense. Additionally, we create Table 4 that gives the relevant parameters of fit for each of the five terms and the overall solution.

Table 4. Conservative solution and parameters of fit

	inclS	PRI	covS	covU
1 CAUS_F*~EFFECT_F*~PSYD_F*~DYNA_F*~ENT_F	0.918	0.827	0.259	0.057
2 CAUS_F*~EFFECT_F*PSYD_F*DYNA_F*EMJV	0.890	0.710	0.233	0.029
3 CAUS_F*EFFECT_F*PSYD_F*DYNA_F*ENT_F	0.980	0.958	0.230	0.148
4 CAUS_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F	0.891	0.807	0.207	0.000
5 ~EFFECT_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F	0.999	0.999	0.263	0.057
M1	0.896	0.810	0.702	

Because of this complexity, we move to the creation of the most parsimonious solution that takes into consideration all the logical remainders of the truth table.

Parsimonious solution

We can notice that the parsimonious solution is much simpler than the conservative solution and has three terms with one condition in each (table 5). The first parameter of fit, consistency sufficiency (inclS) is a numerical expression of the extent to which the set-theoretic statement of sufficiency is consistent with the empirical evidence at hand. The closer this parameter is to one, the more consistent it is with the data.

Table 5. Parsimonious solution and parameters of fit

		inclS	PRI	covS	covU
1	EFFECT_F	0.921	0.806	0.467	0.120
2	EMJV	0.604	0.434	0.367	0.037
3	~ENT_F	0.653	0.537	0.596	0.218
	M1	0.693	0.571	0.863	

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Intermediate solution

The third strategy as explained before is the intermediate solution. To obtain this solution we use directional expectations for the conditions based on extant theory. In our case, we used the notion that prescribed that in stable environments the recipe for high performance is to use more causal decision – making. Within our model this notion translates into the directional expectation to have Low Market Dynamism and Causation as a decision-making strategy. When we apply this directional expectation for the two conditions, the logical remainders that fulfill them will become part of the minimization process ('easy counterfactuals'), while the other logical remainders will be filtered out ('difficult counterfactuals').

The intermediate solution in Boolean notation is given below:

CAUS_F*~EFFECT_F*PSYD_F*EMJV +

CAUS_F*~EFFECT_F*~DYNA_F*~ENT_F +

CAUS_F*EFFECT_F*PSYD_F*ENT_F +

CAUS_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F +

~EFFECT_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F -> PERF_F

Table 6. Intermediate solution and parameters of fit

	inclS	PRI	covS	covU
1 CAUS_F*~EFFECT_F*PSYD_F*EMJV	0.845	0.621	0.234	0.011
2 CAUS_F*~EFFECT_F*~DYNA_F*~ENT_F	0.946	0.884	0.408	0.060
3 CAUS_F*EFFECT_F*PSYD_F*ENT_F	0.980	0.958	0.230	0.148
4 CAUS_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F	0.891	0.807	0.207	0.000
5 ~EFFECT_F*PSYD_F*~DYNA_F*~EMJV*~ENT_F	0.999	0.999	0.263	0.057
M1	0.880	0.786	0.706	

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The Sufficiency plot of the intermediate solution is given below in Figure 4.

We can notice that China, Germany, and Hong Kong are deviant cases consistency in kind, while Poland is deviant case consistency in degree. These cases need further exploration.

Figure 4 Sufficiency plot of the intermediate solution
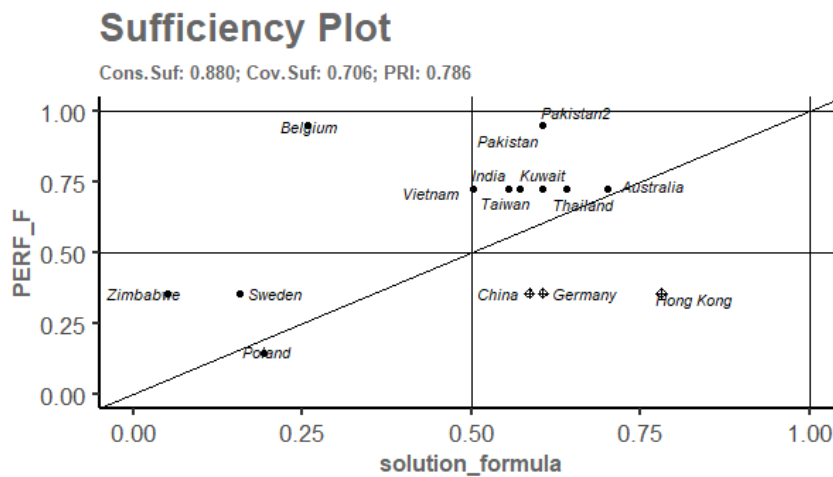
It is important to understand that neither one of the three solutions is superior to the others, and none of them is in violation of the empirical evidence we possess. (Schneider and Wagemann, 2012) In the management literature, it is common practice to analyze the combination of the parsimonious and intermediate solutions (Fiss, 2011). In this combined analysis we differentiate between 'core conditions', those that are part of both parsimonious and intermediate solutions, and 'peripheral conditions', those that only appear in the intermediate solution.

In Table 7, black circles indicate the presence of a condition ("●"), circles with a cross-out ("⊗") indicate its absence. Large circles indicate core conditions and small ones refer to peripheral conditions. Blank spaces indicate a 'don't care' situation in which a causal condition may be either present or absent (Ragin and Fiss, 2008).

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Table 7. Configurations for High Performance

	Solution incl=0.8 dir_exp=(1, , ,0 , ,)				
	1	**2**	**3a**	**3b**	**3c**
Decision making strategy					
Causation	●	●	●	●	
Effectuation	⬤	⊗	⊗		⊗
Environment					
Psychic Distance	●	●		●	●
Market Dynamism			⊗	⊗	⊗
Individual characteristic					
Entrepreneurial Experience	●		⊗	⊗	⊗
Joint Venture		⬤		⊗	⊗
Consistency	0.980	0.845	0.946	0.891	0.999
Raw Coverage	0.230	0.234	0.408	0.207	0.263
Unique Coverage	0.148	0.011	0.060	0.000	0.057
Overall Solution Consistency	**0.880**				
Overall Solution Coverage	**0.706**				

6. ANALYSIS OF CONTINGENCIES AND STRATEGIC PATHWAYS

Ahsan and Musteen (2011) provide an engaging overview of the extant research on uncertainty and market entry. Their meta-analysis of the literature emphasizes the role of organizational learning and flexibility, previous experience, and local contingencies (i.e., market attractiveness) as factors which explain market entry decisions in the context of uncertainty. This logic is closely aligned with our fsQCA results. From our analysis, we can identify three environmental contingencies and four related paths that explain the high performance of Smollan subsidiaries.

Our first contingency is high uncertainty which is described as a combination of high psychic distance and high market dynamics. We can find two strategic paths that Smollan adopts when faced with high uncertainty. First, Path 1 is called Flexible Market Entry which is a combination of centralized strategy formulation and localized strategy execution. In this strategy, Smollan uses effectuation and entrepreneurial experience to offset the environmental uncertainties regardless of entry mode chosen. The country subsidiaries that pursued this path were Mozambique, Thailand. Strategy formulation occurs centrally at HQ using causal approaches to decision-making while strategy execution takes place at the local subsidiary level making use of entrepreneurial experience and related effectuation practices. Again, the extant literature provides substantial support for this type of strategy approach. These practices have strong resonance with (Mintzberg and Waters 1985) - that not all strategy activities are consciously planned, and that a subset of strategy relevant activities is created and executed intuitively by entrepreneurs rather than as the result of causal strategy planning (Pattinson 2016). Harms and Schiele (2012) explore the balance of causation and effectuation in international new ventures. They find

that experienced entrepreneurs apply effectuation rather than causation approaches to international new venture creation. More recently and as a corollary to market entry choice, Vanderstraeten et al. (2020) have examined how a combination of causal and effectual approaches impacts innovation. Examining a sample of innovation intensive firms in Belgium, they provide empirical evidence that combining causal and effectual decision-making logics is beneficial for innovative performance.

Second, Path 2 is the Partnering strategy where Smollan uses joint ventures as an entry mode to offset uncertainties from high market dynamism when effectuation is low. The joint ventures themselves provide similar effects to performance as the effectuation dimension of alliances. Again, this behavior has been found extensively in the extant literature (Brouthers 2002, Hennart 2009, Kraus et al. 2015). Earlier research has shown for example that as investment risk increases, firms develop joint ventures to acquire knowledge from local firms (Beamish and Banks 1987). Joint ventures also allow firms to lower long-term costs through similar mechanisms (Delios and Beamish, 1999). Smollan subsidiaries where Path 2 was chosen were for Hong Kong and Taiwan.

Our second contingency is medium uncertainty which is characterized by a combination of high psychic distance and low market dynamism. The strategy employed is the High-equity Market Entry. Smollan subsidiaries where Path 3b and Path 3c were chosen were for Australia, Germany, and India. Smollan chooses a high causation and low effectuation route to market entry. In all three countries, Smollan reported to us that they had chosen a high equity mode approach of either a brownfield acquisition or greenfield new subsidiary in these markets. By using high equity entry mode Smollan has higher control of the subsidiary that should alleviate the effects of the high psychic distance. The motivations

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for pursuing high commitment forms of market entry in psychically distant markets typically runs contrary to traditional views of the liability of foreignness (Johanson and Vahlne 2009) which would suggest that the commitment of assets in psychically distant markets poses a substantial risk and thus firms would pursue less committed market entry approaches. However, a stream of the outward FDI literature that focuses on demand considerations in the host market would argue that in fact, when firms perceive consumer potential for their product, service, or experience in the host market, they will seek to exploit that opportunity through equity-based modes of entry (Bailey and Li 2015). The transfer of assets to a foreign market through equity modes would be undertaken for one of two reasons (or both). First it would be to bring firm-specific advantages (e.g., superior management process and practices) to the host market to out-compete local rivals (Dunning 1980, Hennart 1982) or second to learn how to replicate and copy best practices in the host market (Zaheer 1995). Further local demand motives for FDI include the following. First, accessing higher levels of consumer sophistication and market segmentation challenges the firm to improve and enhance their competitiveness (Porter 1985 and 1990). Second, entering host markets with strong local demand may enhance competitiveness by allowing a firm to tap into regional (psychically similar) clusters that are also growing (Enright 2000, Porter 1990).

The third contingency is low uncertainty characterized by low psychic distance and low market dynamism. This produces Path 3a in table 7 which is a combination of causal decision-making and any market entry mode. Smollan country subsidiaries that use this approach are Pakistan, China, Kuwait, Vietnam. Configuration 1 is what we term as Structured Market Entry strategy. This is where in the face if low market dynamism and

low psychic distance, Smollan uses causal, structured approaches to market entry. This finding is in line with extant research (Chikhouni et al. 2017). First, if psychic distance is low, transaction costs are relatively low due to the stable business context leading to more committed and structure forms of market entry (Zhao et al. 2004). Second, a resource-based view of strategy would suggest that low psychic distance reduces the liability of foreignness from a knowledge perspective meaning that risks of structured, committed market entry are lower (Eramilli 1991). Third, the Uppsala model of international expansion would also support the view that similar market environments to the ones faced by firms at home would encourage greater commitment to the market and a more structured approach as the managers are more familiar with the nature of the foreign market (Johanson and Vahlne 1977). Low market dynamism may also favor a high control entry mode.

Configurations for low performance

In our sufficiency analysis for low performance, based on the asymmetry principle we created a new truth table (Appendix B). We again followed good practice of QCA that prescribes the minimum values for the parameters of fit. We chose the same values as in the configurations for high performance, that is, the raw consistency threshold value to be $\geqslant 0.8$ and PRI to be $\geqslant 0.5$. Based on the small number of cases (16), we kept the frequency threshold $n=1$. With these values, we only have 2 configurations with one case (Poland and Sweden) that would satisfy the parameters of fit (raw consistency $\geqslant 0.8$ and PRI $\geqslant 0.5$). Hong Kong (Row 47), even though has the raw consistency value $\geqslant 0.8$, its PRI value is < 0.5, thus indicating significant inconsistency. This configuration is a typical case of a simultaneous subset relation (SSR) where the same configuration is part of both the outcome and its absence. Thus, we must discard that configuration.

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Table 8. Configurations for low performance

	inclS	PRI	covS	covU	cases
1 CAUS_F*~EFFECT_F*DYNA_F*~PSYD_F*~EMJV*ENT_F	0.853	0.634	0.223	0.109	Sweden
2 ~CAUS_F*~EFFECT_F*~DYNA_F*~PSYD_F*~EMJV*ENT_F	0.901	0.813	0.141	0.027	Poland
M1	0.867	0.710	0.250		

Table 9. Ranking of test solutions

Model	RCC_Rank	SC
2 EFFECT_F*DYNA_F+EMJV*ENT_F+~EFFECT_F*~DYNA_F*~ENT_F	3	0.672
3 EFFECT_F+~EMJV*~ENT_F+EMJV*ENT_F+~PSYD_F*DYNA_F*EMJV	3	0.754
1 PSYD_F+~ENT_F	2	0.857

Based on all this, we cannot continue with sufficiency analysis for the negative outcome since the results would be skewed. "In other words, there are many ways to be nonperforming here, but no consistent pattern." (Fiss, 2011: p.410). However, we proceed with more in-depth analysis of the cases of Poland and Sweden. Based on the evidence from the QCA analysis, the configuration of Sweden was high in causation and low in effectuation in a dynamic market, where they chose to pursue an acquisition as an entry mode. Even though in Poland both decision-making logics fell under the threshold for membership of the high-level sets, it is noteworthy to point that the causation was higher (0.43) than effectuation (0.26) in degree. For Sweden the difference was in kind since the value for causation was 0.85 while for causation was 0.16. Both managers had significant entrepreneurial experience (eighteen years in the case of Poland and ten in the case of Sweden). Thus, as a tentative explanation for the low performance in Sweden we can propose the use of mainly causal logic with an experienced entrepreneurial manager of the acquired firm in a dynamic market. In the case of Poland, the slightly higher causation but still lower than the threshold, in a less dynamic market. What is common for the two cases can be summarized in the following Boolean notation:

$$\sim EFFECT\_F * \sim PSYD\_F * \sim EMJV * ENT\_F <- \sim PERF$$

Thus, even though based on only two cases, the tentative conclusion could be that configurations with low effectuation by entrepreneurial managers of acquired firms in low psychically distant countries would potentially lead to low performance.

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Robustness checks

In every QCA study researchers make decisions concerning calibrating set membership, thresholds in data analysis, etc. Therefore, we must report all of these decisions and their rationales in a transparent way. Additionally, we must elaborate on how these decisions shape our results. However, we must keep in mind that we are testing the robustness within the set – theoretic postulates and not try to mimic robustness tests in regression analyses (Schneider and Wagemann, 2012). In our paper we follow the notion that "QCA findings can be considered robust if slightly different decisions lead to similar enough findings in terms of necessity and sufficiency so that the paths identified and the consistency and coverage measures of fit do not warrant substantively different interpretations ." (Greckhamer et al., 2018)

Our robustness test was performed following the seven-step protocol as outlined in Oana & Schneider (2021). The steps are the following:

1. Produce the initial solution (IS)
   a. In our case we used the parsimonious solution from above. Our IS solution used a raw consistency threshold of 0.8 and a frequency cutoff of 1
2. Determine the sensitivity ranges
   a. The goal is to find the upper and lower bounds within which the solution stays the same, while keeping constant all other parameters that produced the IS. We tested the sensitivity of the calibration thresholds for Causation and Market dynamism, and the raw consistency threshold. The results are summarized in Table XXX

3. Produce alternative solutions for the various analytic changes

We produced three alternative solutions as follows. In alternative test solution 1 (TS 1) we lower the consistency threshold from 0.8 to 0.75; in test solution 2 (TS2) we alter the calibration thresholds of Causation to 3.41 (0-anchor), 4.72 (0.5-anchor), and 5.39(1-anchor); in test solution 3 (TS 3) we alter the calibration thresholds of Market dynamism to 2.9 (0-anchor), 4 (0.5-anchor), and 4.55 (1-anchor). We built the three test solutions to be as challenging as conceptually plausible by varying parameters outside the sensitivity range, i.e., in the "hard test range". For example, our consistency threshold is below the sensitivity range (0.78 – 0.82) but still within the general guidelines not to be below 0.75.

4. Obtain the TS and the Robust Core (RC). We intersect all alternative solutions in TS to obtain minTS and create the union of all alternative solutions in TS to obtain maxTS. We obtain the RC by intersecting the IS with the three test solutions

5. Calculate the fit-oriented parameters (RF)

   a. In order to evaluate the overlap between IS, RC, and minTS=maxTS we calculate the following parameters of fit: RFcov, RFcons, RFSCminTS, and RFSCmaxTS. They numerically express robustness "understood as the size of the overlap between IS, RC, minTS, and maxTS" (Oana & Schneider, 2021). The values of 1 would indicate perfect robustness or full overlap between IS and RC. Our parameters of fit are lower than 1, but close to it. Thus, from a parameter of fit perspective, our solution is quite robust to the changes we tested.

6. Calculate the case-oriented robustness parameters (RCR)

a. Next robustness is tested on the case level. We calculate the parameters RCR_typ, RCR_dev, SSR that represent the ratio of cases that are robust. We also calculate the RCC_Rank that ranks the robustness scenarios into ranks from 1 to 4 (best to worst). In our case the 88.9 percent of the cases are robust.

7. Interpret the robustness results

The information revealed by this 7-step protocol shows that our IS is relatively sensitive to changes in calibration thresholds and to raw consistency threshold. Despite that, we conclude that our Initial Solution is relatively robust in terms of fit because the values of RFcov and RFcons are close to 1, and the overlap between IS and the alternative solutions is high (RFSCminTS and RFSCmaxTS). Our protocol also allows to see which alternative solution is most problematic, which in our case is TS2 where we 'hard tested' the thresholds of the causation condition (see table 9 for details). This solution has the RCC_Rank of 3 and the Set Coincidence of 0.672. All the relevant information from all seven steps of the robustness test protocol are summarized in table 10. Based on the above tests, we can conclude that our results are quite robust.

Table 10. Robustness Protocol Report

Sensitivity ranges				
	Condition	**0**	**0.5**	**1**
Calibration Anchors	Causation	1	4.11	5.4
		3.4	4.71	7
	Dynamism	1	4.51	4.6
		2.8	4.71	6.4
Parameters	Raw consistency	0.78	0.8	0.82
	Frequency	1	1	1
Robustness parameters				
	RFCons	RFcov	RFsc_mints	RFsc_maxts
Fit oriented	0.742	0.771	0.743	0.867
	RCR_typ	RCR_dev	SSR	
Case oriented	0.889	0	1	
Worst performing model				
EFFECT_F*DYNA_F+EMJV*ENT_F+~EFFECT_F*~DYNA_F*~ENT_F				

INSERT TABLE 10. Robustness Protocol Report

7. DISCUSSION

We now turn to a discussion of our findings. We look at implications for theoretical development in both IB and entrepreneurship and offer managerial implications derived from our empirical findings.

Implications for IB theory

IB theory research predominantly assumes that firms select 'optimal' entry modes (Verbeke et al., 2019). Our results indicate that sometimes firm performance is not determined solely by the choice of entry mode as long as other conditions in the configuration are present or absent. Rather, we find that no single variable is by itself a sufficient antecedent of high performance in new foreign market entry. We conclude that predictions of internationalization performance based on the presence of a single antecedent can be strengthened by the adoption of a configurational approach whereby a set of conditions must be in place to consider the contingencies on each level, individual, firm and environmental. Because of the multiple pathways to high performance revealed by our configurational approach, we have shed light on conflicting strategy-environment-performance relationships and empirical evidence that have been reported in past studies.

Additionally, the results point to a potential source of competitive advantage for emerging market multinationals relative to developed country multinational firms in the context of uncertain markets. This notion stems from the inherent uncertainty of the emerging markets that makes the EMNEs more flexible when entering new markets with similar levels of uncertainty. This needs to be verified in further research by following the

internationalization efforts of a MNE from a developed country in context of market uncertainties.

Implications for Entrepreneurship theory

Drawing on the extant literature, some previous studies have considered effectuation and causation to be incompatible (e.g., Corner and Ho 2010; Chandler et al. 2011; Brettel et al. 2012) while others have argued that effectual and causal logics can coexist at the firm level (e.g., Fisher 2012; Reymen et al. 2015). Co-existence of causation and effectuation can take the following three forms: a combination of the two logics at the same time (Brettel et al. 2012), the dominance of logics at different moments in time (Nummela et al. 2014; Reymen et al. 2015; Smolka et al. 2018), and their temporal coexistence in separate functional areas (Sarasvathy 2001). Notwithstanding theoretical arguments for their coexistence, there is still a lack of clear empirical evidence about both the relationship between effectuation and causation as well as its performance implications (An et al., 2019). Our paper provides initial empirical evidence that effectuation in combination with causation in high uncertainty situations leads to higher performance. In our flexible market entry strategy, effectuation logics in strategy execution follow causal logics strategy formulation. Our findings also propose how levels of environmental uncertainty combined with market entry modes affect the outcome of the decision-making processes. One interesting aspect of this finding is that in one configuration, choosing JV as an entry mode leads to the same high-performance outcome as in using effectuation combined with entrepreneurial experience in the same context. Lastly, we explored the boundary conditions of effectuation and extended the focus of effectuation to MNEs in the context of internationalization from a previous focus on new entrepreneurial ventures.

Managerial implications

Notwithstanding the scholarly nature of this study, we have uncovered some managerial implications for practitioners. First, companies should carefully select executives with the market you are entering in the sense that more established markets call for more causal managers while more uncertain, dynamic markets may need more entrepreneurial or intrapreneurial managers. Second, a broader talent management strategy, screening for entrepreneurial experience in recruitment can offer a way to offset market uncertainties such as psychic distance without the need for depending on local partners (path 1). Third, executives should develop appropriate decision-making logics based on market uncertainty. Concurrent or sequential use of effectuation and causation remain an important feature of adapting to high uncertainty. This could be an individual skill developed during prior entrepreneurial experience or could be the focus of an internal development program for managers in uncertain markets.

Limitations and further research

Our study only considers internationalization efforts of a single EMNE in multiple markets. Although focusing on one firm in one industry has the benefit of reducing unobserved heterogeneity, it raises the question of how generalizable our findings are. While we have argued above that the advantages of this choice outweigh its limitations, we take note of this as follows. Our results may stem from industry specific factors. Future research should extend our insights towards MNEs in different industries by follow-up surveys with a broader range of companies. This approach might strengthen the generalizability of our findings. Further single industry studies may corroborate our findings from retail services

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that we analyzed. Another aspect that could potentially be tested is the inclusion of each of the five effectuation dimensions as separate conditions in the configuration. Additionally, future research could look into team level conditions such as team conflict or team collaboration. Another step in testing the proposed connections could be through deductively tested hypotheses. Future research could also include a test for predictive validity of the results.

APPENDIX A: Truth table for the positive outcome (High Performance)

	CAUS_F	EFFECT_F	PSYD_F	DYNA_F	EMJV	ENT_F	OUT	n	incl	PRI	Cases
33	1	0	0	0	0	0	1	1	1	1	Pakistan
48	1	0	1	1	1	1	1	1	1	1	Taiwan
64	1	1	1	1	1	1	1	1	1	1	Thailand
41	1	0	1	0	0	0	1	2	0.999	0.998	Australia, India
9	0	0	1	0	0	0	1	1	0.999	0.998	Pakistan2
62	1	1	1	1	0	1	1	1	0.962	0.916	Mozambique
35	1	0	0	0	1	0	1	3	0.878	0.711	China, Kuwait, Vietnam
57	1	1	1	0	0	0	1	1	0.852	0.643	Germany
47	1	0	1	1	1	0	1	1	0.830	0.535	Hong Kong
46	1	0	1	1	0	1	0	2	0.774	0.589	Belgium, Zimbabwe
38	1	0	0	1	0	1	0	1	0.737	0.366	Sweden
2	0	0	0	0	0	1	0	1	0.548	0.187	Poland
1	0	0	0	0	0	0	?	0			
3	0	0	0	0	1	0	?	0			
4	0	0	0	0	1	1	?	0			
5	0	0	0	1	0	0	?	0			
6	0	0	0	1	0	1	?	0			
7	0	0	0	1	1	0	?	0			
8	0	0	0	1	1	1	?	0			
10	0	0	1	0	0	1	?	0			
11	0	0	1	0	1	0	?	0			
12	0	0	1	0	1	1	?	0			

13	0	0	1	1	0	0	?	0
14	0	0	1	1	0	1	?	0
15	0	0	1	1	1	0	?	0
16	0	0	1	1	1	1	?	0
17	0	1	0	0	0	0	?	0
18	0	1	0	0	0	1	?	0
19	0	1	0	0	1	0	?	0
20	0	1	0	0	1	1	?	0
21	0	1	0	1	0	0	?	0
22	0	1	0	1	0	1	?	0
23	0	1	0	1	1	0	?	0
24	0	1	0	1	1	1	?	0
25	0	1	1	0	0	0	?	0
26	0	1	1	0	0	1	?	0
27	0	1	1	0	1	0	?	0
28	0	1	1	0	1	1	?	0
29	0	1	1	1	0	0	?	0
30	0	1	1	1	0	1	?	0
31	0	1	1	1	1	0	?	0
32	0	1	1	1	1	1	?	0
34	1	0	0	0	0	1	?	0
36	1	0	0	0	1	1	?	0
37	1	0	0	1	0	0	?	0
39	1	0	0	1	1	0	?	0
40	1	0	0	1	1	1	?	0
42	1	0	1	0	0	1	?	0
43	1	0	1	0	1	0	?	0

44	1	0	1	0	1	1	?	0
45	1	0	1	1	0	0	?	0
49	1	1	0	0	0	0	?	0
50	1	1	0	0	0	1	?	0
51	1	1	0	0	1	0	?	0
52	1	1	0	0	1	1	?	0
53	1	1	0	1	0	0	?	0
54	1	1	0	1	0	1	?	0
55	1	1	0	1	1	0	?	0
56	1	1	0	1	1	1	?	0
58	1	1	1	0	0	1	?	0
59	1	1	1	0	1	0	?	0
60	1	1	1	0	1	1	?	0
61	1	1	1	1	0	0	?	0
63	1	1	1	1	1	0	?	0

	CAUS_F	EFFECT_F	PSYD_F	DYNA_F	EMJV	ENT_F	OUT	n	incl	PRI	cases
2	0	0	0	0	0	1	1	1	0.896	0.813	Poland
38	1	0	0	1	0	1	1	1	0.848	0.634	Sweden
47	1	0	1	1	1	0	0	1	0.804	0.465	Hong Kong
57	1	1	1	0	0	0	0	1	0.734	0.357	Germany
35	1	0	0	0	1	0	0	3	0.699	0.289	China, Kuwait, Vietnam
46	1	0	1	1	0	1	0	2	0.623	0.314	Belgium, Zimbabwe
48	1	0	1	1	1	1	0	1	0.597	0	Taiwan
62	1	1	1	1	0	1	0	1	0.588	0.084	Mozambique
64	1	1	1	1	1	1	0	1	0.502	0	Thailand
41	1	0	1	0	0	0	0	2	0.492	0.002	Australia, India
9	0	0	1	0	0	0	0	1	0.489	0.002	Pakistan2
33	1	0	0	0	0	0	0	1	0.423	0	Pakistan
1	0	0	0	0	0	0	?	0			
3	0	0	0	0	1	0	?	0			
4	0	0	0	0	1	1	?	0			
5	0	0	0	1	0	0	?	0			
6	0	0	0	1	0	1	?	0			
7	0	0	0	1	1	0	?	0			
8	0	0	0	1	1	1	?	0			
10	0	0	0	1	0	1	?	0			
11	0	0	0	1	0	0	?	0			
12	0	0	0	1	1	1	?	0			
13	0	0	1	1	0	0	?	0			
14	0	0	1	1	0	1	?	0			

15	0	0	1	1	1	0	?	0
16	0	0	1	1	1	1	?	0
17	0	1	0	0	0	0	?	0
18	0	1	0	0	0	1	?	0
19	0	1	0	0	1	0	?	0
20	0	1	0	0	1	1	?	0
21	0	1	0	1	0	0	?	0
22	0	1	0	1	0	1	?	0
23	0	1	0	1	1	0	?	0
24	0	1	0	1	1	1	?	0
25	0	1	1	0	0	0	?	0
26	0	1	1	0	0	1	?	0
27	0	1	1	0	1	0	?	0
28	0	1	1	0	1	1	?	0
29	0	1	1	1	0	0	?	0
30	0	1	1	1	0	1	?	0
31	0	1	1	1	1	0	?	0
32	0	1	1	1	1	1	?	0
34	1	0	0	0	0	1	?	0
36	1	0	0	0	1	1	?	0
37	1	0	0	1	0	0	?	0
39	1	0	0	1	1	0	?	0
40	1	0	0	1	1	1	?	0
42	1	0	1	0	0	1	?	0
43	1	0	1	0	1	0	?	0
44	1	0	1	0	1	1	?	0
45	1	0	1	1	0	0	?	0

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49	1	1	0	0	0	0	?	0
50	1	1	0	0	0	1	?	0
51	1	1	0	0	1	0	?	0
52	1	1	0	0	1	1	?	0
53	1	1	0	1	0	0	?	0
54	1	1	0	1	0	1	?	0
55	1	1	0	1	1	0	?	0
56	1	1	0	1	1	1	?	0
58	1	1	1	0	0	1	?	0
59	1	1	1	0	1	0	?	0
60	1	1	1	0	1	1	?	0
61	1	1	1	1	0	0	?	0
63	1	1	1	1	1	0	?	0

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