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► **To cite this version:**

Margot Racat, Antonin Ricard, René Mauer. Effectuation and causation models: an integrative theoretical framework. *Small Business Economics*, 2023, 10.1007/s11187-023-00787-x . hal-04131644

HAL Id: hal-04131644

<https://hal.science/hal-04131644v1>

Submitted on 16 Jun 2023

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Effectuation And Causation Models: An Integrative Theoretical Framework

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Abstract

The realm of entrepreneurship has seen a rise in research on effectuation from the perspective of cognition, which has sparked significant discussion among academics due to a lack of well-defined theoretical foundations. However, despite this interest in cognitive theories, the grounded cognition theory has not been adequately explored to explain the behavior of entrepreneurs. Accordingly, we propose an integrative theoretical framework for the effectuation and causation models in light of an offloading process. This process helps to explain the relationship between the entrepreneur's cognitive antecedents and their behavioral outcomes. Consequently, our study provides theoretical underpinnings for effectuation and a better understanding of how effectuation and causation models are alternatingly engaged during the entrepreneur's decision-making process.

Plain English Summary

The entrepreneur's behavior explained by the grounded cognition theory: how and why effectuation and causation are complementary models of decision-making? This research draws on grounded cognition theory and aims to deepen our understanding of the entrepreneurial decision-making process through the notion of 'offloading'. It also discusses its behavioral consequences according to effectuation and causation models. This research theoretically explains the basis for effectuation and suggests an integrative framework for the entrepreneurial decision-making process, which is critically needed in the current body of research. By understanding the complementary nature of the two models, entrepreneurs can gain a better understanding of their own decision-making process and improve their overall practices. This research therefore strengthens entrepreneurs' awareness of the point at which they switch from one process to another, thereby legitimizing their decision-making process, by improving representation of the entrepreneurial decision-making process. This research therefore helps us understand the business practices of entrepreneurs.

Keywords

Effectuation, Causation, Grounded Cognition Theory, Offloading, Entrepreneur, Legitimacy.

JEL Classifications L26 Entrepreneurship, D81 Criteria for Decision-Making under Risk and Uncertainty, D91 Role and Effects of Psychological, Emotional, Social, and Cognitive Factors on Decision-Making

1 Introduction

The CEO of Uptake Technologies, Brad Keywell, was awarded the title of “EY World Entrepreneur of the Year”¹ in 2019 for creating six companies with a total value of more than six billion US dollars. He declared that “*undertaking is not just breaking models, but also building new ones and finding more intuitive and direct ways to achieve one’s ends.*” Literature about entrepreneurship has demonstrated over the past two decades that entrepreneurs do not always base their decisions on clear and stable objectives, but rather tend to make piecemeal decisions, and build up the strategy for their business ventures from available means and resources (Baker and Nelson, 2005; Fisher, 2012; Furlotti et al., 2020; Welter et al., 2016). In line with these perspectives, the stream of research on effectuation, first introduced by Sarasvathy (2001a, 2017), attempts to better understand how entrepreneurs undertake business venture creations through a non-predictive approach (Dew et al., 2008; Hauser et al., 2020). Subsequently, there has been a growing interest in effectuation among both academic and business circles, as it recognizes that entrepreneurs operate in a context of uncertainty, wherein decision-makers refrain from making predictions or engaging in planning (Frese et al., 2020; Martina, 2019).

The traditional view on entrepreneur’s decisions used to consider a causal decision-making process that is useful when information is available and reliable, and when the outcomes of the situation can be predicted. Effectuation can be seen as “a tool for problem-solving when the future is unpredictable, our goals are unspecified or simply unknown, and when the environment is not independent of our decisions”, Sarasvathy (2004a, p. 525). Despite the abundance of research on effectuation (Alsos et al., 2020; Dias et al., 2019), there is still no consensus among researchers regarding the definitions of the concept and model. To address this issue, Grégoire and Cherchem (2020) reviewed the literature on the various definitions of effectuation and concluded that it should be named as a “model-of-action” due to its lack of theoretical foundations and as it has not yet endured the empirical validation to name it model. In contrast, they refer to causation as a model to reflect the fact that numerous works have tested and validated causation model. Further research is needed to fully

¹ https://www.ey.com/en_gl/weoy/ey-world-entrepreneur-of-the-year-2019-brad-keywell-us

understand the underlying principles and outcomes of effectuation. Moreover, the authors indicate that “among the most salient alternatives [to the original term ‘*process*’], effectuation is sometimes presented as an approach, a model of decision-making, a series of heuristics, a set of principles, a form of reasoning, or a theoretical framework” (p.627). Hence, while we also advocate the term ‘*effectuation model-of-action*’ in line with researchers who strongly encourage developing the theoretical roots of effectuation (Arend et al., 2015; Grégoire and Cherchem, 2020), the term *model* is used in this paper as our purpose is to provide such theoretical understanding, and in keeping consistency with the causation model.

The effectuation model differs from the conventional predictive model by explaining how entrepreneurs make decisions in an uncertain environment. Some researchers have taken a confrontational approach, pitting the effectuation and causation models against each other, when in fact they should be viewed as two alternative decision-making processes that can complement each other: “optimal decisions result from a combination of both logics, where the causal logic ensures that the venture stays focused and predicts what is predictable, while effectual decision-making allows responding flexibly to changing circumstances and maintaining hands-on control over uncertain aspects of the venture” (Reymen et al., 2015, p.355). Yet, although it is widely admitted that entrepreneurs draw on both effectual and causal models, literature is now required to explain what triggers one or the other cognitive process and behavior (Alsos et al., 2020; Galkina et al., 2022; Jiang and Tornikoski, 2019; Reymen et al., 2015; Smolka et al., 2018). Consequently, our research aims to fill this void by utilizing cognitive theories to clarify how the two processes are triggered alternately.

The field of entrepreneurship has partially addressed the underpinnings of entrepreneurial behaviors, building on elements of grounded cognition theory via the situated cognition perspective (Randolph-Seng et al., 2015) to explain entrepreneurs’ cognitive processes (De Winnaar and Scholtz, 2019; Dew, Grichnik, Mayer-Haug, et al., 2015). However, none has yet shown the interrelationships between the psychological theoretical foundations for information processing and the effectuation model, despite its relevance. More specifically, the grounded cognition theory states that cognitive processes are based on the situation and embodied sensations provided either by the environment or the action undertaken (Barsalou, 1999, 2008). Sensations provided by the environment are the initial input for perceptual processing, leading to mental states and treatment (i.e., analysis, memorization, re-enactment, etc.), which translates into action. Prior research from various fields – neurosciences, psychology, philosophy, etc. – have (re)developed cognitive theories

by further integrating the perceptual states of the body, the environment and the outcoming situated action (Borghgi and Pecher, 2012; Fischer, 2012). These theories have met significant success in psychology literature and are now impacting other fields of research (e.g., marketing, management, etc.) enabling the entrepreneurship literature to consider its relevance in contributing to the understanding of entrepreneurial decision-making (Borghgi et al., 2017; Borghgi and Pecher, 2012). Therefore, in this paper we propose to draw on the grounded cognition theory (Barsalou 2008, 2010) to establish the theoretical underpinnings of the effectuation model (Saravathy, 2001b, 2001a, 2004).

The present research offers theoretical and methodological contributions, both of which create the potential to develop practical tools for business venture creation and development. From the theoretical perspective, this research develops an integrative framework to explain the underpinnings of the effectuation model and how it is alternately engaged with the causation model for decision-making leading to behavioral outcomes. By so doing, we dig into the underlying mechanisms of the effectuation model by revealing the phenomenon of *offloading* (Risko and Dunn, 2015). Offloading is the processing that reduces the cognitive load of a given amount of information (for instance about a new business venture). It organizes and arranges the given amount of information to generate a shortcut in processing the information. This process is preceded by a trade-off between elements of tension (constraints and levers) and its triggering leads to the effectuation. In addition, the choice between using effectuation and causation models during the decision-making process depends on the specific situation at hand (Reymen et al., 2015), and this flexibility is facilitated by the offloading process, which is made possible by the human capacity for metacognition (de Winnaar and Scholtz, 2019). As a result, the theoretical model of entrepreneurial decision-making presented here allows us to reevaluate the various principles of effectuation in terms of cognitive and behavioral stages.

From a methodological perspective, the integrative framework of the entrepreneur's decision-making process should enable us to increase the empirical validation of the effectuation model as a tool for new business ventures and start-ups, and its use should extend to established companies (Matalamäki, 2017). Moreover, this theoretical framework should enable the use of more quantitative methods for investigating the entrepreneur's decision-making *in situ* (e.g., experiments), as is already the case for various scientific fields (Arend et al., 2015; Dias et al., 2019; Grégoire and Cherchem, 2020; Perry et al., 2012). As a result, this study also contributes to the current discussions about the integration of experimental

methods into entrepreneurship research, as it may offer a reliable and feasible methodological approach for investigating entrepreneurs' cognition and behavior in situ (Berglund et al., 2020). Finally, from a practical perspective, the present research provides the foundations with which to further develop a structured and viable tool for entrepreneurs to use for business creation ventures using quantitative methodology.

2 Literature review

2.1 Effectuation and causation models

Sarasvathy (2001a) initiated a strand of research aiming to analyze and describe entrepreneurial behavior, drawing on an alternative perspective to the traditional view of entrepreneurial decision-making based on rational reasoning. In her attempt to model a representation of the different steps for entrepreneurial decision-making, Sarasvathy (2001a, 2017) proposes *effectuation theory* which describes how the entrepreneur draws on their surroundings to reach an identified objective instead of creating objectives based on analysis of market information. Overall, her work emphasizes how expert entrepreneurs will less follow a planned and predictive decision-making process, but rather act and base their decisions on available means, knowledge, and networks in their surrounding environment (Kalinic et al., 2014). Sarasvathy (2004, p.525) stated that: “effectuation is a useful theory of designing in a three-dimensional problem space consisting of Knight’s uncertainty (Knight, 1933), March’s goal ambiguity (March, 1982), and Weick’s enactment (Weick, 1979).”

Developing on this view of the entrepreneurial decision-making process, researchers have shifted from viewing effectuation as a theory to viewing it as a model-of-action (Arend et al., 2015; Grégoire and Cherchem, 2020), thus enabling us to distinguish between effectuation and causation model in the initial theory (Sarasvathy, 2001a). Initial view of the effectuation model describes it as being “a set of means as given and focus on selecting between possible effects that can be created with that set of means” (Sarasvathy, 2001b) and can be seen as an adaptive feedback-seeking and feedback incorporating process enabling the entrepreneur to leverage unexpected events for the benefit of the business venture (Chandler et al., 2011). While Sarasvathy (2017) acknowledges that, in situations of uncertainty, entrepreneurs integrate causal decisions; she nevertheless argues that they mainly behave in accordance with their direct environment (Hauser et al., 2020). Therefore, the effectuation model is aligned with the entrepreneurship literature, such that it supports the idea that business opportunities emerge from a combination of resources (human resources,

knowledge, finance, etc.) and from the ability to find and exploit opportunities (Dew et al., 2009).

In her model, Sarasvathy (2001b) identified the following five typical decision-making *principles* observed among effectual entrepreneurs: “bird in hand”, “crazy quilt”, “lemonade”, “affordable loss”, and “pilot in the plane”. Effectual principles were found to further encourage entrepreneurs' creativity and flexibility with regards to unexpected situations and dynamic environments. More specifically, the effectuation model shows that behaviors are a consequence of the entrepreneur's available means (*bird in hand*) combined with cooperation between the entrepreneur and their network of partners (*crazy quilt*). The iterative and cumulative “mean-effects-mean-effects” process enables them to continuously adapt to unforeseen events and to leverage the unexpected (*lemonade*). Furthermore, entrepreneurs assess how much they can afford to lose in testing a business opportunity, as opposed to estimating a return on investment (*affordable loss*): entrepreneurs assume that costs can be more easily controlled than revenues, so they base their decisions on cost control, rather than on an estimated hypothetical revenue. Finally, effectual entrepreneurs' attitudes toward control and prediction guide their overall behaviors (*pilot in the plane*), not only their financial decisions.

In comparison, a causal model takes a contrasting perspective on the five principles of the effectuation model. First of all, the starting point of a causation model is to set a goal, unlike the *bird in hand* principle. Secondly, any rationale and steps that follow are coherent with this goal: market analysis, benchmark (i.e., competition), analysis of the environment, etc. Thirdly, the strategic plan decides on the means and resources that may be mobilized (Miller and Cardinal, 1994), instead of leaving them to emerge by themselves as the situation evolves. Thus, contrary to the *crazy quilt* principle, the causation model primarily relies on positioning, analysis of competitors, building competitive advantage, etc. The purpose of strategy here is to raise barriers (regulatory, capital, image, network size, alliance, etc.) to prevent newcomers from competing in the same market as the entrepreneur's company, and collaboration with firms is seen in terms of attaining a goal and protecting the company from those same competitors. Yet, planning and forecasting can lead entrepreneurs to avoid and disregard unplanned events, as opposed to the *lemonade* principle, and do not encourage a positive attitude toward unexpected events, which in turn tends to bias decisions and limit resilience. Finally, from a financial perspective, and unlike the *affordable loss* principle, the causation model requires decisions to be based on a business plan, market analysis, and

expected return on investment. This places the focus more on the potential gain the business venture is likely to make out of a project, rather than how much it risks losing.

Based on the above description of the effectuation model, and the causation model, Table 1 summarizes the main drivers of the entrepreneur’s behavior according to both effectual and causal models (Sarasvathy, 2008).

Table 1 Comparison of the main differences between causal and effectual rationales

	Causal	Effectual
Attitude toward objective	Guides actions and decisions.	Emerges as venture develops.
Attitude toward return on investments	Estimated, anticipated.	Control over the means. Affordable loss principle.
Attitude toward risks	Perform risk analysis.	Favors flexibility over rigidity to integrate the unexpected.
Action	Based on prediction and anticipation.	Based on control and co-creation.
Behaviors	Time consuming, based on data, ordered. Relies on external market information. Guided by long-term view and strategy.	Fast, flexible, combination. Relies on personal skills and network. Guided by a short-term view and reactivity.

While a lot of early work on effectuation has highlighted a separation between effectuation and causation (e.g., Brettel et al., 2012), more recent work has revealed the simultaneous occurrence and potential combination of effectuation and causation (see for example Alsos et al., 2020; Galkina et al., 2022; Jiang and Tornikoski, 2019; Reymen et al., 2015; Smolka et al., 2018). This is in keeping with Sarasvathy’s original empirical findings wherein even expert entrepreneurs showed both effectuation and causation patterns in their decision-making, with a strong emphasis, nevertheless, on effectuation (Sarasvathy, 2008, p. 32). The debate is twofold: some studies emphasize iterative movement between effectuation and causation over time (Sitoh et al., 2014; Reymen et al., 2015), While other argue that the choice is made depending on the context (Berends et al., 2014; Futterer et al., 2018). While questions remain about how to properly combine effectuation and causation in an entrepreneurial process, the general tendency is to argue that a combination of the two has positive effects for the overall entrepreneurial process (Braun and Sieger, 2021; Smolka et al., 2018).

Reymen et al. (2015) investigated the relationships between causation and effectuation models in more detail and showed the recursive relationship between the two. Causation may shape some decisions which will influence the design of the business venture, its environment, and use of effectuation, with the opposite also holding true. Entrepreneurial decision-making follows a hybrid logic that relies on both models simultaneously, with a preference for one evolving over time. Reymen et al. also note that perceptions of uncertainty, resource position, and stakeholder pressures, combined with entrepreneurial decisions on venture scope, have an influence on both models. In our article, we argue that there are more elements to be considered beyond those identified by Reymen et al. (2015) and therefore we further explore the cognitive processes leading to effectuation and causation. We will draw on grounded cognitive theory in this paper in order to identify the underpinning mechanisms.

2.2 Grounded cognition theory as a theoretical foundation of the effectuation model

Thirty years after its emergence in psychology and its extension to other fields, Barsalou (2010) defined grounded cognition theory (GCT) as being a perspective on cognition in which “the environment, situations, the body, and simulations in the brain’s modal systems [that] ground the central representations in cognition. From this perspective, the cognitive system utilizes the environment and the body as external informational structures that complement internal representations” (p.717). GCT further posits that an individual re-enacts previous experiences through the mental simulation of known sensations (i.e., sight, olfaction, gustative, tactile, audition) to find the best response to the current environment and situation (Barsalou, 1999). More specifically, perception is the correlation between mental activity and the processing of raw sensations acquired by external and internal receptors of the body (i.e., mechanical, proprioceptive, and cutaneous) (Barsalou, 2008b; Paterson, 2006). Perception, in this regard, is the processing of information which consists of selecting, organizing, and interpreting raw sensations provided by one or several receptors in terms of frequency and relevance to draw on a global message to the brain (Pecher and Zwaan, 2005). Organs and receptors send information through electrical signals to the brain, which translates these signals into action (i.e., behavioral answers) (Grundwald, 2008). In short, according to GCT, cognition is grounded in embodied experiences for which the environment acts as an activator, stimulating the individual’s information processing (i.e., situated cognition) via body receptors and internal sensors stimulated by the action undertaken (i.e., embodied cognition) (Clark, 1999; Barsalou, 2003, 2005, 2008a, 2010).

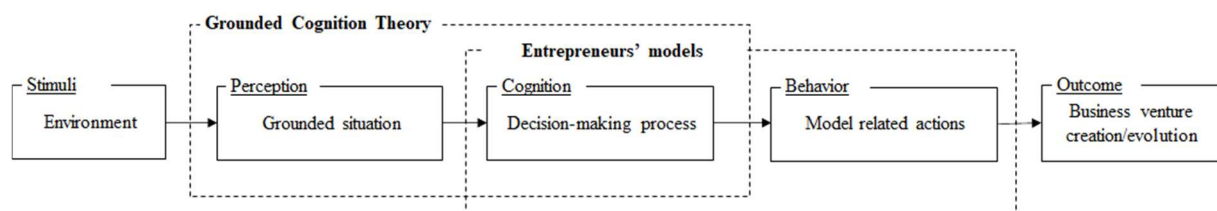
Following these rationales, GCT (Barsalou, 2008, 2010; Borghi and Pecher, 2012) represents a promising theory for explaining the underlying process activated by the entrepreneur in their immediate environment to make decisions. Indeed, the entrepreneur is permanently confronted with perceived opportunities which are affected by both individual internal states of the body and external stimuli from the environment. This is also aligned with previous research frameworks which emphasize how “grounded cognition [...] has significant implications for the conceptualization of entrepreneurial behavior both by researchers and entrepreneurs themselves” (Dew et al., 2005, p.145). In other words, GCT enables us to explain the embodiment of the entrepreneur’s decision-making and how this cognitive processing relates to situations.

Previous approaches attempting to adapt GCT to the context of entrepreneurship have been of two kinds: the first argues that entrepreneurial cognition is situated (i.e., Situated Entrepreneur Cognition - SEC) (Dew et al., 2015), while the second purports that entrepreneurial cognition is socially situated (i.e., Socially Situated Cognition - SSC) (Semin and Smith, 2004). The SEC involves perception and action referring to situated action theories, which consider the environment and people as being fundamental for knowledge formation, but not essential for cognitive processing (Barsalou, 2010; Meier et al., 2012; Wilson, 2002). Dew, Grichnik, Mayer-Haug, et al. (2015) conducted a literature review on entrepreneur cognition which “offers an important point of departure for novel research on entrepreneurial cognition, because it puts the whole person into the analysis, richly connected with other agents, incorporating their entire corpus and interacting with a material world full of ordinary objects that have surprising cognitive lives” (p.159). In general, the authors demonstrate that the situated entrepreneurial cognition (SEC) framework encompasses three distinct concepts: embedded cognition, grounded cognition, and distributed cognition. However, the SEC research framework states that *grounded cognition* is part of entrepreneurial cognition while, as indicated above, GCT states that the *situation* is part of information processing and mental representation, and thus the *situation* is a function of *grounded cognition* (Barsalou, 2010, p.717): “the environment, the situations, the body, and simulations in the brain’s modal systems ground the central representations in cognition. From this perspective, the cognitive system utilizes the environment and the body as external informational structures that complement internal representations. In turn, internal representations are situated character, implemented via simulations in the brain’s modal systems, making them well suited for interfacing with external structures.”

Secondly, the SSC (Semin and Smith, 2004) deepens our understanding of entrepreneurial cognition based on four core assumptions: “(1) cognition is for the adaptive regulation of action, and mental representations are action-oriented; (2) cognition is embodied, drawing on our sensorimotor abilities and environments as well as our brains; (3) cognition and action are the emergent outcomes of dynamic processes of interaction between an agent and an environment; (4) cognition is distributed across brains and the environment (e.g., through the use of tools) and across social agents (e.g., when information is discussed and assessed in groups)” (p.53). Thus, the SSC explains the social dimension of entrepreneurial decision-making processes, but it does not explain the underpinnings of the information processing mechanisms while acknowledging the situated and embodied grounds of cognition.

Consequently, both SEC and SSC relate to elements of GCT to explain entrepreneurial cognition, but no model or theory draws on its implications for decision-making and behavioral outcomes and, consequently, its role as a foundation of the effectuation. Hence, we posit that GCT enables us to provide underpinnings of the effectuation model to further explain and predict entrepreneurial decision-making according to its cognitive and behavioral stages. The perceptual processing of stimuli information engenders a cognitive processing, which in turns generates potential actions. As a result, the entrepreneur may be successful or not in the business venture creation or evolution. Therefore, by breaking down the decision-making process into its perceptual, cognitive, and behavioral stages, we can better understand how entrepreneurs behave based on both effectuation and causation models. In line with this, we set out our conceptual research model of the entrepreneur’s behavior in Figure 1 below.

Fig. 1 Conceptual research model



3 Toward a complementary perspective on effectuation and causation models for decision-making

Previous literature states that the effectuation and causation models relate more to a preference in use depending on the situation during the decision-making process (Reymen et al., 2015). In support of this perspective, the metacognition model enables us to understand how a combination of the two is processed (de Winnaar and Scholtz, 2019). Metacognition is the “knowledge structures that people use to make assessments, judgements, or decisions involving opportunity evaluation, business venture creation, and growth” (Randolph-Seng et al., 2014). Thus, drawing from GCT, detailed in the previous section, and the metacognition model, this paper develops the integrative entrepreneurial decision-making framework (figure 2) by introducing the concept of *offloading* (Risko and Dunn, 2015) which enables the entrepreneur to select the right cognitive model (i.e., effectuation or causation) in order to engage in making a decision with regards to the situation (i.e., venture context). As outlined in the introduction, offloading is the processing that reduces the cognitive load of a given amount of information (for instance, about a new business venture). It organizes and arranges the amount of information supplied to create a shortcut in processing the information. This processing is preceded by a trade-off between elements of tensions (constraints and levers) and its triggering leads to the effectuation model.

Entrepreneurs operate in “an environment characterized by incomplete information, time pressure, ambiguity and uncertainty” (Allinson et al., 2000). These situational elements shape the venture context and direct the entrepreneur’s information processing: the entrepreneur will face situations wherein information is either limited or abundant, the context is chaotic or orderly, the environment is stressful or relaxed, and the context is of varying degrees of uncertainty, i.e., high or low. In parallel, the business venture context is also shaped by individual elements relating to the entrepreneur’s previous experiences, their perception of affordable loss, and their perception of control over the situation: the entrepreneur facing the venture context will reenact sensations, feelings and knowledge acquired during past situations, similar to or differing from the current business venture context they are facing (e.g., first business venture experience or occupying functions leading to a similar decision-making process). The entrepreneur may also consider the situation differently depending on their aversion to risk (high or low), and their capacity (strong or weak) to handle the situation based on self-confidence in their overall know-how.

These situational and individual elements follow the assumption in Sarasvathy’s original study that expert entrepreneurs have developed their decision-making pattern over time (Sarasvathy, 2009). Accordingly, expert, and non-expert, entrepreneurs’ experience, stakes,

and perceived control over the situation at hand are all factors which will either favor the effectuation model or not, depending on the context. Indeed, entrepreneurs (expert and non-expert) may go through the same decision-making process according to their perception of the situation and their individual characteristics: previous experience may not require experience in setting up business ventures only. Entrepreneurs may have experiences related to the type of decision-making and actions their entrepreneurship requires (e.g., leading a project, being responsible for a large amount of money, being able to take risks, acknowledging uncertainty, etc.).

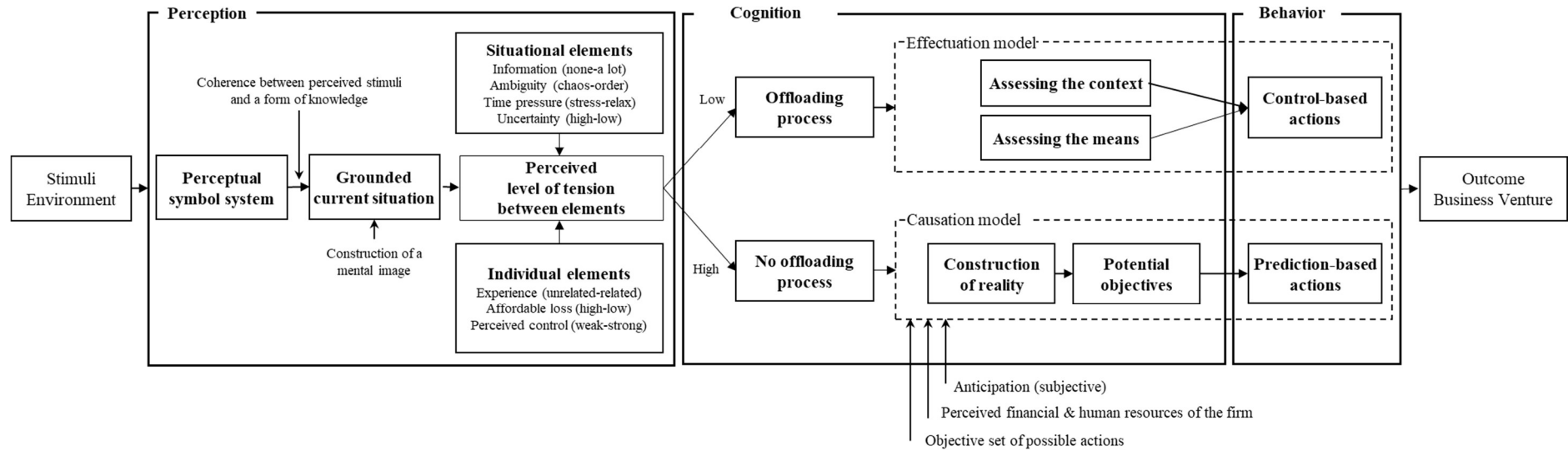
Hence, situational and individual elements are then constraints and levers that create tensions, and the balance between these potentially lead to an offloading process which is initiated by metacognition (Wiltbank et al., 2009), and which shortcuts the causal processing of a situation. Accordingly, we posit that metacognition organizes the cognitive process leading to either an effectuation model, via an offloading of information, or a causation model. The balance between elements of tension (constraints and levers) may lead to a shortcut in reasoning such as, on the one hand, the offloading process may not be triggered when tensions generate a situation in which prediction is possible, or that a lack of experience increases the need for processing information, and thus the entrepreneur analyzes information within the causation model. On the other hand, the offloading process may be triggered when tensions generate a habitual situation in which perceived control is high and time is constrained, or that confidence in one's ability to control the situation reduces the need for processing information, and thus the entrepreneur stops processing information which is already known (i.e., reenactment and use in the present situation), and thus the entrepreneur analyzes information within the effectuation model. The offloading process will therefore lead the entrepreneurial decision-making process towards effectual information processing. For example, in the first case, the entrepreneur will construct a representation of the business venture reality and set up potential objectives to then select those which are the most promising according to predictions. In the second case, the entrepreneur will, based on previous experiences and personal confidence, assess the means and context of the business venture from a set of possible actions, perceived financial and human resources of the company, and anticipate how the situation may evolve. For instance, when the decision involves the aim of expanding the company internationally, constraints may be connected to the time available with which to assess the international markets while levers may be connected to the perceived success of the product in the foreign market. So, when there are

strong levers and weaker constraints perceived in the business venture context, there is a low perceived level of tension between elements leading to an offloading of information. In other words, the entrepreneur will process a reduced amount of information leading to the effectuation model. Conversely, when the perceived level of tension between elements is high, the information is processed entirely through the causation model.

Hence, the offloading process, that potentially leads to shortcut reasoning, details the ‘hybrid’ logic of entrepreneurial decision-making (Reymen et al., 2015). Entrepreneurs alternately rely on one or the other models to evolve over time and over the life of the business venture (i.e., evolution of the constraints of the situation or of individual levers), with a predominance of the effectuation model in phases of high uncertainty and time pressure, and all other parameters being equal (like in the earlier stage of business venture creation). Conversely, when entrepreneurs face low uncertainty and limited time pressure, they will predominantly rely on the causation model (like in the mature stage of the life of the business venture). Indeed, as the entrepreneur gains experience and expertise, the feeling of control over the situation becomes higher, and stakes may lower, which in turn favors the offload of information and thus the effectuation model to generate new ideas. Consequently, drawing from the above literature and theory, the entrepreneur’s decision-making process is shaped by their propensity to drive their attention towards environmental cues, leading them to follow the model which is most suitable for solving the situation (Haynie et al., 2010), i.e., a causation or effectuation model. Thus, entrepreneurs are continuously revising the best way to ‘think’ about the decision to be made, while creating mental simulations of the potential actions that can be undertaken. The entrepreneur oscillates between both models successively until they reach a satisfactory decision.

Thereby, in the proposed integrative theoretical framework, the different initial principles are reassessed according to cognitive (assessing the means/assessing the context) and behavioral stages (combination/control). Indeed, when the entrepreneur triggers the effectuation model, the means and context correspond to the information gathered from the environment and internal states, when facing the venture context, which enables them to assess the business opportunity. When the causation model is triggered, the entrepreneur proceeds to prediction and planification of actions. As a result, the proposed integrative theoretical framework in Figure 2 enables us to better emphasize the underpinnings of how the effectuation and causation models combined shape the entrepreneur’s decision-making process and behavioral outcomes (i.e., actions undertaken).

Fig. 2 Entrepreneur decision-making framework



4 Entrepreneurial implications: Revisiting Sarasvathy's thought experiment 'Curry in a Hurry'.

This section revisits Sarasvathy's thought experiment with regards to the integrative theoretical framework. The first introduction of the 'Curry in a Hurry' case traces the process for building an imaginary Indian restaurant for which the author proposes an analysis of two models: causation and effectuation. We develop on this fictitious case to illustrate how grounded cognition theory; the metacognition model and the offloading process help to explain the effectuation model as proposed.

In her pioneering article, Sarasvathy (2001a) first explained how the causation process requires the entrepreneur to invest significant amounts of time and research effort to segment, target, and position their decision-making, according to principles such as those proposed by Kotler or Porter. This process consumes a significant amount of resources, both for the analysis and for the operationalization of the marketing strategy. A thorough analysis would lead them to establish a perfect plan providing numerous details about the operationalization and the appropriate strategy to attain entrepreneurial goals. The author goes on to argue that the effectuation model leads to various paths. For instance, on the one hand, the business could be initiated by a local restaurant that would enable the entrepreneur to sell a selection of Indian fast food in a corner of the shop or to create a popup restaurant during days when the restaurant is closed. On the other hand, the menu could be developed from discussions with one or two of their friends or relatives who work next to the premises and could bring food for them and their office colleagues to taste. This trial session could lead to three possible avenues for business development: an initial business could be conceived to start a lunch delivery service to serve the colleague's office. The business could then develop incrementally to reach a sufficient reputation and thus start a proper restaurant. A second business could be developed from the trial session: the entrepreneur may observe that people enjoy their conversation and that a convivial atmosphere mixing food and discussion could be successful. A third potential business plan could emerge from the failure of the trial and switching to instead writing a book or some other activity somehow connected to this experience. Thus, strategic moves do not emerge from a detailed plan, but rather from a nested relationship between the entrepreneur and a network of customers and strategic partners.

The integrative theoretical framework developed in this article helps us to understand entrepreneurs' cognitive processes, in this specific fictitious context, which leads to action in

the following way: drawing from the author's fictitious example, (1) an entrepreneur facing a situation, i.e., a stimulus (e.g., restaurant premises for sale), will build a mental image based on their perception of the characteristics of the current situation (e.g., type of restaurant to advertise, size of the premises, appropriateness of the location, etc.); (2) this mental image not only depends on the individual and the characteristics of the situation, but also on how they embody the situation (e.g., perception of smell, hunger, surroundings, etc. that generate different mental images of the same situation); and then, (3) the perceived level of tension between constraints (e.g., the amount of time the entrepreneur has to process the information given by the restaurant sale advertisement) and levers (e.g., the number of restaurants already owned by the individual, their financial situation, etc.) will potentially lead to an offloading process (i.e., a shortcut in processing the information as the reenactment of previous information may be sufficient to follow through).

Let us first consider the causation model. This can be triggered when the perceived level of tension is high between current constraints and levers. Hence, it does not lead to an offloading process, which means that it does not generate a shortcut rational processing of the information. This model is typically leveraged from the entrepreneur's perception that the situation is unusual (e.g., they have no experience in the food industry). Unusual situations reinforce low tolerance towards ambiguity combined with low perceived control. If the entrepreneur's future personal situation is at risk (e.g., job loss, low savings), the risks of opening a new restaurant are higher. This therefore triggers the feeling that time must be devoted to analyzing the situation (e.g., analyzing the number of potential clients, food preferences, planning arrangements, etc.) to reduce perceived risks. Therefore, the causation cognitive model combines perceptions of objectives (e.g., the capacity to raise money, to create a successful recipe, team skills, etc.) and subjective (e.g., anticipation of size of the market depending on the location of the restaurant) elements which concur to construct reality which increases the perceived feeling of control over the success of the restaurant. In this case, the causal construction of reality takes time and makes the decision-making process more linear, as causal reasoning tends to make entrepreneurs adhere to their vision, to their plan, and to raise resources which are appropriate to reaching their goals. Secondly, regarding the effectuation model, this can be triggered by a perceived low level of tension between constraints and levers (for instance, the entrepreneur's ability to recognize an already known situation or similarities between a past and present situation). This leads to an offloading of information. As the GCT states, perception triggers the re-enactment of previous knowledge

formation, which provides the ability to use past experiences as a reference for present comparison. In this context, the entrepreneur has a higher tolerance towards ambiguity and perception of control (e.g., “I successfully managed a drugstore so I can run a restaurant”). This therefore triggers the feeling of greater confidence in their ability to start new business ventures. As effectuation goes through the offloading process, which shortcuts reasoning, it speeds up the decision-making process, making it faster, more dynamic, and nonlinear.

Consequently, the offloading process is at the core of the entrepreneur’s decision-making process, leading them to choose to take one cognitive model or another. Effectuation and causation models result from a recurrent assessment of levers (e.g., people the entrepreneur knows who can help to design and run the restaurant, how much money they can afford to lose on the project, material means, etc.) and constraints (e.g., how much time the entrepreneur can dedicate to assessing the opportunity, the newness of the situation) to make a strategic decision. In turn, once the cognitive stage has been proceeded, the effectual or causal behavior is engaged: in the first case, effectuation will lead the entrepreneur to combine and control elements perceived as key success factors; while in the second case, the entrepreneur will first make predictions and set up a plan for actions. Both will lead to a successful or failed outcome of the business venture creation or development.

5 Discussion

Over the past two decades, the stream of research on effectuation has attracted increasing attention and provoked intensive debate in the academic community, enabling us to better investigate the effectuation model in the field of entrepreneurship, despite the absence of consensus on its theoretical foundations (Alsos et al., 2020). In this research, we proposed a theoretical foundation for effectuation, and in so doing, we gain further insight into the entrepreneur’s behavior by differentiating their effectual actions into cognitive and behavioral states. As such, we contribute to developing a better understanding of entrepreneurs’ decision-making processes. The present research aimed to develop the rationales underlying the effectuation *model-of-action* (Grégoire and Cherchem, 2020) by proposing an integrative theoretical framework presenting the perceptual and cognitive processes involved therein, leading to a specific behavioral outcome, and how both effectuation and causation models interact. This original framework offers significant contributions on theoretical, methodological, and managerial levels.

5.1 Theoretical contribution

From a theoretical perspective, the present research emphasizes how effectuation and causation models are not incompatible but are instead rather combined and alternately engaged during the entrepreneur's decision-making process. Indeed, our framework illustrates how opportunities derive from the construction of a mental image, formed by perception, and grounded in past and present experiences. Thus, the situation faced by the entrepreneur stimulates the creation of a mental image grounded in the entrepreneur's environment and sensations. After the mental representation is created, it goes through the metacognitive system where the entrepreneur balances the various constraints and levers faced. This may lead to some information being offloaded, potentially resulting in a faster decision-making process. In other words, effectuation is an adaptation of heuristics for entrepreneurs. This framework therefore demonstrates how both causation and effectuation are part of the same process, and how entrepreneurs may therefore rely on one or the other as previously suggested in the literature on entrepreneurial behavior (Reymen et al., 2015).

Our introduction of grounded cognition theory enables us to deepen our understanding of the entrepreneur's behavior by differentiating Sarasvathy's initial principles into cognitive and behavioral states, and to better position the effectuation model with regard to the causation model, both stimulated by grounded information. Our framework also shows that the different initial principles are reassessed according to cognitive (assessing the means/assessing the context) and behavioral (combination and control) stages to better represent the effectuation model and thus provide an effective tool for entrepreneurs to understand how they may behave to develop a business venture.

5.2 Contributions to methodological developments

Our integrative theoretical framework offers support for methodological consideration of the experimental design, to investigate an entrepreneur's behavior more concretely. Experimentation is largely considered in many other fields (Charness et al., 2012; Kistruck and Slade Shantz, 2021; Racat et al., 2021), including psychology, from which the present theoretical framework has emerged, and we also believe this methodology is relevant for research in the field of entrepreneurship (Kraus, Meier and Niemand, 2016). Therefore, the present research contributes to ground experimental design consideration in the field of entrepreneurship. More specifically, by using the grounded cognition theory to explain the entrepreneurs' decision-making process and their behavior, this research develops a rationale

for using experimentation as a solid methodology for the stream of research on effectuation. As the literature suggests, studies in this field are limited, given that entrepreneurs' behaviors regarding decision-making have been little studied *in-situ*, but rather based on post-situation studies and with self-report statements, for both qualitative and quantitative studies. Experimental design may provide levers with which we can better approach how researchers in the field may address cognitive and behavioral processes based on existing models (causation and effectuation).

Furthermore, grounded cognition is a psychological theory which forms the basis of many experimental works in the business sciences, including, for example, marketing (Racat et al., 2021; Racat and Capelli, 2016). Thus, incorporating experimentation as a methodology in the field of entrepreneurship research is of great interest and our research contributes to provide strong theoretical foundations to the effectuation model for conducting such methodology. Despite the artificial aspect of experimentation, today's advances in this methodology and access to less intrusive tools for measurement (e.g., eye-tracking, facial emotion, etc.) provide higher external validity of the results. Entrepreneurship research can employ experimentation to test the effectuation model of action. For instance, a simulated real-world scenario could be created where entrepreneurs have to make actual decisions. This would enable the collection of real-time behavioral and cognitive data, as well as post-situation analysis using a declarative dataset. A concrete example of this would be physiological data collection while exposed to two laboratory conditions which relate to the entrepreneur's existing or future business venture. Following a two-way between-subject experimental design, we could investigate the effect of the environment and of the entrepreneur's experience (e.g., time pressure - low vs. high level x experience - none vs. several) on the type of decision-making process (effectuation vs. causation), in laboratory conditions (i.e., control of the environment and its influence as external stimuli as well as internal influence of the body state via temperature of the room, for instance). Each participant would have to make decisions and behave accordingly in the context of a same business venture before all participants. It would then be possible to record observable (e.g., sweating, or emotional states) and declarative (e.g., innovativeness scales) measures. The GCT in this case would enable us to justify the control of the environment as a factor and the *a priori* assumption in terms of the influence it should have on the entrepreneur's cognitive and behavioral responses. The same rationale goes for the manipulation of the experience level, which is re-enacted when facing new situations, since the GCT provides insight into

how the individual processes the information obtained within a specific context. This theoretical framework might also help to obtain greater explanatory power when examining effectuation with quantitative methodology (McKelvie et al., 2020).

5.3 Practical implications

The fictional case presented herein provides an illustration with which to connect two streams of research: effectuation and GCT. Both have been studied independently, whereas GCT is showing the strong potential of informing research on effectuation in multiple ways. By enhancing the representation of the entrepreneur's decision-making process, we contribute both to improving the entrepreneurs' understanding of their own actions, and to the ecosystem with which they interact. By doing so we enable entrepreneurs to conform to expectations of the ecosystem and to reinforce their legitimacy. We also help them to understand how they make decisions and the heuristics which influence these, thus helping to reduce/enhance their impact (Busenitz and Barney, 1997; Ricard and Aldebert, 2018). This strengthens their awareness of the moment in which they switch from one process to another, thus empowering their decision-making process. By doing this, we address arguments evoked by certain authors who say that effectuation is difficult for entrepreneurs to understand as it is subjective (Fisher, 2012). Secondly, our framework could arguably be seen from the emerging design science perspective in entrepreneurship (Dimov et al., 2022; Seckler et al., 2021) as the first step to producing a canvas, to better prepare entrepreneurs in their decision-making. Indeed, ecosystems which promote aid for entrepreneurs are arguably more able to accompany their decision-making if they can better represent the underlying rationales of their decisions. Finally, entrepreneurs can now better understand the initial conditions which lead to the phenomenon of offloading. This new insight provides direct clues for entrepreneurs and for the organizations which assist them regarding how they might perceive the same situation differently depending on variations of contextual elements. In other words, both types of actors adopt a higher perspective on the elements involved in decisional outcomes. For instance, an improved understanding of the role of time in the offloading phenomenon will make entrepreneurs more able to detect when and why they should rely on this phenomenon, or not.

5.4 Limitations and avenues for future research

This theoretical article proposes to unveil the theoretical roots underlying *effectuation* as a model. Although we only provide theoretical insights into connections between effectuation as a model and GCT, we feel this paper opens up significant avenues for future research, the pursuit of which should aim to ground the theoretical foundations of effectuation in a solid theory of psychology, and to generate future empirical work based on experiments to examine entrepreneurial decision-making. By providing theoretical foundations to the effectuation model, we deepened the understanding of the entrepreneurial decision-making process. To this end, the present research enables future research to examine how the entrepreneur establishes strategies to pursue the business venture (e.g., go or no-go strategy). Indeed, our research concentrates on the cognitive processes leading to either causation or effectuation and does not look at the outcomes of the decision-making process such as possible choices, behaviors, strategies, or even absence-of-strategy (Inkpen and Choudhurys 1995). In line with this limitation, recent research proposed that absence-of-strategy occurs when decisions are embedded in a specific context, aside of effectuation and causation (Hauser et al. 2020). We suggest that future work should dig into the connection between absence of strategy and our framework. Finally, future research could explore further into the cognitive processes leading to other than effectuation or causation models, for example to exit a process. In this case, the effectuation and causation decision-making process would not be engaged at all as the perceived level of tension may lead the entrepreneur to conclude that it is best to go on another business venture opportunity or simply stop the process if no other alternative is possible.

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