Causal beliefs in the rationalization of entrepreneurial strategies

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Resumo

This study aims to contribute to the advancement of the Theory Based View, conjecturing the importance of studying, in addition to the theoretical concepts that strategists construct, the way in which their beliefs of causality connect such concepts in the rationalization of strategy. For that, it strives to explain the use of causation and effectuation logic in prospective and retrospective rationalizations of strategies in an entrepreneurial context. In each interview conducted with the members of a technology center, retrospective and prospective rationalization exercises were carried out about the organization's strategies. Based upon these interviews cognitive maps were created and subsequently analyzed using coincidence analysis. Differences between strategic reasonings made retrospectively or prospectively were detected, they were analyzed based upon their content and structure, in order to identify the determinants of rationalizations characterized by causation and/or effectuation logic an entrepreneurial context. In addition, a comparative analysis of the factors obtained from the creation of cognitive maps was performed, along with the actions that were highlighted by the interviewees and their individual characteristics. The research contributes theoretically, methodologically and empirically to the development of VBT and the theory of effectuation (and causation) applied to strategy in entrepreneurial contexts.

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Abstract

This study aims to contribute to the advancement of the Theory Based View, conjecturing the importance of studying, in addition to the theoretical concepts that strategists construct, the way in which their beliefs of causality connect such concepts in the rationalization of strategy. For that, it strives to explain the use of causation and effectuation logic in prospective and retrospective rationalizations of strategies in an entrepreneurial context. In each interview conducted with the members of a technology center, retrospective and prospective rationalization exercises were carried out about the organization's strategies. Based upon these interviews cognitive maps were created and subsequently analyzed using coincidence analysis. Differences between strategic reasonings made retrospectively or prospectively were detected, they were analyzed based upon their content and structure, in order to identify the determinants of rationalizations characterized by causation and/or effectuation logic an entrepreneurial context. In addition, a comparative analysis of the factors obtained from the creation of cognitive maps was performed, along with the actions that were highlighted by the interviewees and their individual characteristics. The research contributes theoretically, methodologically and empirically to the development of VBT and the theory of effectuation (and causation) applied to strategy in entrepreneurial contexts.

Introduction

Recently, the so-called "Theory-Based View" (Felin and Zenger, 2015, 2017, 2020; Felin, Kauffman, & Zenger, 2020) has been proposed at the interface of the fields of strategy and entrepreneurship. According to this perspective, firms with superior performance - especially entrepreneurial and innovative firms - owe this competitive advantage primarily to the insights provided by the "theories" that their leaders mentally form about the market(s) in which they operate. Thus, TBV consists of a behavioral approach, with cognitive emphasis, that explains the outstanding success of new ventures and their sustainability over time.

To continue the elaboration of this tradition in formation, it is necessary to advance the understanding, not only of the "theoretical" concepts that entrepreneurs construct, elaborate, and test to make sense of their problems, but, primarily, of the causal beliefs that connect these concepts, characterizing their "theories." Indeed, in the field of philosophy, it has been argued that causal beliefs have a unique potential not only to explain past actions, but also to indicate likely future actions (Hitchcock, 2017a).

Two complementary notions that may be relevant to this context of theory development are those of causation and effectuation (Sarasvathy, 2001). After all, in principle, because they deal with the order in which one reasons about a cause-and-effect relationship (i.e., whether from this to that or the other way around), both causation and effectuation can be said to relate fundamentally to logical processes. That is, both processes have less to do with what in fact the entrepreneur/strategist did, does or will do, and more to do with the logic that guides his action. In other words, the same concrete (i.e., historical) action can result from a mental process of

causation (i.e., if it was thought of from the specific intended effect/end) or effectuation (i.e., if it was thought of from the available causes/means).

A review the literature on causation and effectuation logics has shown that several studies have been done aimed at understanding retrospective rationalization (Lam and Harker, 2015; Lingelbach et al., 2015; Reymen et al., 2015), directed at past actions. However, such research has not sought to understand prospective rationalizations, focused on strategists' future actions (c.f. Matalamäki, 2017a; Perry et al., 2012). Tackling this gap is relevant especially when considering that, in causation philosophy, it has already been pointed out that prospective rationalizations do not necessarily follow the same logic as retrospective rationalizations (Hitchcock, 2013, 2016, 2017a). Moreover, the main utility of the study of causality lies precisely in the possibility for the knower of a causal relationship to intervene in a cause in the present with a view to obtain an effect in the future (Hitchcock, 2017a). That is, in practice, managers in general and entrepreneurs in particular are more interested in understanding what they can do about the future than about what has already remained in the past — although these time horizons are not independent in strategy formation (Bansal et al., 2019).

In particular, it is argued that "entrepreneurial contexts" — i.e., in which several new ventures are under development (Ott et al., 2017) - are particularly prone to deviate from the pattern of causation (i.e., which predominates in established organizations), exhibiting a tendency to use effectuation (Fisher, 2012; Sarasvathy, 2001). However, as subsequent research related to effectuation theory has shown, even in these contexts, one has to consider the possibility that the same theoretical system of an entrepreneur may be rationalized by causation in some of the causal beliefs that constitute it and by effectuation in others (Matalamäki, 2017a).

In this sense, understanding the determinants of the causal/effectual reasoning logics that are used by strategists in entrepreneurial contexts in the "theoretical" rationalization of their strategies and whether these rationalizations differ in terms of retrospection or prospection are important dimensions of the strategic and entrepreneurial phenomenon from a behavioral perspective, but still open in the corresponding academic literature. Therefore, building on these research traditions, the overall aim of this paper is: to explain the use of causation and effectuation logics in prospective and retrospective rationalizations of strategies in an entrepreneurial context.

Theoretical framework

Behavioral strategy and the theory-based view

Recently, studies in strategy have been moving closer and closer to the field of entrepreneurship (Ott and Eisenhardt, 2020). Ott, Eisenhardt, and Bingham (2017) consider how strategy formation, i.e., the process by which executives design those actions for the purpose of creating and capturing value, is essential to understanding the success or failure of firms located in entrepreneurial contexts — i.e., in the context of entrepreneurial firms or established firms competing in markets with innovation-focused strategies.

The behavioral strategy stream, in particular, emphasizes the mental processes underlying these actions as the prominent factors in explaining organizational performance heterogeneity (Gavetti, 2012; Powell et al., 2011). Thus, research in this area aims to build, elaborate, and test theories that relate human cognition and psychosocial behavior to strategic management (Powell et al., 2011). The "contextualist" stream stands out as the closest to a strategic realism (Gavetti and Rivkin, 2007), aiming to track how cognition and action interact over time in historically situated contexts, characterizing changes or continuities in an organization's strategic path (Gavetti and Rivkin, 2007; Powell et al., 2011). Therefore, the contextualist current brings the focus to the cognition of entrepreneurial strategists, highlighting how their mental models affect the way they perceive and interpret the environment and, consequently, influence the way they act within their organizational context.

In this more contextualist bias, the so-called "theory-based view" (TBV) has recently been proposed, which argues that the theories that economic actors construct, elaborate, and test are the main determinants of organizational performance heterogeneity, especially in entrepreneurial contexts (Felin and Zenger, 2017). Consequently, the theories created by these agents serve as guides toward specific solutions to specific problems, helping them find undervalued assets in the market (Felin and Zenger, 2020). Thus, the search for solutions becomes a quest to address unique subproblems, which direct entrepreneurs to recognize specific latent resources and uses for these problems (Felin et al., 2020). Consequently, theorizing is "an active effort to project into the future and to imagine possibilities beyond what might readily be observed" (Felin and Zenger, 2015).

By framing a problem or group of problems, a valuable theory provides a causal representation of the world, illuminating the connections between interrelated problems and providing a path towards a solution (Felin and Zenger, 2017). Consequently, a theory can be considered to be about the connections between phenomena, creating a story about why acts, events, structures, and thoughts occur. Thus, it emphasizes the nature of causal relationships, identifying the order of events and getting into the processes underlying their occurrence, with the goal of understanding the systematic reasons for the phenomenon of interest (Sutton and Staw, 1995).

Thus, in opposition to other theories of strategy and entrepreneurship that estimate that bounded rationality should be the central construct of behavioral economic theory (Kahneman, 2003), Felin and Zenger (2017) complement the framework of contextualist cognitive theories by arguing that this focus on human limitations makes it difficult to explain economic novelties and performance heterogeneity. On the contrary: for these authors, it is the ability — not the limitation — of the individual to theorize that animates markets and reveals paths to value creation (Felin and Zenger, 2015). Therefore, the theories constructed by economic agents (such as managers), similarly to the theories developed by scientists, would be able to explain such economic novelties and the heterogeneity of performance among firms. Added to this, valuable theories are novel and, moreover, they are sustainably novel because they convey a sense of causality to those who compose the theories, but not to other economic actors in the same industry or institutional context (Felin et al., 2020). Such theories are the mental images of the space of alternative strategic solutions, and it is these images that direct the attention and

awareness of the decision maker. Consequently, by not focusing on the rational failures of strategists, TBV highlights the ability of strategists-as-theorists to pose questions and problems that allow managers to see new economic possibilities, armed with theories they have created about such situations. Hence these authors call their theory a "theory-based" view; after all, they attribute to these theories-in-use of strategists the source of the most significant differences in performance found among companies operating in the same market.

Thus, Felin and Zenger (2017) have shown that by conceptualizing strategists and entrepreneurs as theory-creators, it is conceived that they are not only limited by their existing resources (Barney, 1986); their new theories enable the creation of new questions and problems, allowing them to find different paths to value creation. Therefore, what animates the strategists' vision are the problems and issues about which they think. Moreover, since the environment offers an immense number of latent opportunities (Chater et al., 2018), it is always perceived from a reflection on the question being asked or the problem being formulated by the strategist, never in a neutral observational way. Thus, according to TBV, perception and observation do not occur in objective nature, i.e., in the objects themselves, but rather, based on the questions and theories that economic actors impose on situations and environments.

As a result, the value of resources is now viewed through the lens of unique theories, showing how the existence of new theories can explain heterogeneity and the origin of highly successful strategies. Therefore, subjective theories of economic value can lead to factors or observations not perceived by other actors, revealing valuable assets or opportunities that are overlooked and thus enabling the development of extraordinary performance strategies. Theories take the form of an architecture of problems and subproblems relating them to causal expressions, which causally map these problems and subproblems with the goal of finding value for the entrepreneur (Felin et al., 2020).

The following section presents two of the main ways in which this causal relationship can be established.

Causation and effectuation logic as theoretical resources for TBV

Causation is related to the classical school of strategic planning (Mintzberg et al., 1998), which aims to base the decision-making processes of strategists on a rational view of action (Ansoff, 1991). The final objective is usually well structured and specific, with a group of causes that can be generated from the decision-making process, given certain limits on the means and a criterion to select among these means — this criterion being generally determined in order to obtain the maximization of the expected return from the predetermined objective (Porter, 1998; Sarasvathy, 2001). In summary, causation is defined as a process in which the specific intended effect is taken as given, with the focus falling on the selection of means (i.e., "causes"). Thus, it is based on a logic of prediction, seeking first to predict a specific end to be achieved (Sarasvathy, 2001).

On the other hand, the notion of "effectuation" has been proposed as an alternative to causation (Sarasvathy, 2008), being defined as a process that takes means as data, with a focus on selecting among possible effects that can be created from such means (Sarasvathy, 2001). Thus, effectuation works with non-predictive situations, such as those studied by Mintzberg (1998),

considering the characteristics and circumstances of the decision maker in order to achieve a group of effects or aspirations. In this way, it emphasizes the possibility of achieving such effects and certain criteria to select among the possible effects, using a logic that prioritizes the control of means, from a predetermined level of acceptable risk or losses (Sarasvathy, 2001; Wiltbank et al., 2006).

Originating in the academic discussion on entrepreneurship (Sarasvathy, 2001), the distinction between causation and effectuation has entered several other fields (Matalamäki, 2017a), including that of strategy (Wiltbank et al., 2006), but - to the best of our knowledge - has not yet significantly influenced the behavioral strategy stream. Apparently, this lack of influence stems from the impression by authors of an emphasis in the strategy field that effectuation theory, in countering the traditional notion of causation, is more related to the action itself than to the mental processes underlying it (Ott et al., 2017).

In order to determine whether a justification is considered causal or effectual it can be considered from the type of the decision. For this purpose, the contents of each justification are analyzed, making a qualitative coding of the respondents' answers (Chandra and Shang, 2017), in order to determine which logic characterizes the organizations' strategic decisions according to the following constructs. Thus, if a causation logic was used, elements of the maps are observed in which the decisions were:

a) Focused on maximizing returns (Sarasvathy, 2001);

b) Made from a competitive analysis (Sarasvathy, 2001);

c) Based on business planning (Sarasvathy, 2001);

d) Carried out with the goal of foreseeing an uncertain future (Sarasvathy, 2001); and/or

e) Conducted in order to satisfy organizational needs (Reymen et al., 2015).

If an effectuation logic was used, elements of the maps are observed in which the decisions were:

a) Made from experimentation with alternatives (Sarasvathy, 2001);

b) Focused on minimizing losses (Sarasvathy, 2001);

c) Made based on strategic alliances (Sarasvathy, 2001);

d) Carried out with the objective of controlling an uncertain future (Sarasvathy, 2001);

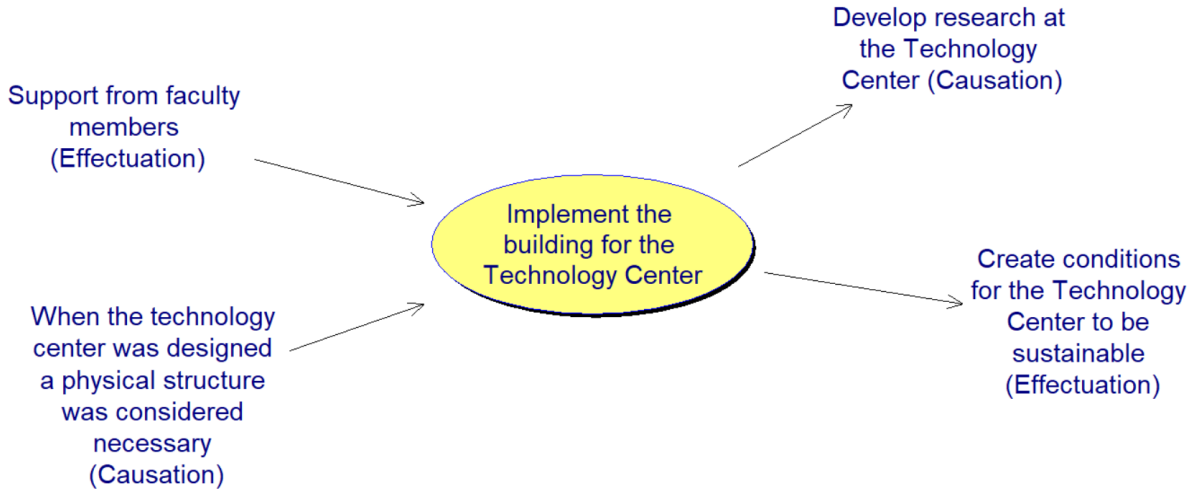
e) Based on resources already obtained (Reymen et al., 2015);

f) Using infrastructure and knowledge available in the environment (Reymen et al., 2015);

g) Following personal preferences (Reymen et al., 2015); and/or

h) adapted based on feedbacks (Reymen et al., 2015).

Figure 1 – Causal map



Source: Prepared by the authors, 2022.

In addition to the analysis by type, when considering whether a justification is classified as causal or effectual, the structural order of reasoning can be taken as a basis. This is determined from a cognitive map, as can be seen on figure 1, based on the analysis of the direction of the arrow, taking this direction as indicative of the structure of the strategist's reasoning in the particular decision under analysis. Specifically, for a given causation belief, the justification is characterized as causation, based on its structure, if the causal relationship is represented from an arrow coming from the action toward an expected goal, that is, the arrow connects the action with a concept located in the head of this action. Meanwhile, for a given causality belief, the justification is characterized as effectual, based on its structure, if the causal relationship is represented from an arrow coming from the concept toward the action, i.e., the arrow connects a concept with the action from the tail of this action.

In this sense, this paper proposes that the notions of effectuation and causation can serve as valuable theoretical resources to elaborate the TBV by refining the understanding of how rationalizations of strategists' causality beliefs occur in entrepreneurial contexts when reflecting on both realized (in the past) and intended (for the future) strategy.

Methodology

Characterization of the research

Given the limitations of previous theories to describe and explain how the logics of causation and effectuation are combined by strategists and entrepreneurs in rationalizing their strategies, this research is configured as an inductive study of emergent theory building — in the form of new propositions — from in-depth analysis of the characteristics of a unit of observation that is especially theoretically relevant for understanding the phenomenon of interest (Bansal et al., 2018; Bansal and Corley, 2012; Eisenhardt et al., 2016; Mahoney, 2000). This is therefore a qualitative study which, as it has its focus on individuals' rationalizations about causal meanings

in particular contexts, can also be categorized as interpretivist (Clarke and Mackaness, 2001; Eden, 1992; Gephart, 2004; Isabella, 1990).

Analytically, this work is classified as cognitive research (Hodgkinson et al., 2017). More specifically, it is a study focused on the extraction (i.e., elicitation) (Dieste and Juristo, 2011), analysis (Eden, 2004), and configurational comparison (Baumgartner and Ambühl, 2018; Thiem, 2014) of aspects of entrepreneurs' mental models, embedded in the tradition of ideographic causal mapping or, simply, "cognitive mapping" (Eden and Ackermann, 1998; Hodgkinson and Healey, 2008). In this case, the unit of analysis are the causality beliefs presupposed in these mental models, and the units of observation are the entrepreneurs selected to participate in the research.

Characterization of the context

The research was conducted in a context involving a nascent market for the production, application, and characterization of carbon nanotubes in Brazil, which is characterized by a business environment with few firms seeking to navigate a landscape determined by uncertainty, ambiguity, and high velocity (c.f. Ott and Eisenhardt, 2020). Specifically, a technology center focused on the development of new materials created by professors at a university was studied. This center is recognized for its excellence in research involving various materials, contributing to the improvement of products, processes, and services through technologically advanced and economically feasible solutions. The team has a consolidated expertise of 20 years of operation, and the center offers an infrastructure for technological development for a body of nearly 100 scientists. The center's proposal is to be an intermediary entity between the university and the industry; from this, it researches and develops technology high potential for companies, and creates a platform capable of fostering the formation of technology-based startups. The center has existed for more than 10 years, has more than 25 patents filed, and is always rethinking its business models in the face of uncertainties on the environments in which it operates. In this sense, the managers involved in it undergo a risky process of trying to develop and consolidate new businesses for an organization-in-formation, simultaneously assuming entrepreneurial and strategic roles at the center.

In all, 13 members of the technological center were interviewed, at least twice each - 3 of them being professors, with 2 having worked for more than 7 years at the center. Meanwhile, the other members were contract employees, with a range of 1 to 8 years at the center and an average of 4.4 years of experience. Thus, the overall average was 4.8 years, showing how the sample is able to capture the history of the center, since the average of the members is close to half the history of the organization, which has existed for just over 10 years, with 6 members with at least 6 years of experience. Furthermore, 7 were managers in the center, showing that the sample mostly represents the knowledge of people with high strategic impact in the organization.

Data Collection

The main technique for data collection was in-depth semi-structured interviews (Clarke and Mackaness, 2001; Isabella, 1990). In a broad review of knowledge extraction techniques, the semi-structured interview was found to be one of the most effective on several criteria, compared

to other alternatives (Dieste and Juristo, 2011). Indeed, in the area of ideographic causal mapping specifically, it is argued that this form of data collection should be favored over structured interviews or questionnaires, especially if respondents are to be given the freedom to generate different constructs from each other, as is the case in this research (Eden and Ackermann, 1998; Hodgkinson et al., 2004).

For each respondent, two interviews were conducted remotely, based on a script designed to elicit justifications for actions highlighted by respondents. The interviews aimed to determine which were, in the past, and which are, in the present, the strategic decisions (i.e., the company's plans, considering such decisions as referring to concrete events located spatially and temporally - i.e., "do this or that at such and such a time, in such and such a context"). In these interviews, in addition to the strategic decisions themselves, the manner in which strategists rationalize their decisions was documented, with the aim of determining the logic underlying their causal beliefs about each of the events (i.e., the assumed causal connections between events). To determine causal beliefs, we sought to identify rationalizations that would point, on the part of the entrepreneurs, to elements they considered insufficient but not redundant parts of a set of factors that in themselves would not be necessary but would be sufficient (INUS) (Mackie, 1965) to cause the specific decision made (BAUMGARTNER, 2020).

The first interview was divided into two parts, and in the first part, the strategic history of the company was studied, based on an action highlighted by the interviewee, which was questioned in search of justifications retrospectively. In the second part, an action that the interviewee wants to carry out in the future was studied, which was questioned in search of justifications prospectively. From the first interview, cognitive maps of the interviewees were constructed, which were reviewed with them in a second interview. During this second round of interviews, the cognitive map was shown to the interviewee, and each of the map's nodes was reviewed, as well as the connections between the nodes; furthermore, new questions were asked in order to find out if the interviewee had anything more to add to the map. After this, a saturation point was reached, in which the interviewees could find nothing more to add or modify, other than stating that the map represented the way they thought about the action.

Data Analysis

The data analysis was first done from ideographic causal mapping, followed by a characterization of causation and effectuation in these maps, and finally a comparative configuration based on the actions and justifications described in the maps. With that, this section presents how the analysis was done, in conjunction with the literatures of ideographic causal mapping and comparative configurational analysis.

Cognitive Mapping

Cognitive maps were developed using Decision Explorer, a software specifically created for ideographic causal mapping (Ackermann and Eden, 2010). The main actions are highlighted in the cognitive maps, while the other constructs are connected to them and to each other from arrows, which symbolize cause and effect relationships, and from dashes, which symbolize purely connotative relationships, without cause-and-effect implications. Causal relationships can

have a positive or negative character. Thus, they were considered as positive when they represent a cause that leads to the effect; meanwhile, they were considered as negative when they represent a cause that hinders that effect from occurring. Such negative relationships are symbolized by a (-) at the head of the arrows connecting the constructs. In addition, some actions were defined in opposition to other possible options, which was represented in the maps by a (...) after the action description (i.e., A...B, action A was performed in opposition to - or "instead of" - performing option B). With this, it was analyzed whether a justification is causative or effectual based on the type of decision and the structural order of reasoning, as previously described in the theoretical framework.

All nodes that were in the tail of the action were considered as justifications for it and classified according to the elements described above, meanwhile, only some of the nodes placed in the head of the action were considered as justifications for it. Thus, nodes in the head of the action that were only implications of them were excluded from this analysis, without being able to be considered as justifications for the existence of that particular action. Each of these nodes was analyzed, and one of the elements mentioned above was taken as representative of its type. From this classification, it was determined whether this node would be considered as a causation or effectuation reasoning based on the type of the decision.

Variations based on individual and organizational factors

An analysis was made of the variations observed in the use of causation and effectuation logics based on the variations of the following individual factors: length of time in the company; and whether the interviewee was a teacher or not.

These factors were chosen because they represent the greatest differences among the members of the center perceived from the interviews. The length of time they have been in the company reflects the number of actions they have participated in, as well as the knowledge and potential influence they have had on them. Meanwhile, whether or not the member is a professor was highlighted several times during the interviews as a major differentiating factor between the center's employees, since the objectives of the hired members differ considerably from those of the professors working at the center.

Coincidence Analysis

This paper used coincidence analysis (CNA), a comparative configurational method, to compare the maps. After all, the analytical interest of the paper was not about correlations and pairwise dependencies between specific variables, but exactly about how different features of the maps combined - conjunctively and disjunctively - into explanatory configurations of outcomes of interest. CNA is currently the most correct and complete configurational comparative method available to search for causally interpretable patterns of an outcome of interest in a configurational dataset (Baumgartner & Ambühl, 2020; Baumgartner & Falk, 2021). Thus, its procedure, implemented in the 'cna' R package (Baumgartner & Ambühl, 2021), was used to proceed with data analysis.

Following the state-of-the-art recommendations for CNA model selection (Parkkinen & Baumgartner, 2021), we only selected the models at or above the 98th percentile of both fit-robustness (FR) and consistency-coverage (concov) scores among all models issued by the 676 sensitivity re-analyses that resulted from varying the lower threshold of acceptable equivalence from 75% to 100% of each set's elements, with a 1% increment at each new re-analysis. We performed crisp-set CNA (csCNA) for the initially coded dataset and fuzzy-set CNA (fsCNA) for the fuzzy-scored dataset (Baumgartner & Ambühl, 2020). Fuzzy scores were calculated by means of the Totally Fuzzy and Relative transformation (TFR, Cheli & Lemmi, 1995; Filippone et al., 2001) as recommended by Verkuilen (2005) and Duşa (2019). Finally, the most robust model was selected from the previously retained most robust models. Such analyses were done both for present conditions, symbolized by capital letters, and for absent conditions, symbolized by lower case letters.

The factors that were chosen as possible outcomes for the coincidence analysis are:

1. Complexity of the cognitive map (COMP);
2. Existence of negative justification (NEGT);
3. Proportion of concepts in the map with effectuation type (PPEC);
4. Proportion of concepts in the map of tail versus head (PRTH);
5. Opposition effectuation (OPPE) - Opposition effectuation occurs when a concept is in the head and is classified as effectuation;
6. Opposition causation (OPPC) - The opposition causation occurs when a concept is in the tail and is classified as causation;

The factors that were chosen to conduct the study, although not as outcomes, are:

1. time (TIME);
2. Whether the respondent is a teacher (PROF);
3. Whether the map is prospective (PROS);

Results

From the results of the coincidence analysis of the characteristics of the maps and their respondents, the following theoretical propositions were built (Table 1).

Table 1 - Theoretical propositions

Proposition 1	In forward-looking rationalizations, there is a greater tendency for there to be more justifications located structurally after the described action.

Proposition 2	In prospective rationalizations, there is a greater tendency for there to be no effectual opposition.
Proposition 3	In prospective rationalizations, there is a greater tendency to focus on the positive justifications for the intended actions, not considering the difficulties and impediments to accomplishing them.
Proposition 4	In retrospective rationalizations, there is a greater tendency for there to be more justifications located structurally before the described action.
Proposition 5	In retrospective rationalizations, when there are a greater relative amount of causation concepts and a lack of negative justifications, one has, as a consequence, causation opposition.
Proposition 6	In retrospective rationalizations, there is a greater tendency for causation type concepts to exist.
Proposition 7	In retrospective rationalizations, there is a greater tendency for negative justifications to exist in conjunction with positive justifications.

Source: Prepared by the authors, 2022.

Proposition 1

Proposition 1: "In prospective rationalizations, there is a greater tendency for there to be more justifications located structurally after the described action", originated from the following equation extracted from the coincidence analysis: negt*OPPE+negt*ppec*PROS<->prth.

Such a solution means that the fact that the map has no negative justification and has causal opposition or has no negative justification and has a low relative proportion of effector type concepts and the map is prospective is regularly associated with the fact that it has a low relative proportion of concepts in the tail.

This provides evidence of the importance of the type of reasoning in determining the proportion of effectuation concepts in the map, with a higher relative number of concepts in the head when the map is prospective, especially when combined with the map not having negative justification. Furthermore, it is noted that the fact that there are no negative justifications, combined with the fact that the map has effectuation opposition, implies a greater relative concentration of concepts in the head of the action, suggesting a relationship between the existence of negative justifications with the relative proportion of concepts in the tail of the action.

Proposition 2

Proposition 2: "In forward-looking rationalizations, there is a greater tendency for there to be no effectuation opposition, in which the justification is in the head of the action and is classified by

type as effectuation," originated from the following equation extracted from the coincidence analysis: negt*PRTH+negt*ppec*PROS<->oppe.

This solution means that the fact that the map has no negative justification and has a high relative proportion of concepts in the tail of the action or that it has no negative justification, has a low relative proportion of effectuation concepts and is forward-looking are regularly associated with the fact that it has no effectuation opposition.

Consequently, it stands out that maps with no negative justification tend to have no effectual opposition, and prospective maps, combined with other factors, are regularly associated with a lack of effectual opposition.

Proposition 3

Proposition 3: "In prospective rationalizations, there is a greater tendency to focus on positive justifications for intended actions, not considering difficulties and impediments to carrying them out", originated from the following equation extracted from the coincidence analysis: prof+PROS<->negt.

This solution means that the fact that the map is not of a teacher or is prospective are regularly associated with the fact that she has no negative justifications.

With this, it can be seen that if the respondent was not a teacher, he/she would not give negative justifications. This can be understood if one realizes that it was the teachers who coordinated the organization in a more general way; thus, it would be easier for them to observe, besides the positive causes, the negative causes that hindered the accomplishment of the action. This is corroborated by the fact that prospective maps do not have such negative justifications, since retrospective maps allow a greater focus on the unfolding of the action, pondering not only what caused it to occur, but also what prevented or hindered its development.

Proposition 4

Proposition 4: "In retrospective rationalizations, there is a greater tendency for there to be more justifications located structurally prior to the described action," originated from the following equation extracted from the coincidence analysis: NEGT+oppe*PPEC+oppe*pros<->PRTH.

Such a solution means that whether the map has a negative justification or has no effectual opposition and has a relatively high proportion of concepts with the effectual type or has no effectual opposition and is not prospective is regularly associated with having a high relative proportion of concepts in the tail.

Thus, it seems to be more common to have negative justifications in the tail of the action, because the existence of these leads to more concepts in the tail. Added to this, the fact that no effectuation opposition is identified and that there is a higher proportion of effectuation concepts leads one to understand that this focus on effectuation concepts in general generates a greater number of concepts in the tail, where effectuation concepts are normally expected. Moreover, the combination of the absence of effectuation opposition and the retrospective aspect of the map also leads to a greater number of concepts in the tail.

Proposition 5

Proposition 5: "In retrospective rationalizations, when there are a greater relative amount of causation concepts and a lack of negative justifications, one has, as a consequence, causation opposition, in which the justification is at the tail of the action and is classified by type as causation," originated from the following equation extracted from the coincidence analysis: COMP*prof*PRTH+negt*ppec*pros+negt*ppec*TIME<->OPPC.

Such a solution means that the map being relatively complex and the map not being of a teacher and the map having a high relative proportion of concepts in the tail of the action or the map having no negative justifications and having a low relative proportion of effector type concepts and the map being retrospective or the map having no negative justifications and having a low relative proportion of effector type concepts and a high relative time in the company are regularly associated with the map having causal opposition.

Therefore, a high complexity of the result to explain the causation opposition is evidenced. The emphasis on causation concepts and the fact that the map is retrospective seem to have as a consequence the existence of causation opposition.

Proposition 6

Proposition 6: "In retrospective rationalizations, there is a greater tendency for causation-type concepts to exist", originated from the following equation extracted from the coincidence analysis: COMP*time+pros*prth+oppe*OPPC*prof<->ppec.

This solution means that the fact that the map is complex and the respondent's relative company time is low, or that the map is retrospective and has a low relative proportion of concepts in the action tail, or that the map has no effectuation opposition and has causation opposition and the respondent is not a teacher are regularly associated with the issue of the map having a low relative proportion of effectuation type concepts.

Therefore, it is identified that complex maps made by individuals who have been at the organization for a short time have a higher relative amount of causation concepts, which is expected, because, by being at the technology center for a shorter time and still being able to build a more complex map, it is more likely that there is a focus on the organization's goals, thus on causation concepts. On another note, the fact that the map is retrospective and has more concepts in its head leads it to have more causation concepts, which is a predictable result, because concepts in the head tend to be causation concepts, especially in conjunction with the map being retrospective, which refers to a greater focus on the goals that were put in place for the action to have taken place.

Proposition 7

Proposition 7: "In retrospective rationalizations, there is a greater tendency for there to be, in conjunction with positive justifications, negative justifications", originated from the following equation extracted from the coincidence analysis: COMP*PROF*pros+OPPE*ppec*PRTH<->NEGT.

Such a solution means that the fact that the map is complex, the individual is a teacher, and the map is retrospective, or the map has effectual opposition, a relatively low proportion of effectual type concepts, and a relatively high proportion of concepts in the tail are regularly associated with the question of the map having a negative justification.

Therefore, it can be seen that when a teacher thinks retrospectively about an action in a complex way, he/she tends to put negative justification on the action, which is expected, since the teachers presented a more general view of the organization. Adding this to the fact that the map was complex and performed retrospectively, it is clear that they were able to consider not only what caused the action to occur, but also the difficulties it faced. Meanwhile, the existence of effectuation opposition along with a low relative concentration of effectuation concepts and a high relative concentration of concepts in the tail also lead to the existence of negative justifications, showing a greater tendency for negative justifications to originate from something that lies prior to the action in the individual's cognitive map and with a greater tendency to be of causation.

Discussion

According to Tapinos and Pyper (2018), there have been only limited studies that analyze forward-looking activity as an individual activity, and those do not present systematic attempts to map this process. Added to this, according to Djuricic and Bootz (2019) "it would be important first to get a deeper understanding of the reasoning behind effectuation" in order to affect the use of the effectuation approach in foresight practices. Thus, from the results obtained this study shows that the fact that actions are rationalized looking backwards or forwards has consequences in the way individuals' theories are constructed, affecting their mental mapping about the justifications for action. Thus, a clear contribution to the development of the behavioral strategy stream and specifically to Felin and Zenger's (2015, 2017, 2020) theory-based view is evidenced in amplifying the study of strategists' theories within an entrepreneurial context, with a differentiation between future, and past, directed thoughts.

Based on this, it can be seen how structural and type classifications can differ considerably in the rationalization of individuals, indicating outcomes that appear to oppose each other but are sustained when considering the combined factors that generate this effect, and with this, it can be seen that the position of justification on the map differs from the classification of this justification according to concepts in terms of effectuation and causation type. Thus, it can be seen how determining a justification structurally brings a new scope of analysis to the way justifications are generally classified within articles dealing with effectuation, which feature an emphasis on classification by type, as in the case of Chandra and Shang (2017). Furthermore, this study highlights how coincidence analysis as proposed by Baumgartner and Ambühl (2020) brings a new way of analyzing justifications underlying mental processes, clarifying the factors that most influence prospective and retrospective rationalizations about strategic and entrepreneurial aspects.

Consequently, it is observed how a study on causality beliefs is able to explain not only past actions, built retrospectively, but also future actions, built prospectively. Therefore, it

corroborates what has been argued in the field of philosophy (see HITCHCOCK, 2017a), i.e., that causality beliefs have a potential to explain likely future actions. Added to this, by showing that effectuation theory has an intimate relationship with the mental processes underlying the actions under analysis, we contribute by showing its potential influence on the behavioral strategy stream, in which authors previously considered that the distinction between causation and effectuation is more related to the action itself than to the mental processes underlying it (Ott et al., 2017). With that, going beyond the already present contribution of the notions of causation and effectuation in the field of strategy (Wiltbank et al., 2006).

In this way, it is observed how effectuation can pertain to certain types of reasoning, such as those coming from individuals who have a broader knowledge of the firm. Meanwhile, causation seems to be more common when maps are built retrospectively. Thus, it also corroborates what was put by Matalamäki (2017b), i.e., that there are certain specific applications of causation reasoning and others of effectuation reasoning.

From this, it is noted how the concepts that classify action as of causation and effectuation types that have been specified from Sarasvathy (2001) and Reymen (2015) bring a rich explanation to the categorization of concepts as causation or effectuation, and can be used widely to classify justifications of actions taken retrospectively and prospectively. However, such classifications do not encompass as a whole how rationalizations can be singled out as causal or effectual, as they do not consider the structural positioning of such justifications. Thus, the present study shows a new way of classifying such actions, going beyond the type classification and considering the position, as something prior or subsequent to the action, in the individual's reasoning. In addition, the existence of the opposition between causation and effectuation, situations in which such classifications give opposite results, shows the possibility of understanding causation and effectuation from different theoretical lenses, capable of illuminating different characteristics of such concepts

Conclusion

While this study was able to generate some theoretical, methodological, and managerial contributions, it also has some limitations. The main limitation of this work comes from the fact that it was based on a single case, which constituted a case capable of representing a highly entrepreneurial context. However, by limiting itself to only one case, it has, as a consequence, a limitation on the study's power to generalize. The main technique used to perform the analysis of this case, the coincidence analysis, brings a rigor to the study and allows to sustain the inferences with a comparison between each of the actions described by the interviewees, but its power of empirical generalization is limited because it is not a technique based on probabilistic arguments, taking a sample as representative of the population as a whole. In this sense, the propositions extracted can be imported to study other similar cases, but only as theorizations potentially applicable to similar contexts.

Consequently, in order to make a robust explanation about the use of causation and effectuation logics in prospective and retrospective rationalizations of strategists in an entrepreneurial context, it is recommended that comparative studies of multiple cases be conducted, in addition

to quantitative researches that can test the propositions brought in this research in a more representative sample of the population of entrepreneurial companies as a whole.

Another limitation of this paper comes from the way the maps were constructed. Although rigorous techniques were employed in order to sustain the credibility of the concepts present in the cognitive maps, they still came from interviews with the entrepreneurs of the technology center. Thus, they have limitations as to how each of the concepts were placed on the map, based on recorded interviews and reviews with the interviewees. Thus, these maps approximate, but do not fully represent, the individual's theory of the phenomenon of interest. Furthermore, the definitions of justifications and non-justifications, as well as the classifications of justification types, were made based on recorded interviews and the researchers' interpretations; thus, they were based on how each individual described the actions, and are subject to different interpretations and consequent classifications.

Even considering such limitations, it is hoped that this work is able to contribute from the way it was developed, in addition to its results and its propositions. Thus, it is expected that it can lead to future theoretical, methodological, and managerial developments on prospective and retrospective rationalizations, and the use of causation and effectuation in entrepreneurial contexts.

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