How does the combination of factors influence entrepreneurs' decision-making logic? A qualitative comparative analysis

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Abstract

This study explores the different paths that lead to the effectuation and causation of entrepreneurial decision-making logic. Data were collected from a sample of 300 entrepreneurs in China in January and March 2018 and analyzed using crisp-set qualitative comparative analysis (csQCA). The results reveal various combinations of four key factors, i.e. environmental uncertainty, entrepreneurial experience, organizational slack, and centralization of decision-making factors, determine the effectuation or causation logics. No antecedent condition alone is necessary to produce the outcome, although several factors are identified as sufficient for the presence of effectual or causal decision-making logics. This study advances the entrepreneurship literature by revealing the combinations of factors that Knowledge of how the factors interact in the decision-making process determine entrepreneurial decision-making logic. The study findings can help entrepreneurs better communicate, discuss and justify their decisions.

Keywords: Effectuation, causation, environmental uncertainty, entrepreneurial experience, organizational slack, centralization of decision-making

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Introduction

Entrepreneurial activities provide viable solutions to economic challenges imposed by rapidly changing business environments (Lin et al. 2020, Stroe, Parida, and Wincent 2018). Particularly, during times of crisis such as the Covid-19 pandemic, entrepreneurs can help in mitigating some of the devastating impacts (Filser et al. 2020, Kraus et al. 2020, Ratten 2020). Despite the critical role of entrepreneurship in overcoming the challenges, the institutional environment and its associated uncertainties can constrain entrepreneurial resources, particularly in emerging economies where institutional environments are typically unpredictable and unstable (He et al. 2020, Michailova and Ang 2008, Yukhanaev et al. 2015).

Scholars have approached the dynamics around entrepreneurial decision-making mainly from two theoretical perspectives – causation and effectuation decision-making logic (Matalamäki 2017, Reuber, Fischer, and Coviello 2016, Sarasvathy 2001). While causation centers around predictive logic, effectuation draws on non-predictive logic. A seminal work by Sarasvathy (2001) explored the distinction between predictive and non-predictive entrepreneurial decision-making logics and presented a shift from the classical entrepreneurship '*opportunity discovery and exploitation'* paradigm towards *'opportunity creation'*. Conventional predictive causal thinking requires the entrepreneurs to conduct planning, starting with the end, analyze and make factual predictions of possible returns, consider alternative actions and select the one with the highest possible return (Perry,

Chandler, and Markova 2012). While predictions form the basis for causal decision-making logic, limited resources and the contextual complexity of forecasting are often challenging, signaling a departure from prediction reliance by academics and practitioners (Dew et al. 2009).

Some scholars argue that effectuation decision-making logic is more advantageous for entrepreneurs as possessing and controlling critical resources may provide better entrepreneurial opportunity than the adoption of a pre-set goals approach under the causation logic (Sarasvathy 2001, Sarasvathy and Dew 2008). However, other scholars appear to disagree with the aforementioned position, arguing that the choice of entrepreneurial decision-making logic is not clear cut but dependents on other moving parts. For example, certain studies, such as Laine and Galkina (2017), Shirokova et al. (2020) and Welter and Kim (2018) argue that entrepreneurs operating in an environment with high degrees of uncertainty are better suited to effectuation decision-making logic. Conversely, Yu et al. (2018) suggested that causation decision-making logic is more ideal for entrepreneurs doing business in less unpredictable places. Other scholars further digress by arguing that it is the experience of the entrepreneur that should be the key determinant between causation and effectuation decision-making logics (Chandler et al. 2011, Politis, Winborg, and Dahlstrand 2012, Sarasvathy 2001, Zhang, Cui, et al. 2019). Therefore, while existing literature provides a conceptual template for understanding and advancing the debate on entrepreneurial decision-making, there is a lack of consensus among scholars on the choice between causation and/or effectuation logic, which provides mixed messages.

This study seeks to narrow this above research gap by exploring *under which*

circumstances can entrepreneurs employ causation and/or effectuation decision-making logics within an emerging economy context. Given the fragmentation and lack of consensus among scholars on the factors that influence entrepreneurial decision making, we draw on the literature to broadly classify four key decision-making determinants of causation and effectuation logic to achieve our research aim. Therefore, we argue that an entrepreneurs' choice of causation or effectuation can be impacted by the level of environmental uncertainty (Bridge 2021, Engel et al. 2014, Laine and Galkina 2017), entrepreneurial experience (Chetty, Ojala, and Leppäaho 2015, Hauser, Eggers, and Güldenberg 2020), organizational slack (Ruiz-Jiménez, Ruiz-Arroyo, and Del Mar Fuentes-Fuentes 2020) and centralization of decision-making (Verreynne, Meyer, and Liesch 2016, Wegner, Faccin, and Dolci 2018). These four broad factors more or less encompass the key factors influencing the entrepreneurial choice of causation or effectuation decision-making logic.

The empirical context of the study is based in China, a strategic and leading emerging economy, which presents a unique opportunity to study how entrepreneurial resource-constrained firms can make decisions and exploit the associated uncertainties and imperfections posed by institutional uncertainties to their benefits (Ahlstrom and Ding 2014, Huang, Liu, and Li 2020, Peng et al. 2020). The institutional environment in emerging economies is typically more unpredictable and unstable relative to developed economies (Arakpogun et al. 2020, Kim, Sawng, and Park 2021, Michailova and Ang 2008). China is a leading example in this regard (Li, Wang, and Long 2019, Wu, Eesley, and Yang 2021) with still considerable levels of state control and business involvement (Cheng et al. 2020, Wang, Wan, and Yiu 2019). Furthermore, there is a burgeoning increase in entrepreneurs with

disruptive innovations and manufacturing hubs that are having a geo-strategic influence on the global economy (Williamson et al. 2020). Moreover, our data sample of 300 entrepreneurs (see the method section for details) is specifically drawn from China's Pearl River Delta, a region that has witnessed an explosive growth in entrepreneurship in recent years (Chen, Wang, and Huang 2020, Yang 2020).

We adopt a crisp-set qualitative comparative analysis (csQCA) (Rihoux and Ragin 2008) in our empirical examination, as this approach provides an opportunity to compare the different configurations affecting effectuation and causation entrepreneurial decision-making logics from an integrated perspective. As causation and effectuation decision-making logics encapsulate different processes of venture functioning and innovativeness (Brettel et al. 2012), our research provides theoretical and practical contributions. For example, our research addresses the lack of efforts to contextualize effectuation (Arend, Sarooghi, and Burkemper 2015, Welter and Kim 2018) by focusing on entrepreneurial experience in China. Our findings also underline the argument that experienced entrepreneurs are likely to apply effectuation logic (Read and Sarasvathy 2005) while novices tend to adopt causation logic (Gabrielsson and Politis 2011). More interestingly, our findings suggest that regardless of the level of experience, entrepreneurial decision making is more robust when a 'hybrid' approach that combines elements of both causation and effectuation logic is adopted.

The remainder of the paper is structured as follows. In the next part, we debate the existing literature and highlight the importance of studying the antecedents of entrepreneurs' decision-making logic. We then explain our data collection process and provide the results of the research. In the final part of the paper, we outline theoretical and practical implications

and suggest future directions for research.

Literature review

Causation and effectuation approaches were introduced to conceptualize the differences in two main entrepreneurial decision-making strategies and heuristic principles impacting venture creation and its functioning (Sarasvathy 2001). Causation is underpinned by rational reasoning with pre-set entrepreneurial goals, systematic planning and analysis of required resources to identify the business opportunities that generate the highest returns (Chandler et al. 2011, Sarasvathy 2001, Wiltbank et al. 2006). Causation asserts the importance of the analysis of the business environment to allow a firm to position itself in the market, identify its competitive advantages and required means to attain its goals. In contrast, effectuation entrepreneurial logic posits that the venture is dependent on and driven by a set of available means, which are effectively used by entrepreneurs to reconfigure endogenous environment in pursuit of imagined opportunities (Dutta and Thornhill 2014, Emami, Packard, and Welsh 2020). Entrepreneurs' perception differs in terms of anticipation of and dealing with uncertainty. Causally driven entrepreneurs strive to avoid making decisions under uncertainty because this is perceived as a potential threat to goal accomplishment. The effectuation approach enables exploitation of unexpected environmental contingencies and flexibility and adaptability to changes in the dynamic business environment (Dutta, Gwebu, and Wang 2015, Fisher 2012).

Attempts have been made by scholars to investigate the antecedents of entrepreneurial decision-making logic with evidence pointing towards the existence of multiple factors influencing the choices of causation and/or effectuation approaches (Laine and Galkina 2017,

Reymen et al. 2015, Roach, Ryman, and Makani 2016, Smolka et al. 2018). As highlighted earlier in the introduction, while such studies provide the foundations for understanding and advancing the debate on entrepreneurial decision-making, there is a lack of consensus among scholars on the factors that influence entrepreneurial decision-making. To mitigate this, we draw on the literature to broadly classify four key decision-making determinants of causation and effectuation logic to achieve our research aim.

Firstly, we argue that environmental uncertainty, in which "the consequences of one's actions and the conditions and/or factors of success are ex-ante unknowable" (Grégoire and Cherchem 2020, 622) constitutes an important contextual factor (Engel et al. 2014, Yu et al. 2018). This makes reliance on prior experience and available information less effective in the process of opportunity identification. The effectuation theory posits that this logic is more appropriate to address environmental uncertainty, which requires entrepreneurs to focus on what could be done with available means and thus be guided by effectuation rather than by causal logic (Chandler et al. 2011, Laine and Galkina 2017). Studies have shown that high uncertainty induces effectuation decision-making logic (Shirokova et al. 2020, Welter and Kim 2018). Although entrepreneurs may use effectuation and causation logics simultaneously, Laine and Galkina (2017) provided evidence to substantiate that increase in environmental and institutional uncertainty increases the use of effectuation. Vanderstraeten, Hermans, van Witteloostuijn and Dejardin (2020) recently highlighted that in a dynamic business environment, relaxing of the rigidity of a causal logic through simultaneous adoption of an effectual logic is unable to provide a sufficient level of flexibility to entrepreneurs. Yu et al. (2018) then argued that causal and effectual logics can be combined in a more uncertain

environment, whereas entrepreneurs operating in less uncertainty tend to adopt causal decision-making logic. The emphasis on the dynamic and unpredictable business environment in these studies further justifies that China is an apposite case to explore how entrepreneurs behave when operating in countries with unpredictable institutional setup.

Secondly, entrepreneurial experience is regarded as one of the most distinctive features of entrepreneurs (Chandler et al. 2011, Politis, Winborg, and Dahlstrand 2012, Sarasvathy 2001, Zhang, Cui, et al. 2019). However, research in this area provides mixed evidence to show which entrepreneurial logic is utilized by expert and novice entrepreneurs. Studies such as Dew, Read, Sarasvathy and Wiltbank (2011), Read, Dew, Sarasvathy, Song and Wiltbank (2009), and Wiltbank, Sudek and Read (2009) demonstrated that expert entrepreneurs in comparison to novices were more effectually driven and applied non-predictive logic to address market uncertainty. This is also echoed by Harms and Schiele (2012), Kalinic (2014) and Chetty et al. (2015) who studied the effectuation concept in the internationalization context. Schmidt and Heidenreich (2018) further indicated that entrepreneurial experience drives causation logic and oppresses effectuation, while entrepreneurs with start-up experience are more likely to be driven by effectuation logic. Conversely, Engel et al. (2014) supported the notion of applying effectuation logic by both expert and novice entrepreneurs. Moreover, entrepreneurs are able to switch between effectual and causal decision logics to better adapt to a specific context (Hauser, Eggers, and Güldenberg 2020). While novices use effectual logic differently even in similar business environments (Liu 2019). Given the burgeoning entrepreneurial activities in China, the research context provides a unique opportunity for understanding the decision making-making dynamics between expert and

novice entrepreneurs.

Thirdly, the availability of relevant resources acts as an antecedent to entrepreneurial logic in a manner that an effectual approach would dominate the causal logic in resource-poor situations (Read and Sarasvathy 2005, Reymen et al. 2017). Driven by entrepreneurial agility (Khan, Majid, and Yasir 2020), the mean-oriented effectual approach could result in greater use of organizational slack, which refers to the resources that are idle and possessed in excess of resource demands from current business (Bourgeois 1981, Sharfman et al. 1988). Theoretically embedded in the resource-based view (Barney 1991), organizational slack helps entrepreneurs to reconfigure existing resources to better adapt to endogenous and exogenous pressures, initiate strategic change and seize unforeseen opportunities that might not be pursued by resource-constrained firms with limited market power and a relatively small customer base (Wiklund and Shepherd 2005). Two opposing research streams have emerged in the discussion of organizational slack (Ruiz-Jiménez, Ruiz-Arroyo, and Del Mar Fuentes-Fuentes 2020). Wang, Guo and Yin (2017), Hughes, Eggers, Kraus and Hughes (2015), and Voss, Sirdeshmukh and Voss (2008) indicated that firms with slack resources are better able to adapt to complex competitive landscapes, take greater risks and have more room for experimentation. Conversely, opposing scholars (Alsos et al. 2020, De Jong, Zacharias, and Nijssen 2020) argued that a high level of slack may signal abundance and could negatively impact entrepreneurial eagerness to explore and creatively utilize their means.

Fourthly, studies have explored centralization of decision-making, which is defined as the degree to which power and control are concentrated in the hands of a relatively few individuals within an organization (Alonso, Dessein, and Matouschek 2008, Khan and

Manopichetwattana 1989, Martin, McKelvie, and Lumpkin 2016). Some researchers argued that at a time of adversity and high uncertainty firms tend to centralize and this approach may reduce the participation of and interaction between members of an organization (Davis, Eisenhardt, and Bingham 2009, Wegner, Faccin, and Dolci 2018, Yan and Yan 2016). An alternative stream of research (Ajayi, Odusanya, and Morton 2017, Alonso, Dessein, and Matouschek 2008, Bakonyi 2018, Giotopoulos et al. 2017, Verreynne, Meyer, and Liesch 2016) advocated that in uncertain environments companies are motivated to decentralize their decision-making practices to fulfill innovation potential of employees and create more room for experimentation and greater flexibility. Given the prevailing sunstantial levels of state control (Wang, Wan, and Yiu 2019) as well as institutional power centralization in China (Zhang, Liu, et al. 2019), it is interesting to explore the debate around (de)centralization of entrepreneurial decision-making in such a context.

While the above analysis further lends credence to our earlier idea of a lack of consensus in the literature, we believe that these four factors broadly capture the key determinants influencing the entrepreneurial choice of causation and/or effectuation decision-making logics. We present our conceptual model in Figure 1.

[Insert Figure 1 about here]

Method

Sample and data collection

We collected data between January and March 2018 and our sample comprised of 300 entrepreneurs from China's Pearl River Delta region, which is known for attracting foreign investments and domestic entrepreneurial development (Chen, Wang, and Huang 2020, Yang

2020). The questionnaire was developed in English, translated into Chinese and sent to entrepreneurs, 235 of which provided valid responses (78.3%). Among the surveyed entrepreneurs, 161 were male (68.5%) and 74 were female (31.5%); 94 had work experience within 5 years, accounting for 40%; 81 had 6-15 years of work experience, accounting for 34.5% and 60 had more than 15 years of work experience, accounting for 25.5%. Among the surveyed entrepreneurs 114 had less than 50 employees, accounting for 48.5%; 87 had 50-200 employees, accounting for 37%; and 34 employed over 200 employees, accounting for 14.5%.

Measures

Environmental uncertainty was measured using a 9-item scale adopted from Jansen, Van Den Bosch and Volberda (2006). The reliability coefficient of the scale was 0.8.

Entrepreneurial experience was measured by dichotomous variables "1" (with entrepreneurial experience) or "0" (without entrepreneurial experience).

Organizational slack was measured using a 3-item scale adopted from Danneels (2008). The reliability coefficient of the scale was 0.7.

The centralization of decision-making was measured using a 5-item scale adopted from Hage and Aiken (1967). The reliability coefficient of the scale was 0.754.

Causation was measured using a 7-item scale adopted from Chandler et al. (2011). The reliability coefficient of the scale was 0.941.

Effectuation was measured using a 13-item scale adopted from Chandler et al. (2011). The reliability coefficient of the scale was 0.686.

The complete measurement items can be found in Table 1.

[Insert Table 1 about here]

Method and calibration

This study uses qualitative comparative analysis (Fiss 2007, Ragin 2008), which allows exploration of the configurations of multiple paths to the desired outcome. We adopted crisp-set qualitative comparative analysis (csQCA) because the relationship between the antecedents (environmental uncertainty, entrepreneurial experience, organizational slack and centralization of decision-making) and the outcomes (causation or effectuation), is, as argued in the literature, non-linear. Moreover, the csQCA method claims causal asymmetry, that is, if A → B, ~ A → ~ B is not at all true. For example, if experienced entrepreneurs are more inclined towards effectual decision-making as argued by Dew et al. (2011) and Wiltbank et al. (2009), then one can assume that the lack of entrepreneurial experience would lead to causal decision-making logic. This assumption, however, can be contested as evidenced by Schmidt and Heidenreich (2018) concluded that experience drives causation logic and oppresses effectuation. Furthermore, the combination of the research antecedent factors has been guided by qualitative comparative analysis (QCA) in extant studies, such as Kusa, Duda and Suder (2021) and Medina-Molina, Pérez-Macías and Gismera-Tierno (2022). The method of csQCA, therefore, allowed us to focus on paths (combination of factors) rather than on the effect of independent variables on dependent variables.

Given the susceptibility of antecedent factors to change (Chu and Yoon 2020), it is critical to focus on the calibration of the current conditions that underpinned our research (Kusa, Duda, and Suder 2021, Medina-Molina, Pérez-Macías, and Gismera-Tierno 2022). Moreover, the work of Ragin (2017, 13) on QCA indicates that the use of uncalibrated measures is “inferior to calibrated measures” as the former “simply show the positions of

cases relative to each other." As mentioned earlier, csQCA enabled us to combine factors rather than just focus on the effect of variables, which is more akin to a calibrated approach. Therefore, calibration would not only enable us to match the underlying antecedents of this paper to external standard (Ragin 2017), but further strengthens the rigour and validity of our research (Pappas and Woodside 2021, Romero-Castro, López-Cabarcos, and Piñeiro-Chousa 2022).

As a precursor to calibration, a researcher must specify the values for a given threshold (Ragin 2017), we converted the variabilities within our antecedent into 'sets' – where sets typify the threshold "…of belonging of a given variability…" (Kusa, Duda, and Suder, 239) in a specified category (Medina-Molina, Pérez-Macías, and Gismera-Tierno 2022). Since a given set can take any value from "0" to "1" (Kusa, Duda, and Suder 2021, Woodside and Zhang 2013), where "0" depict non-membership and "1" for membership (Ragin 2017), we began our calibration process (Kusa, Duda, & Suder, 2021) by assigning "0" and "1" to three antecedents (environmental uncertainty, organizational slack and centralization of decision-making) and two outcomes (causation or effectuation), whereas the entrepreneurial experience antecedent was itself a dichotomous variable (see Table 2).

For the value of environment uncertainty, "0" means stable environment and low uncertainty, and "1" means high environmental uncertainty and fierce competition. For the value of entrepreneurial experience, "0" means no entrepreneurial experience, and "1" means one or more entrepreneurial experiences. For the value of organizational slack, "0" means that the enterprise does not have idle resources for activities other than for daily operations, and "1" means that the enterprise has resources at its disposal for exploratory activities. For the

value of decision centralization, “0” means a relatively low degree of decision centralization and “1” represents centralized decision-making where priority is given to authority and formalization. For the value of causation, “1” means that the enterprise tends to adopt a causation mode for decision-making, and “0” means non-causation. For the value of effectuation, “1” means that the enterprise often adopts the effectuation mode for decision-making, and “0” means non-effectuation.

[Insert Table 2 about here]

We then identified all combinations of antecedents that can lead to the outcomes. Data from 235 valid responses were analyzed through the fsQCA 3.0 software, and the threshold value of case frequency was set to be 1. In Table 3 “1” indicated that the factor appeared and “0” indicated that the factor did not appear. For causation, 67 combinations of “1” and 168 of “0” appeared whereas for effectuation, 74 combinations of “1” and 161 samples of “0” appeared.

[Insert Table 3 about here]

Results and discussion

The output of qualitative comparative analysis (QCA) is divided into two parts: the analysis of sufficient necessity, and counter-factual analysis and solving. In QCA, consistency and coverage are used as the indexes to test the result reliability, that is, to judge to what extent a specific configuration is the necessary and sufficient condition of an outcome and the explanatory power of a specific configuration on the interpreted results. Consistency indicates the adequacy of result paths, and coverage indicates the necessity of result paths. Counter-factual analysis and solving are the intermediate and parsimonious solutions obtained

by incorporating the simple and difficult logical remainder into the operation. Antecedent conditions contained in both the parsimonious solution and in the intermediate solution are called core conditions, while antecedent conditions contained only in the intermediate solution are called subsidiary conditions. It is not required to distinguish the two with sufficient theoretical interpretation since non-core conditions may also be indispensable antecedents in interpretation (Ragin 2008). Accordingly, four antecedent conditions were included in csQCA with a default consistency threshold value of 0.8, and a case frequency threshold value of 1. The results are shown in Table 4.

[Insert Table 4 about here]

As can be seen in Table 4, consistency indexes of all presented paths are greater than the theoretical value of 0.8, indicating that each path is a sufficient condition influencing entrepreneurial logic. The overall consistency index is greater than 0.9 for both outcomes (effectuation and causation). Coverage represents the explanatory power of a path on the interpreted results, and a larger index value indicates greater explanatory power. Thus, we identified seven equally effective paths to effectuation and causation decision-making logics, which contained different combinations of antecedent conditions. For the influence on effectuation, three combinations of antecedents are included, respectively, environmental uncertainty * organizational slack * ~ centralization of decision-making (path 1), environmental uncertainty * entrepreneurial experience * ~ centralization of decision-making (path 2), and environmental uncertainty * entrepreneurial experience * organizational slack (path 3). For the influence on causation, four combinations of antecedents are included, respectively, environmental uncertainty * ~ entrepreneurial experience * organizational slack

* ~ centralization of decision-making (path 4), environmental uncertainty * entrepreneurial experience * ~ organizational slack * ~ centralization of decision-making (path 5), environmental uncertainty * entrepreneurial experience * organizational slack * centralization of decision-making (path 6), and ~ environmental uncertainty * entrepreneurial experience * organizational slack * ~ centralization of decision-making (path 7) (where * represents the concept of intersection in set theory, which means “and”; ~ represents “non” in set theory).

According to the results of our QCA, a high environmental uncertainty condition is a necessary condition for entrepreneurs to adopt effectuation for decision-making (paths 1,2,3), which corresponds to the original conceptualization of Sarasvathy (2001), who argued that threats of undesirable contingencies can be addressed through an effectual approach. This research outcome also extends empirical research, such as of Shirokova et al. (2020) and J. Chen, Liu and Chen (2021), which implies that in an unpredictable and dynamic environment entrepreneurs opt for effectuation decision-making logic. As for causation decision-making logic environmental uncertainty remains a highly influential factor, as it is present in paths 4,5 and 6, however is absent from path 7. This outcome emphasizes the complexity of operating in the context of rapid institutional changes and adverse economic conditions (Peng et al. 2020, Zhang et al. 2020) and could be linked to previous findings of Vanderstraeten et al. (2020) and Reymen et al. (2015). Environmental uncertainty condition is absent from path 7, which supports the notion, that in the environment characterized by a low level of institutional uncertainty (Shirokova et al. 2021) and when the decisions are made about existing artifacts, such as products, services, markets, or technologies (Hauser, Eggers, and Güldenberg 2020), causal decision-making logic is still applicable. Our finding thus provides a new contribution

that signpost the need to make the decisions based on a 'hybrid' approach in a country such as China – one that combines elements of both effectuation and causation.

The notion that experienced entrepreneurs are likely to apply effectual logic as argued by Read et al. (2009) and Read and Sarasvathy (2005) is supported by our findings in paths 2 and 3. Although it was interesting to know that entrepreneurial experience condition is present in paths 5, 6 and 7, which are leading to causal decision-making logic. These outcomes show that expert entrepreneurs facing environmental uncertainty tend to make effectual decisions in decentralized organizations (path 2) or organizations possessing idle resources (path 3), whereas lack of organizational slack and decentralization make causation for those entrepreneurs more appealing (path 5). Path 4 leading to causation reinforces the idea that entrepreneurs can be guided by established plans, even though they lack experience, operate in an uncertain environment and with de-centralized organizational structure, however, poses idle resources. These findings are in line with the previously discussed tendency for novices to employ causal decision-making logic (Gabrielsson and Politis 2011, Read and Sarasvathy 2005) and draw attention to the organizational slack condition (in path 4). Resource availability, as indicated by Ruiz-Jimenez et al. (2020), can have a negative impact on incentives to innovate, eagerness to explore and creative utilization of means. As such, entrepreneurs commit more to established plans and objectives through causal logic. Moreover, in contrast to path 4, the combination of conditions in path 3 shows the presence of entrepreneurial experience condition. Consistent with the study by Chen et al. (2021), we argue (as shown in path 3) that experienced entrepreneurs may have more slack resources available to them from their operational activities, which then can be used to explore a wide

range of mean-driven alternatives for future development (effectual logic).

Our findings provide an interesting insight into the absence of decision-making centralization condition in five out of seven paths. Confirming previous findings (Ajayi, Odusanya, and Morton 2017, Alonso, Dessein, and Matouschek 2008, Bakonyi 2018, Giotopoulos et al. 2017, Verreynne, Meyer, and Liesch 2016), we share the view that in an uncertain environment, firms are motivated to decentralize their decision-making practices while opting for effectuation logic (as seen in path 1 and path 2). As for causation decision-making logic, we found that centralization of decision-making condition is absent in paths 4, 5 and 7, however, this condition is present in path 6. It is worth noting that path 4 and path 5 contain the environmental uncertainty condition and exclude the centralization of decision-making condition. These findings can be interpreted in the context of the transitional economy of China, which is characterized by unique institutional and cultural settings (He, Lu, and Qian 2019) and collectivism in particular, which could help reconcile the tension between exploration and exploitation, and fosters firm's dynamic absorptive capacity (Zhang, Zhao, and Lyles 2018). In such a context, a centralized organizational structure as indicated earlier by Yang, Zhou and Zhang (2015) can weaken the positive effect of collectivism on ambidextrous innovation and managerial efficiency.

Furthermore, the configuration of conditions in path 6 implies, that the presence of all four factors leads to causation decision-making logic. While previous studies found that entrepreneurs driven by effectuation decision-making logic take advantage of and capitalize on contingencies and uncertainty (Futterer, Schmidt, and Heidenreich 2018, Peng et al. 2020), our results show that environmental uncertainty combined with entrepreneurial experience,

organizational slack and centralization of decision-making factors lead to causation decision-making logic. In Path 7, which leads to causation, environmental uncertainty and centralization of decision-making conditions are absent, whereas entrepreneurs indicated their reliance on experience and idle organizational resources.

Robustness assessment

We employed two approaches for robustness checks of the results. Firstly, we identified a combination of antecedent conditions leading to the reverse of outcome variables (Grofman and Schneider 2009, Kan et al. 2016). The cause of positive results and that of negative results are not symmetrical, that is, the combination of antecedent conditions leading to positive results and that leading to negative results can be different. In this paper, three kinds of antecedent condition combinations for "~ effectuation" have been obtained: 1) environmental uncertainty * entrepreneurial experience * ~ organizational slack * centralization of decision-making, 2) ~ environmental uncertainty * ~ entrepreneurial experience * ~ centralization of decision-making, and 3) ~ environmental uncertainty * entrepreneurial experience * organizational slack. These three combinations leading to effectuation are different from those, which we identified initially and do not contradict them. Furthermore, two combinations leading to "~ causation" have been obtained in this analysis: 1) ~ environmental uncertainty * ~ entrepreneurial experience, and 2) ~ entrepreneurial experience * ~ organizational slack * ~ centralization of decision-making. These two conditional combinations are different and not in contradiction with the combinations that we obtained initially.

Secondly, we adjusted the threshold value (Schneider and Wagemann 2012, Skaaning

2011) and found out, that there was no change to the content of combinations after the consistency threshold was raised from 0.8 to 0.9.

Theoretical and practical implications

This study contributes to the literature by uncovering the antecedents and circumstances that trigger entrepreneurs to opt for effectual or causal decision-making logic. Specifically, the findings bridge the knowledge gap on whether entrepreneurs operating in an environment with high degrees of uncertainty need to adopt effectuation (Laine and Galkina 2017, Shirokova et al. 2020) or causation decision-making logic (Yu et al. 2018). We reveal that entrepreneurial decision is not a binary choice. Instead, entrepreneurial decision-making is one that involves a careful analysis of the business environment to adopt the optimal logic, which could either be causation or effectuation, or a combination of elements from both logics. We refer to the latter as a 'hybrid' approach to entrepreneurial decision-making – one that combines causation and effectuation logics irrespective of, for example, the levels of a firm's experience and organizational slack.

The study contributes to solving the problem of a lack of consensus and mixed messages in the literature when it comes to the choice between causation and/or effectuation logic, by showing that the combination of four antecedents more or less encompasses the key factors influencing entrepreneurial choice. While some prior scholars argued that an entrepreneurs' choice of causation or effectuation can be impacted by the level of *environmental uncertainty* (Bridge 2021, Engel et al. 2014, Laine and Galkina 2017), another school of thought focuses on *entrepreneurial experience* (Chetty, Ojala, and Leppäaho 2015, Hauser, Eggers, and Güldenberg 2020). Others pinpointed *organizational slack* (Ruiz-Jiménez, Ruiz-Arroyo, and

Del Mar Fuentes-Fuentes 2020) as opposed to *centralization of decision-making* (Verreynne, Meyer, and Liesch 2016, Wegner, Faccin, and Dolci 2018). To the best of our knowledge, none of these studies have combined these antecedents to explore their dynamic relationship. Our study is among the first to combine these antecedents and uncover the fact that these factors do not exist in isolation but interact to influence entrepreneurial decision-making. Our findings show that environmental uncertainty combined with entrepreneurial experience, organizational slack, and centralization of decision-making can also inform the choice of causation logic. This provides further support for our proposal of a hybrid approach to entrepreneurial decision-making, particularly in emerging economies with a high level of unpredictable institutional environments such as China.

Speaking of China, we use this leading and strategic emerging economy context to underline the practical implication of our findings and address the lack of efforts to contextualize, for example, the effectuation logic (Arend, Sarooghi, and Burkemper 2015, Peng et al. 2020, Welter and Kim 2018). Our research thus responds to an important call by adding to scarce knowledge (Peng et al. 2020) and revealing the specificity of factor combinations leading to causation and/or effectuation decision-making logics in China.

The findings of our study have practical implications for entrepreneurs operating in emerging economies such as China. The study suggests that effectuation is not simply the opposite of causation decision-making logic. As such, entrepreneurs are encouraged to consider which combinations of factors lead to effectuation outcomes. In other words, effectuation is not an “anything goes” approach (Hauser, Eggers, and Güldenberg 2020), but rather it relies on certain principles and practices, such as the utilization of entrepreneurial

experience in adverse environmental conditions and rejection of centralized decision-making or combined entrepreneurial experience with organizational slack at time of high environmental uncertainty. As uncovered in the current study, knowledge of how the factors interact in the decision-making process will help entrepreneurs to communicate, discuss and justify their decisions.

Limitations and future directions

Although this study provided insightful findings, it also contains certain limitations, and further research is needed. Firstly, as the data was collected from a single emerging market setting (i.e., China's Pearl River Delta region), further studies may focus on other regions in China or other emerging economies to complement our study. Secondly, we analyzed the combinations of four factors influencing entrepreneurial decision-making logic. Future research may explore the interaction of other factors not captured in this study, for example, those underpinned by institutional logic (Greenwood et al. 2011) and influence the way individuals act and behave. Thirdly, although QCA method is particularly useful for exploration, identification of multiple paths to an outcome (equifinality), and deeper understanding of factor combinations rather than independent causes (Marx, Rihoux, and Ragin 2014), the method lacks explanatory power. In order to explain how and why factors interact and lead to the outcome, further research can be conducted by using different qualitative or quantitative methods. Finally, scholars may consider paying particular attention to contexts, such as industry and examine possible changes in decision-making logic over time and how entrepreneurs combine effectuation and causation to gain competitive advantage.

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Table 1: Measurement items for variables

Environmental uncertainty

1. The degree of changes in the market environment, in which the company operates is dramatic.
2. Customers often have new requirements for the company's products/services.
3. The market environment in which the enterprise is located is constantly changing.
4. In the past year, the market environment, in which the enterprise is located has not changed (Reverse-coded).
5. The number and variety of products/services in the market, in which the company operates are constantly and rapidly changing.
6. The company is in a market where competition is very fierce.
7. The company faces relatively strong competitors.
8. The company is in a highly competitive market.
9. The market where the company is located is often in a price war.

Organizational slack

1. My company has a proper reserve of resources.
2. My company has sufficient financial resources.
3. My company can always find the resources it needs when it needs them

The centralization of decision-making

1. Employees have sufficient opportunities for informal communication.
2. Staff in different departments may call each other if needed.
3. We discourage employees from discussing work-related issues with people who are not their direct supervisors (Reverse-code).
4. Employees have easy access to each other.
5. The employees can easily talk to a person whom they need to talk to.

Causation

1. We analyze the long-term opportunities and select the ones that would provide the best returns.
2. We adopt strategies that best leverage our resources and capabilities.
3. We design the business strategy and make detailed plans.
4. We organize and implement control processes to ensure that objectives are met.
5. We select our target market on the basis of research and conduct a full competitive analysis.
6. We have a clear and consistent vision of what we want to achieve.
7. We plan and design our production and marketing activities.

Effectuation

1. We try to launch different products and/or adopt different business models.
2. We now offer almost the same products and services as previously envisioned (Reverse-coded).
3. We now offer products and services that are completely different from the original design.
4. We will try various ways until we find the right business model.
5. We always invest resources to the extent that we can afford to lose.
6. We always invest money within the limits of what we initially thought we could

afford to lose.

7. We ensure that even if the investment project fails, the company will not be exposed to financial risk.
8. We expand our business when opportunities arise.
9. We adjust our work plan according to the resources we have.
10. We remain flexible to seize and capitalize on opportunities as they arise.
11. We avoid actions that limit flexibility and adaptability.
12. We agree in advance with customers, suppliers and other organizations to reduce uncertainty.
13. We obtain as much prior commitment from our customers and suppliers as possible.

Table 2: Calibration of variables

	Variables	Calibration	Results
Antecedents	Environmental uncertainty	≥5.7571	1
		＜5.7571	0
	Entrepreneurial experience	yes	1
		no	0
	Organizational slack	≥5.1429	1
		＜5.1429	0
	Centralization of decision making	≥4.1657	1
		＜4.1657	0
Outcomes	Causation	≥5.8	1
		＜5.8	0
	Effectuation	≥5.3165	1
		＜5.3165	0

Table 3: Truth table (causation/effectuation）

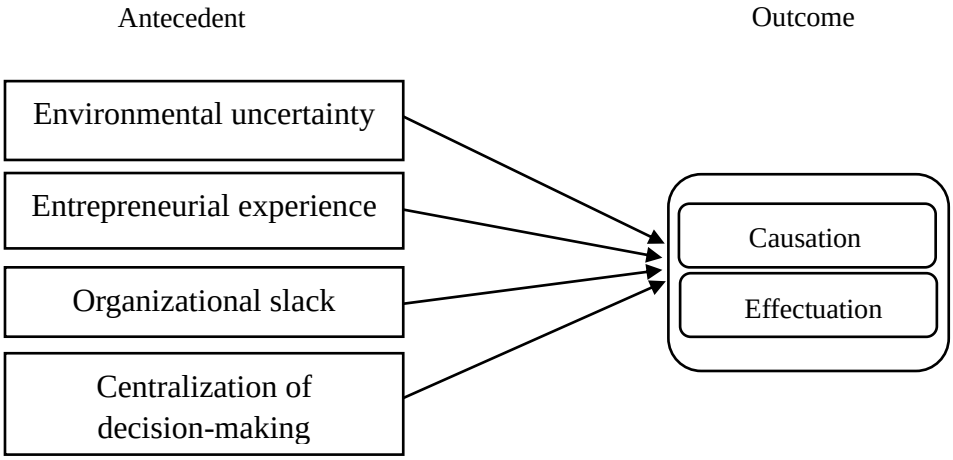
Environmental uncertainty	Entrepreneurial experience	Organizational slack	Centralization of decision making	Frequency	Causation
1	1	0	0	2	1
0	1	1	0	2	1
1	0	1	0	1	1
1	1	1	1	5	1
1	1	0	1	3	0
0	1	1	1	3	0
0	1	0	0	6	0
1	0	0	1	2	0
1	1	1	0	3	0
0	1	0	1	4	0
1	0	0	0	2	0
0	0	0	0	1	0
0	0	1	0	1	0
Environmental uncertainty	Entrepreneurial experience	Organizational slack	Centralization of decision making	Frequency	Effectuation
1	1	1	0	3	1
1	1	0	0	2	1
1	0	1	0	1	1
1	1	1	1	5	1
1	0	0	0	2	0
0	1	0	0	6	0
1	1	0	1	3	0
0	1	0	1	4	0
0	1	1	1	3	0
0	1	1	0	2	0
1	0	0	1	2	0
0	0	0	0	1	0
0	0	1	0	1	0

Table 4: Configurations for effectuation and causation *

	Effectuation			Causation			
	1	2	3	4	5	6	7
Environmental uncertainty	●	●	●	●	●	●	ⓧ
Entrepreneurial experience		●	●	ⓧ	●	●	●
Organizational slack	●		●	●	ⓧ	●	●
Centralization of decision-making	ⓧ	ⓧ		ⓧ	ⓧ	●	ⓧ
Raw Coverage	0.25	0.33	0.47	0.05	0.11	0.21	0.11
Unique Coverage	0.07	0.13	0.27	0.05	0.11	0.21	0.11
Consistency	1	1	0.88	1	1	0.8	1
Overall Coverage	0.67			0.47			
Overall Consistency	0.91			0.9			

*Black circles indicate the presence of a condition, and circles with "×" indicate its absence. Blank spaces indicate "don't care".

Figure 1: The proposed conceptual model



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