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Management Decision

Italian entrepreneurial decision-making under lockdown: the path to resilience

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Abstract

Purpose – This study addresses current research gaps by integrating resilience literature with crisis management theories, focusing on SMEs. Specifically, we examine how the entrepreneurial decision-making process, via the interplay of causation and effectuation logic, impacts a firm's ability to respond to unpredictable events. Our investigation seeks to unearth the potentially complex interplay between causation and effectuation logic in fostering organisational resilience, particularly in the face of unprecedented disruptions such as the COVID-19 pandemic.

Design/methodology/approach – This study includes the responses of 80 Italian entrepreneurs operating in the hospitality sector. The paper deployed a joint analysis through a Partial Least Squares

Structural Equation Modelling technique (PLS-SEM) and a Necessary Condition Analysis (NCA) to assess how the decision-making logics impact the entrepreneurs' decision when reacting to the pandemic.

Findings – The findings show that how entrepreneurs make decisions influence how they react to the crisis. Causation was found as a direct cause of resilience and preparedness, and effectuation was a direct cause of resilience and agility. Moreover, causation indirectly caused resilience through preparedness, and effectuation indirectly caused resilience through agility. Finally, both preparedness and agility are direct causes of resilience.

Practical implications – Our research generated insights into why and how some SMEs respond more effectively to uncertainty than others. It provides actionable strategies that business owners and managers can employ to enhance their ability to withstand and recover from crises.

Originality – This study's originality and novelty lie in its empirical investigation of the roles of causation and effectuation logic in entrepreneurial decision-making and, consequently, their influence on SME resilience. Focused on the Italian hospitality sector, it provides unique insights into resilience strategies under severe, real-world conditions, contributing to theoretical development and practical applications in crisis management.

Keywords: Entrepreneurial decision-making; resilience; covid-19; hospitality; SMEs;

1. Introduction

Entrepreneurs invariably grapple with adversities that threaten their business performance and functionality. The COVID-19 pandemic, a prime example of such adversities, has created a volatile business environment and significantly altered traditional business practices (GEM, 2020). Despite the unpredictable nature of such disruptive events, it is observed that certain firms exhibit a higher capability to confront the unexpected (Sutcliffe and Vogus, 2003). This observation has prompted scholars to explore firms' reactions to external shocks, employing resilience as a theoretical lens to understand disruption (Williams *et al.,* 2017).

While historically pertinent in organisational studies (Alexander, 2013; Linnenluecke, 2017), resilience has been relatively underexplored in the crisis management literature (Boin et al., 2010; Williams *et al.*, 2017). This gap may be attributed to the research focus on the dynamics, causes, and aftermath of crises rather than on discerning how organisations can effectively navigate change and adversity (Comfort, 2007). Furthermore, the majority of resilience literature has been centred on large firms (Linnenluecke, 2017), leaving a research void concerning the response of Small and Medium Enterprises (SMEs) (Branicki, 2022). Existing studies present conflicting results: while some underscore the lack of resilience in SMEs due to resource scarcity and inadequate planning (Branicki, 2022; Ramadani *et al.*, 2022), others highlight their ability to cope with disruptive events by leveraging distinct capabilities (Rapaccini, 2020). This dichotomy underscores the need for a more nuanced understanding of how SMEs can respond to crises and the factors that can enhance resilience.

While the literature on SMEs and resilience is still sparse, it remains crucial to consider the role of entrepreneurs in shaping resilience when investigating SMEs. Indeed, entrepreneurs' actions and decisions strongly impact firms' strategies and their ability to cope with unexpected events (Caputo and Pellegrini, 2021; Zollo *et al.,* 2021). Previous scholars focused on entrepreneurial decision-making, especially in contexts of high risk and uncertainty that mainly characterise the working environment of entrepreneurs (Emami *et al.,* 2020; Shepherd *et al.,* 2015). In this regard, there is a general understanding that causation and effectuation logic influences decision-making processes in situations of uncertainty

and induces entrepreneurs to handle resources effectively (Sarasvathy, 2001; Akinboye and Morrish, 2022). Causation is a decision-making process that requires detailed planning, and it is more suitable in stable and predictable working conditions. Conversely, effectuation is led by intuition and imagination. It is more effective when the environment is perceived as uncertain, new, or unpredictable (Sarasvathy, 2001). Past studies revealed that effectuation could form resilience in different contexts, including new venture creation (Galkina *et al.,* 2022) and business takeover negotiations (d'Andria *et al.,* 2018). Effectuation and causation have also been studied in the post-disaster recovery environment, highlighting their role at different stages of the disruptive event (Nelson and Lima, 2019). However, research investigating the role of causation and effectuation in fostering resilience is still limited and calls for further research on the topic considering the crucial role played by entrepreneurship in post-disaster recovery (Akinboye, 2022). These considerations led us to formulate the following research question: given the disruption caused by the COVID-19 pandemic, how can SMEs respond to uncertainty using causation and effectuation logic, and what is their role in shaping resilience?

Our study proposes a quantitative analysis of how effectuation and causation foster resilience during the first phase of the COVID-19 pandemic by adopting a risk-management perspective (Rapaccini *et al..,* 2020). Our analysis focuses on 80 Italian entrepreneurs operating in the hospitality sector. We view this context as appropriate, considering how aggressively COVID-19 has hit the tourism sector (GEM, 2020). Our study makes three main contributions to entrepreneurship and resilience literature. First, it enriches the current literature and furthers our understanding of the relationship between an organisation's capabilities and adversity by combining the two streams of literature (resilience and crisis management) and assessing how resilience can be achieved during a disruptive event. Second, our analysis empirically tests the role of entrepreneurial decision-making in a disruptive crisis, such as the COVID-19 pandemic. This study helps explain why some SMEs respond better to uncertainty and what are the organisational ingredients to foster resilience. Finally, our findings also have practical implications, suggesting that, even in extremely uncertain conditions, entrepreneurs can develop strategies to recover better and survive, also providing managers and small business owners with concrete solutions to recover from crises.

The paper is structured as follows. The next section describes the literature review and the hypotheses. Then in the method section, the sample and variables used in the analysis are described. After that, the analysis results are presented, and the paper ends with a discussion of findings, limitations, and suggestions for future research.

2. Theoretical backgrounds and hypotheses

Disruptions in the business environment can challenge business performance; for this reason, scholars have tried to explain the crisis's nature and impact (Sine and David, 2003; Wan and Yiu, 2009). A crisis has been defined in management as "a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organisation" (Pearson and Clair, 1998, p. 60). However, the current crisis caused by COVID-19 differs from previous crises, causing a sort of paralysis of the economic system. Indeed, as a response to the spread of the virus, restrictive lockdown measures have been implemented, resulting in the partial or total interruption of economic activities starting from March 2020. The uncertainty created by COVID-19 was even more drastic in Italy, the first European country to be hit by the pandemic, especially for SMEs. Total early-stage Entrepreneurial Activity (TEA)[1] was already decreasing in Italy in 2019, and the situation worsened with the pandemic outbreak (GEM, 2020). Among entrepreneurs, the hospitality and tourism sectors suffered the most due to travel restrictions and growing anxiety about crowded places. Moreover, these sectors were not prepared to work remotely since most of the core business activities require the physical presence of customers. Therefore, the hospitality sector in Italy provides an interesting and unique case study to investigate entrepreneurial responses to the crisis.

2.1. Resilience in entrepreneurship

Resilience has been defined in different streams of literature, demonstrating its appeal across fields and scholars' difficulties in building a common ground theory. At the organisational level, resilience has

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[1] Total early-stage Entrepreneurial Activity (TEA) Rate: Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business (Global Entrepreneurship Monitor).

been described as the ability of an organisation (in terms of resources, routines, structures, etc.) to absorb an environmental shock and learn to bounce back (Meyer, 1982; O'Hare, 1989). Other scholars (Gittell *et al.*, 2006; Lengnick-Hall and Beck, 2005) define resilience as an organisation's "dynamic capability" to exploit and capitalise on a disruptive event. Subsequently, the concept of resilience has extended to broader systems (society, city, community, etc.) that have peculiar features (culture, social connections, etc.) fundamental for actors in the system to cope with adversity (Hall and Lamont, 2013). At the entrepreneurial level, resilience is often presented as a synonym of individual resilience due to the fundamental role of the entrepreneur in the firm's performance (Branicki *et al.*, 2018). As such, resilience identifies as "a personality trait of the entrepreneur" (Bernard and Dubard Barbosa, 2016) or as a result of entrepreneurial life experiences (De Vries and Shields, 2006). Another controversial issue among scholars concerns the nature (outcome or process) of resilience, which impacts its temporal occurrence. Resilience as an outcome happens at the end of the disruptive event, as the ability of the organisation to survive. On the other hand, resilience as a process is situated all over the path an organisation must cross to endure without succumbing. Resilience differs from pivoting since pivoting refers to a change in a firm's strategy that reconstructs the firm through a reallocation or restructuring of activities, resources, and attention (Kirtley and O'Mahony, 2020). Our study adopts a middle-ground definition of resilience proposed by Williams (2017) as "the process by which an actor (i.e., individual, organisation, or community) builds and uses its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning before, during, and following adversity." In particular, the paper explores how resilience evolves in the context of Italian SMEs and the role of entrepreneurial decision-making in shaping resilience during the first phase of the pandemic (first half of 2020). Therefore, it represents a multilevel approach to resilience, investigating the role of entrepreneurs (individual resilience) in creating a resilient SME (organisational resilience).

2.2. Causation and effectuation logic

Most SMEs are founded by entrepreneurs who must make crucial daily decisions for their business activities, most of the time in an uncertain business environment. Given the importance of making accurate decisions and their impact on business success and performance, previous scholars have analysed the process by which entrepreneurs make decisions (Shepherd *et al.*, 2015). Sarasvathy (2001)

identifies two modes of reasoning entrepreneurs employ when they face a decision in business contexts: causation and effectuation. The causation process starts from a given effect and chooses between means to create that effect. It usually characterises a problem-solving decision based on the logic of prediction. The effectuation process, on the other hand, chooses between creating many possible effects with the given set of means (Sarasvathy, 2001). Effectual reasoning is led more by intuition and imagination, focusing on exploiting contingencies and creating new markets. It is based on the logic of control and is more effective in uncertain business settings where new environments can be explored. The work of Sarasvathy challenged the traditional understanding of entrepreneurial decision-making and behaviour. The two logics were initially often introduced as opposite dimensions. Yet, recent research confirmed that they are not mutually exclusive and are rather part of a continuum spectrum of decision-making (Alsos *et al.*, 2020), thus enabling the firm to remain focused on what is predictable (causation) and respond quickly to possible external turbulences (effectuation). The coexistence of causation and effectuation has been studied in three different ways: a combination of the two logics at the same time (Brettel *et al.*, 2012), the predominance of one logic over the other at different moments in time and depending on the business context entrepreneurs were facing (Nummela *et al.*, 2014; Reymen *et al.*, 2015; Smolka *et al.*, 2016), and their coexistence in separate functional areas (Sarasvathy, 2001). These studies have been developed in contexts related to entrepreneurial experience (Dew *et al.*, 2009; Sarasvathy, 2008) and new venture creation and performance (An *et al.*, 2020; Reymen *et al.*, 2015; Smolka *et al.*, 2016). Causation and effectuation also play an important role in resilience because they shape entrepreneurial action and generate different responses towards disruption (Sutcliffe and Vogus, 2003; Castellanza and Woywode, 2022). In this vein, scholars investigate the temporal separation of causation and effectuation in different phases of disaster recovery (Nelson and Lima, 2019) and new venture creation (Galkina *et al.,* 2021). They stressed the dominance of effectuation in the early stages when uncertainty is high, and goals have low specificity and causation emerging only in the subsequent phases. In addition, causation and effectuation have also been studied in a business takeover environment (d'Andria *et al*., 2018), revealing how the two logics activate different dimensions of resilience, cognitive and emotional, respectively. This interesting result shows how adopting one logic changes the response to environmental challenges, activating different behavioural tendencies.

However, studies on causation and effectuation adoption to COVID-19 disruption are still limited (Eggers, 2020; Simms *et al.,* 2022) and calling for further research, especially on the combinations of the two logics to managing the outcomes of crises (Eggers, 2020). To fill this gap, we will study the role of causation and effectuation as simultaneous logic, both necessary to shape resilience in disruptive times. Our analysis contributes to the existing literature in three ways. First, it enriches the conflicting literature on causation and effectuation, presenting an empirical application supporting the view that the two logics are complementary. Second, it provides empirical evidence of SMEs' response to extreme events, thus augmenting the literature on entrepreneurial resilience, which is primarily conceptual and needs more empirical research on entrepreneurial response to the crisis (Branicki *et al.*, 2018). Third, it develops a framework that analyses the impact of decision-making logic as antecedents of resilience starting from the responses of entrepreneurs during disruptive times, addressing calls by Akinboye and Morrish (2021) and Simms *et al.* (2022) by contributing to the discussion of the relationship between effectual and causal logics in response to disruption.

2.3 Theoretical framework

Our theoretical framework comes from the combination of causation and effectuation theory and entrepreneurial resilience. As previously said, causation and effectuation logic find their roots in the seminal work of Sarasvathy (2001). She challenges the opportunity-discovery theory of entrepreneurship (Shane and Venkataraman, 2000), according to which entrepreneurs evaluate and exploit opportunities rationally by comparing the value of the opportunity against the cost to generate that value. Effectuation theory assumes that under situations of uncertainty, entrepreneurs seek to minimise costs and acquire key resources by exploiting contingencies (Chandler *et al.,* 2011) rather than planning. Following previous studies on causation and effectuation as enablers of different forms of resilience (d'Andria *et al.,* 2018), we include the concept of resilience in our framework. In doing so, we adopt a four-stage model developed by Rapaccini et al. (2020) that describes the necessary elements to build resilience during the COVID-19 crisis based on the different periods of the pandemic (days, weeks, months, and years). According to this model, firms undergo the stages of calamity (in the early days of the crisis), quick and dirty (in the following weeks), restart (in the following months), and adapt to the next normal (in the years to come). Each stage corresponds with a key strategic ingredient:

preparedness to respond to calamity, agility to enable quick and dirty, elasticity to allow restart, and redundancy to adapt to the next normal. Our analysis focuses on the early entrepreneurial responses, from a strategic decision-making point of view, corresponding to the first two stages. Accordingly, we focus on the decision-making recipe that allows the generation of preparedness and agility to develop a resilient response to the early phases of the COVID-19 pandemic (Figure 1).

Preparedness is the ability of decision-makers whose businesses are facing turbulent situations to re-think the company's needs and find new opportunities and ideas to overcome the crisis event (Rapaccini *et al.*, 2020). This skill assumes the organisation is flexible and can reorganise resources as needed. Preparedness is fundamental in the first days after the crisis when entrepreneurs must understand the new phenomenon, make employees aware of the situation, and decide how to reorganise the resources to face the needs of the unexpected situation (Muñoz *et al.,* 2019; Rapaccini *et al.*, 2020). The second ingredient is agility, the ability to react quickly to changes in the external environment, which is extremely important in situations where uncertainty prevails (Rapaccini *et al.*, 2020). It can be interpreted as the capacity to be resilient quickly. Agility is crucial in the weeks after the disruptive event when energy is dedicated to developing simple solutions to provide business continuity and mitigate the impact of restrictions (Rapaccini *et al.*, 2020).

Based on what has been described so far, we want to examine how causation and effectuation impact as antecedents of resilience on preparedness and agility and how all the variables then impact resilience.

The role of causation on resilience

The causation logic is based on maximising the potential return by choosing optimal strategies after detailed market analysis and focuses on the predictable part of an uncertain future (Sarasvathy, 2001). The causation process comprises a given goal and a set of alternative means that decision-makers can use depending on the effect they want to realise. This way of thinking relies on logical reasoning as a predictive instrument and aims to control unexpected events through strategic planning. Numerous authors in the past assumed the existence of two schools of thought explaining the role of planning in business performance. One of these, the planning school, is built on the assumption that planning improves human action and promotes the realisation of predetermined goals (Delmar and Shane, 2003). Moreover, planning helps organisations to be prepared for future events, reducing uncertainty and

enhancing faster decisions (Brinckmann *et al.*, 2010). Based on these arguments, we hypothesised that using a logic of thought based on causation leads to having a resilient organisation. The variable "resilience" has to be evaluated as the capacity of an organisation to make long-term decisions, be prepared for unexpected events, and respond to disruptions modifying the business model if necessary. Thus, we propose the following hypothesis:

H1 Causation positively affects organisational resilience in hospitality SMEs.

The role of causation on preparedness

Advanced planning may allow faster decision-making since causes of deviations from the implemented plan can be easily and rapidly detected. In addition, it will enable employees to optimise resource flows by avoiding bottlenecks that can cause delays (Brinckmann *et al.*, 2010). Moreover, planning facilitates the communication of set goals among people inside and outside the firm, increasing the pace at which the firm acts to achieve objectives (Delmar and Shane, 2003). This ability is strictly interconnected with preparedness which, according to Muñoz (2019), can be elaborated on four central attributes: anchored reflectiveness, situated experience, breaking through, and reaching out. In our context, the reaching out attribute is preponderant, suggesting the outward-looking dimension of preparedness related to how entrepreneurs react to external circumstances. Indeed, after an expected event such as COVID-19 disruption, it becomes crucial to communicate with internal and external stakeholders to organise and form business activities to co-create and re-enforce experience (Muñoz et al., 2019). Based on what has been described above, we hypothesised that adopting a causation-based way of thinking could lead to a better-prepared company in analysing its needs and finding new solutions (such as communicating its needs, creating new products/services or exploiting new markets) to overcome difficult periods. This leads us to the following hypothesis:

H2 Causation positively affects preparedness in hospitality SMEs.

The role of preparedness on resilience

Preparedness is an essential antecedent to resilience (Rapaccini *et al.*, 2020). Indeed, as previous authors suggest, entrepreneurs show resilience by preparing for crises instead of preventing them and underline the crucial role of past crisis experiences in reacting to future unexpected events (Muñoz *et al.*, 2019). "Ideal" rules for crisis preparedness would require pre-crisis planning based on accurate knowledge,

learning, and actions to be prepared for disruptive events. However, there are some difficulties in doing this, led by the low probability of such events and the great demands of resource planning, especially for SMEs (McConnel and Drennan, 2006). Therefore, in our analysis, we adopted a definition of preparedness that considers the ability of the organisation to re-think the needs of the firm (bouncing back) and implement new solutions to overcome the adverse event (bouncing forward) (Rapaccini *et al.,* 2020). In line with this vision, preparedness has been conceived, from an organisational point of view, as a series of actions entrepreneurs can undertake to reduce vulnerability from the external environment and build resilience (Williams *et al.*, 2017). These arguments lead us to assume that if a company invest in new strategies to cope with the crisis, such as building new strategic alliances, developing new products or services to generate revenues, and exploring new possible markets, it will be prepared to face the instability and paralysis of the crisis and recover from it without suffering irreparable damage. This leads us to the following hypothesis:

H3 Preparedness positively affects organisational resilience in hospitality SMEs.

The mediating role of preparedness in the relationship between causation and resilience

Both causation and preparedness are direct causes of resilience: an organisation that follows a causal logic and can develop strategies to cope with crises is more likely to be resilient. Yet, preparedness also plays a role in the relationship between causation and resilience. Causation relies on analysis and planning techniques to define predetermined goals (Sarasvathy, 2001), which supports preparedness (Muñoz *et al.*, 2019). For example, a firm that reasons with a casual logic would have stocks of materials in the warehouse and will not adopt a just-in-time logistic. This will impact preparedness since the organisation will have resources that can be easily used to be flexible and react to changes in the external environment (Rapaccini *et al.*, 2020). All said above leads to resilience: the organisation is prepared to be flexible and to respond to disruption. These reasons lead us to the following hypothesis:

H2ΛH3 Preparedness mediates the relation between causation and resilience in hospitality SMEs.

The role of effectuation on resilience

Effectuation is a theoretical framework of decision-making that can help entrepreneurial actions, and it emphasises control rather than prediction (Sarasvathy, 2008). Effectuation logic asserts that entrepreneurs work with the resources they already possess (*bird in hand* principle), consider decisions

that involve affordable losses instead of profit maximisation (*affordable-loss* principle), take advantage of strategic alliances *(crazy-quilt* principle) and prefer to exploit contingencies (*lemonade* principle). This logic was introduced as opposed to causation. However, one logic does not exclude the other, and both co-exist and can be effective depending on how the decision-maker perceives the problem situation and the business context. In this regard, scholars investigate the positive relationship between effectuation and uncertainty, revealing how an effectual logic can be more effective in situations where the environment is dynamic and nonlinear (Chandler *et al.*, 2011; Sarasvathy, 2001) such as the one of COVID-19 disruption. Moreover, effectuation also assists the development of resilience. It enables quick response to unexpected events by leveraging contingencies and acquiring resources through personal means and strategic cooperation (Nelson and Lima, 2020; Simms *et al.,* 2022). Thus, we propose the following hypothesis:

H4 Effectuation positively affects organisational resilience in hospitality SMEs.

The role of effectuation on agility

Agility is the capacity to respond rapidly to changes in the external environment and implement quick and smooth solutions to cope with them (Rapaccini, 2020; Teece, 2016). Past literature investigated agility from various perspectives: portfolio agility is the ability of the organisation to relocate resources from one business entity to the other, organisational agility allows a firm to recognise internal opportunities, while strategic agility is related to firms 'capabilities to take advantage of both internal and external opportunities' (Jafari-Sadeghi *et al.,* 2022). Several dynamic capabilities sustain the development of agility; among them, a key role is played by networking, a relational system of connections that gives firms access to external knowledge and resources and boosts the development of interfirm ties, ensuring flexibility and responsiveness (Mokhtarzadeh *et al.,* 2021). One of the five principles that constitute effectuation, the crazy quilt, describes effectual entrepreneurs as cooperation seekers willing to collaborate with trustworthy parties and exploit external contingencies. Reflecting on what has been said so far, we assume that an effectual decision-making logic will contribute to higher agility, leveraging on networking relationships. Thus, we propose the following hypothesis:

H5 Effectuation positively affects agility in hospitality SMEs.

The role of agility on resilience

The capacity of a firm to be agile and react quickly to disruption is extremely important in contexts with high turbulence and volatility. The COVID-19 crisis, in addition to having the normal features of a crisis, such as instability and unpredictability, is also configured as an environment characterised by absolute uncertainty. As Packard et al. (2017) describe, absolute uncertainty is a situation where the entrepreneur has to investigate not only what solution could be better to solve a particular problem or need but also how valuable the solution could be for the organisation. It becomes clear that, in an ambiguous environment where it is difficult to know exactly the best strategy, a clear ingredient to survive is being agile. Agility will help the decision-maker to be dynamic and react quickly to crises and to find solutions to cope with them. Thus, we propose the following hypothesis:

H6 Agility positively affects organisational resilience in hospitality SMEs.

The mediating role of agility in the relationship between effectuation and resilience

Christopher (2000) argued that a key characteristic of an agile organisation is flexibility. Using the effectuation logic leads the entrepreneur to be flexible and take advantage of unplanned situations that can arise in daily situations. We argue that the logic of effectuation leads to a flexible and agile organisation and, following Rapaccini et al. (2020), considers agility a necessary element for building resilience. Therefore, we propose that:

H5ΛH6 Agility mediates the relationship between effectuation and resilience in hospitality SMEs.

Taken together, our hypotheses portray a theoretical model (Figure 1), which displays four alternative paths to resilience: two direct paths from causation and effectuation to resilience and two indirect paths leveraging on the mediating roles of preparedness and agility.

Insert Figure 1 here

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3. Methods

3.1. Data collection and measures

Data were collected by administering a survey to 80 entrepreneurs operating in the hospitality sector in the northern part of Italy—Veneto and Trentino—among the regions most affected by the first phase of the pandemic (ISTAT, 2020). The survey comprises 22 questions translated from English into Italian following the back-translation procedure (Harkness and Schoua-Glusberg, 1998). We now proceed to delineate the constructs.

Resilience (RES) was measured with a 4-item 5-point Likert scale derived from Rapaccini et al. (2020). Items included how the company communicates and distributes its value, the introduction or increment of new communication channels (social media and website), new ways to distribute products/services (delivery, take away) and possible termination of some traditional distribution channels.

Causation (CAU) and effectuation (EFF) logic were measured using a 5-point Likert scale of 6 items developed by Gabrielsson and Politis (2011). The dimensions of CAU and EFF were measured separately, allowing respondents to select any mix of the two approaches. The items utilised were based on Sarasvathy (2001) and are constructed to measure the tendency of entrepreneurial decisions regarding market definition, goal orientation (predetermined versus flexible goals), uncertainty relation (avoid or welcome it), stakeholder relationships (long-term relationship versus accidental and informal one) and market research (detailed analyses versus informal methods).

Agility (AGI) was measured with a 5-point Likert scale of 3 items derived from Rapaccini et al. (2020). These items were designed to verify how quickly the organisation reacted to restrictions imposed on the movements of people and goods, how much it was able to implement quick and smooth solutions to ensure customer service during the lockdown, and how much it was satisfied with applications and IT infrastructure to support the staff and provide customer support remotely (Rapaccini *et al.*, 2020).

Preparedness (PRE) was measured with a 5-point Likert scale of 4 items derived from Rapaccini et al. (2020) and reformulated to fit the hospitality sector. Items included whether new strategies were included in the response, such as exploring new revenue-generating products and services, searching opportunities to extend the existing capabilities into new markets, investing in new start-ups and partnering with suppliers and/or other companies.

We conducted Harman's one-factor test to test whether a common method bias is present in the data (Podsakoff et al., 2012). Unrotated principal component analysis of the 17 items revealed the presence

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of six distinct factors with eigenvalues greater than one, accounting for 70.1% of the total variance. No single factor emerged from the analysis, and the first factor accounted for limited variance (22.7%). Therefore, we concluded that there is no evidence of common method bias in the data.

3.2 Statistical techniques

We validated our research hypotheses along sufficiency and necessity logic by combining Partial Least Squares Path Modelling (PLS-SEM) (Hair Jr *et al.*, 2016) with Necessary Condition Analysis (NCA) (Dul, 2016). We decided to combine the two approaches since they allow us to determine not only *should-have factors* (using PLS-SEM), i.e., those factors that permit the production of the best possible outcomes, but also *must-have factors* (using NCA), those factors that are critical for the achievement of the outcome. Combining both methodologies would provide us with the best results since we will be able to exploit the combinations and the level of factors necessary to have resilience in times of disruptive change.

Structural Equation Modelling (SEM) is a widely used technique to simultaneously assess multiple relationships between multi-item constructs. SEM techniques are broadly distinguished into covariance-based (CB-SEM) and variance-based (PLS-SEM) based: CB-SEM aims at maximising the variance of the data common to all constructs, while the purpose of PLS-SEM is to maximise the variance of the data explained by each endogenous construct (Hair *et al..*, 2017). As a consequence, CB-SEM is more adequate for theory testing, while PLS-SEM is more appropriate for theory development and prediction (Hair *et al.,* 2016; Dash and Paul, 2021). Moreover, PLS-SEM, compared to CB-SEM, has fewer sample size requirements and can achieve greater statistical power. Thus it is preferable when the sample or the number of items per construct is small and when construct scores are employed in subsequent analyses (Hair *et al.,* 2016, 2017). Since our study has an explorative nature, i.e., it aims at developing a new theory rather than testing an established one, is based on a small number of respondents (80 questionnaires after removing uncompleted and unsuitable responses), and construct scores are employed in a subsequent analysis, i.e., NCA, PLS-SEM was selected. To better assess the capability of PLS-SEM in detecting the hypothesised relationships based on our sample of 80 respondents, we applied the inverse square root and the gamma-exponential criteria (Kock and Hadaya, 2018). These

two criteria suggested that, with a statistical power of 0.8 and a significance level of 0.05, it is possible to discover path coefficients of magnitude equal to at least 0.26 and 0.28, respectively.

Although SEM techniques can assess multiple relationships among multi-item constructs, they follow sufficiency logic. Thus they can infer the degree to which a determinant is sufficient to produce the outcome, but they cannot infer the degree of necessity of the relationships (Dul, 2016). In a sufficiency logic, the absence of a specific determinant could be compensated by other determinants; for example, low levels of causation combined with high levels of effectuation may still lead to high levels of resilience. However, a determinant which is sufficient to produce the outcome may not be necessary. In contrast to sufficiency, necessity logic implies that the outcome can only be achieved if the necessary cause is present. For instance, high levels of causation may be necessary but not always sufficient to achieve high levels of resilience.

NCA is a relatively new technique acting as a complement, not as a replacement, of traditional approaches to analysing causal relationships that may provide new insights normally not discovered with traditional approaches based on sufficiency logic like PLS-SEM. Instead of analysing the average relationships between dependent and independent variables, NCA aims to reveal areas in scatter plots of dependent and independent variables indicating a necessary condition. NCA may spot necessary (critical) determinants preventing the occurrence of an outcome: when some critical determinants are present, a bottleneck holds. Thus leveraging on non-critical ones does not produce an effect on the outcome, and performance can be improved only by leveraging on the critical determinants. Note that although the sufficiency logic followed by PLS-SEM is essential to identify the main determinants of an outcome, the necessity logic followed by NCA allows restricting the attention to a subset of those determinants, which most times are responsible for the outcome. Moreover, NCA differs from Qualitative Comparative Analysis (QCA) since it allows not only the assessment of if a variable is a necessary element to achieve the outcome but also to determine the degree of necessity (i.e., the level of the variable necessary to reach a determined level of the outcome) (Richter *et al.*, 2020).

Following the guidelines provided by Richter *et al.* (2020), we combined PLS-SEM and NCA to account for both sufficient and necessary conditions in the validation of our research hypotheses. In our analysis, PLS-SEM is justified because the sample size is relatively small (e.g., less than 100 observations), and

the indicators are Likert scales, thus likely to be non-normal. PLS-SEM requires no distributional assumption. Thus non-normal data are allowed (Henseler *et al.*, 2016), and sample size requirements are lower than the one of covariance-based SEM (Rigdon, 2016). In addition, compared to covariance-based SEM, PLS-SEM is recommended when the research entails theory development (Sarstedt *et al.*, 2014), like in our case. Both PLS-SEM and NCA were conducted through R for Statistical Computing, specifically, PLS-SEM using package 'plspm' (Gaston Trinchera and Russolillo, 2013) and NCA using package 'NCA' (Dul, 2021).

4. Results

4.1 Measurement model

Reliability and convergent validity of the measurement model were respectively assessed by Composite Reliability (CR) and Average Variance Extracted (AVE), which should be higher than 0.7 and 0.5, respectively (Fornell and Larcker, 1981). Discriminant validity was assessed by comparing each AVE value with squared correlations, as well as through the heterotrait–monotrait ratio (HTMT) (Henseler *et al.*, 2014): for discriminant validity, AVE of a construct must be lower than squared correlations with other constructs, and the HTMT ratio should be lower than 0.85. Finally, Cronbach's Alpha (α) was employed to assess internal consistency.

The measurement model includes five constructs: causation (CAU), effectuation (EFF), preparedness (PRE), agility (AGI) and resilience (RES). Table 1 summarises the measurement model estimated through PLS-SEM, where it is apparent that CR and AVE of all constructs are higher than 0.7 and 0.5, respectively, indicating evidence of reliability and convergent validity. Cronbach's Alpha values indicate high internal consistency for AGI and RES, while internal consistency appears moderate for EFF, CAU and PRE (α between 0.5 and 0.6), in line with previous empirical findings (Gabrielsson and Politis, 2011) and partly due to the low number of items present in these constructs. Discriminant validity is validated through the square root of AVE for each construct that is lower than the correlation with the other constructs, and HTMT ratios are below 0.85 (Table 2). Therefore, the measurement model shows evidence of reliability, convergent validity and discriminant validity.

Insert Table I here

Insert Table II here

4.2 Structural model

The path coefficients β of the structural model were tested by performing a bootstrapping procedure with 5000 resamples, as Hair Jr et al. (2016) suggested. The results, presented in Figure 3 and Table 3, support all the hypotheses on the direct effects. Specifically, they indicate that CAU has a significant and positive impact on RES ($\beta = 0.211$, $t = 2.061$, $p < 0.05$; Hypothesis H_1 is supported) and on PRE ($\beta = 0.358$, $t = 3.412$, $p < 0.01$; Hypothesis H_2 is supported); EFF has a significant and positive impact on RES ($\beta = 0.201$, $t = 1.996$, $p < 0.05$; Hypothesis H_4 is supported) and on AGI ($\beta = 0.329$, $t = 3.097$, $p < 0.01$; Hypothesis H_5 is supported); PRE has a significant and positive impact on RES ($\beta = 0.262$, $t = 2.587$, $p < 0.05$; H_3 is supported); AGI has a significant and positive impact on RES ($\beta = 0.283$, $t = 2.813$, $p < 0.01$; Hypothesis H_6 is supported).

The R^2 of the endogenous construct resulted in 0.128 for PRE, 0.108 for AGI and 0.334 for RES, indicating that the measurement model explains, respectively, 12.8%, 10.8% and 33.4% of the variance of PRE, AGI and RES constructs. We also tested the predictive validity of the structural model by computing the Q^2 index of the endogenous constructs (Chin, 1998). Using an omission distance of 10, we found that all the endogenous constructs have a value of the Q^2 index greater than zero (PRE: $Q^2=0.041$; AGI: $Q^2=0.030$; RES: $Q^2=0.068$), indicating an acceptable predictive relevance of the structural model (Hair Jr *et al.*, 2016).

To check the robustness of PLS-SEM findings, we tested the association of construct RES with three control variables: age, the difference in firm size (post- minus pre-COVID-19 outbreak) and sector. By regressing RES scores from the three control variables, we found that all the coefficients were not

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statistically different from 0, i.e., there is no evidence that RES scores differ across strata of age, firm size, and sector, supporting the absence of confounding in our findings.

Insert Figure 2 here

Insert Table III here

4.3 Mediation analysis

Mediation analysis was conducted to validate two hypotheses: (i) the existence of an indirect effect of CAU on RES mediated by PRE (Hypothesis $H_2 \land H_3$), and (ii) the existence of an indirect effect of EFF on RES mediated by AGI (Hypothesis $H_5 \land H_6$).

We employed the estimated path coefficients to compute the two indirect effects of interest: the indirect effect of CAU on RES mediated by PRE was computed as the product between the path coefficient of CAU on PRE and the path coefficient of PRE on RES; the indirect effect of EFF on RES mediated by AGI was computed as the product between the path coefficient of EFF on AGI and the path coefficient of AGI on RES. These two indirect effects were then tested based on the bootstrap resamples above. The results, shown in Table 4, support the existence of both indirect effects: the one of CAU on RES mediated by PRE is estimated as 0.094 ($t = 2.006$, $p < 0.05$; Hypothesis $H_3 \land H_4$ is supported); the one of EFF on RES mediated by AGI is estimated as 0.093 ($t = 2.025$, $p < 0.05$; Hypothesis $H_5 \land H_6$ is supported).

Table 4 also displays the total effect of CAU on RES and of EFF on RES, calculated as the sum of the direct and indirect effects and tested based on bootstrap resamples. They resulted in 0.305 ($t = 2.723$, $p < 0.01$) and 0.294 ($t = 2.673$, $p < 0.01$), respectively; thus, we deduced that, with respect to the total effect, the indirect effect of CAU on RES is 30.8%, while the indirect effect of EFF on RES is 31.6%.

Insert Table IV here

4.4. Necessary condition analysis

PLS-SEM can infer the degree to which a determinant is sufficient to produce the outcome, but it cannot infer the existence of critical determinants creating bottlenecks, i.e., those causes being *a sine qua non* for the outcome. For this reason, we complemented our PLS-SEM analysis with NCA.

While PLS-SEM estimates a linear function relating the outcome and its determinants, corresponding to a dashed line through the centre of the data points, NCA determines a ceiling line on top of the data. We consider the following ceiling lines: (1) the ceiling envelopment–free disposal hull (CE-FDH) line, which is a nondecreasing stepwise linear function; and (2) the ceiling regression–free disposal hull (CR-FDH), which is a simple linear regression line through the CE-FDH line. A ceiling line separates the space with observations from the space without observations: the larger the empty space, the stronger the constraint that a specific determinant puts on the outcome; thus, the highest is the necessity degree, also called effect size (Dul, 2016). The presence of a necessity relationship can be confirmed statistically by applying a bootstrap significance test (Richter *et al.*, 2020).

We applied CE-FDH and CR-FDH to the scores of the constructs estimated by PLS-SEM to assess the degree of necessity of the relationships between RES and each of the other constructs: CAU, EFF, PRE and AGI. Results are displayed in Figure 4 and shown in Table 5.

The results show that all the constructs CAU, EFF, PRE and AGI show a statistically significant necessity relationship with RES (all the p-values in Table 4 are lower than 0.05) with effect sizes ranging between 0.3 and 0.5, values that indicate a high degree of necessity (Dul, 2016). These results suggest that an improvement in resilience critically depends on the improvement of one causation, effectuation, preparedness, and agility. In other words, a change in resilience is very often due to at least one of these constructs. On its hand, PLS confirmed the individual potentiality of causation, effectuation, preparedness, and agility to influence resilience.

Table 6 specifies the critical levels of causation, effectuation, agility, and preparedness necessary to have a certain level of resilience. To achieve a relevant level of resilience (60%), all four variables are necessary, more or less at the same level: CAU (61.5%), EFF (62.3%), AGI (63.2%) and PRE (45.3%). This is an interesting result, stressing that all four variables are critical bottleneck conditions for achieving entrepreneurial resilience.

By integrating the results from NCA with those from PLS-SEM analysis, we can conclude that the relationship between the considered constructs and resilience is characterised by a high degree of both sufficiency and necessity, meaning that, on the one hand, leveraging on one among causation, effectuation, preparedness and agility can lead to an effective change in resilience, and, on the other hand, a change in resilience is in most times due to a change in one among them. Thus, both approaches are essential for a comprehensive understanding of SMEs' resilience in disruptive times.

Insert Table V here

Insert Figure 3 here

Insert Table VI here

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5. Discussion

This research investigates the role of entrepreneurial decision-making as an antecedent of resilience during the first phase of the COVID-19 pandemic. While a crisis is usually associated with uncertainty, the COVID-19 crisis can be conceived as a context of ambiguity and risk, where the options and outcomes available to entrepreneurs are infinite and undefined (Packard *et al.*, 2017). This situation caused a social disruption and impacted both supply and demand, forcing entrepreneurs to react

promptly to changes to survive. In our analysis, we utilise an existing framework to test entrepreneurial resilience during the COVID-19 crisis based on two key variables: agility and preparedness. We enrich this model by adding causation and effectuation as precursors of resilience, following the stream of literature that considers the two logics as complementary (Brettel *et al.*, 2012; Sarasvathy, 2001; Smolka *et al.*, 2016). The empirical analysis reveals that both causation and effectuation are sufficient and necessary conditions for having a resilient SME during a crisis. This fascinating result underlines how both logics are fundamental for SMEs to go through a disruptive crisis. This result, in contrast with previous studies that highlighted the predominance of effectuation instead of causation in situations of extreme uncertainty (Brettel *et al.*, 2012; Nummela *et al.*, 2014; Sarasvathy, 2001), is probably justifiable by the particular context in analysis. The simultaneous adoption of causal and effectual logic can help the firm respond quickly to external or internal changes and remain focused and plan efficiently what can be controlled. Thus, our study enriches the existing framework on the development of resilience during the COVID-19 disruption (Rapaccini *et al.*, 2020), stressing the core role of entrepreneurial decision-making as an antecedent of resilience. This aligns with the literature stream that interprets entrepreneurial resilience as a synonym for individual resilience (Branicki *et al.*, 2018). Especially in a disruptive environment such as the COVID-19 outbreak and in an extremely vulnerable sector such as the hospitality one, the role of the entrepreneur as a guide and a leader who proactively operates to find solutions and/or alternative paths to survive is fundamental to react to the COVID-19 disruption. In our analysis, we also tested the mediator role of preparedness and agility, respectively, in the relationship between causation and resilience and effectuation and resilience. Results support these hypotheses; both preparedness and agility account for around 30% of the total effect of causation and effectuation toward resilience. This highlights the crucial importance of being prepared to explore the environment and find possible solutions to the disruption (preparedness), reacting quickly to restrictions, and putting in place actions to continue the business even in adverse conditions (agility).

Our results offer several theoretical, practical and methodological implications. In terms of theoretical contributions, our results enrich the debate about the impact of effectuation on business performance. While the validity of effectuation has been largely acknowledged (Chen *et al..,* 2021), our findings suggest that also setting precise and stable objectives and planning careful actions (causation) helps

govern and navigate such uncertainty. Secondly, theoretically speaking, we tend to assume that effectual decisions and actions, and per its contrary effectual, occur simultaneously (e.g. Deligianni *et al.,* 2022). Validating a serial mediation model instead, we reinforce the idea that effectuation is a process and develop a consequentiality logic in the decision-action continuum.

In terms of managerial and practical implications, this study provides entrepreneurs and managers with suggestions to manage a crisis of a vast entity efficiently. In a nutshell, we can suggest as follows (Pellegrini and Ciappei, 2015):

Assessing Extraordinary Situations: Entrepreneurs operating in new and disruptive scenarios face the challenge of recognising and acknowledging the extraordinary nature of the situation. This involves a cognitive shift where they become aware that their existing mental frameworks may not adequately capture the dynamics and complexities at hand. By perceiving the exceptional nature of the scenario, entrepreneurs can overcome cognitive biases and preconceptions that may hinder their ability to envision new possibilities. In this case, entrepreneurs must transcend their consolidated cognitive schemata. These schemata are the cognitive structures developed through past experiences and learning, forming the basis of familiar routines and decision-making processes. Disruptive situations require entrepreneurs to challenge and surpass these established mental frameworks, allowing them to think beyond what they already know.

Imagining new scenarios (Effectual Logics): By discarding consolidated cognitive schemata, entrepreneurs can liberate their thinking and open themselves to new and adaptive strategies according to their base of resources. This departure from existing mental frameworks empowers entrepreneurs to explore alternative approaches, experiment with novel ideas, recombine resources creatively, and imagine solutions that may not have been previously conceivable. These newly formulated strategies reflect the entrepreneurs' ability to envision relationships that deviate from traditional patterns.

Anchoring to rational and familiar processes (Causation Logics): While the need for novel and disruptive strategies is crucial, entrepreneurs also recognise the importance of grounding their cognitive processes in familiar and well-known elements. Drawing from previous experiences, in a transactive adaptation, entrepreneurs may anchor their thinking to processes. These familiar causation logics act as guiding principles or reference points, enabling entrepreneurs to navigate the uncertain and volatile terrain of

disruptive scenarios with a sense of confidence and stability thanks to an enhanced ability to plan. A kind of cognitive and rational compass—"a permanent gravitational centre" to cite a 'genius' of the Italian music Franco Battiato—that may help entrepreneurs to navigate the unknown while inventing unbounded new scenarios by the initial constraints.

In terms of methodological contributions, this study utilises a new analytical model, i.e., necessary condition analysis, which is optimal for finding conditions that must be met to obtain a determined outcome. This is a relatively new method that is emerging, especially in tourism and hospitality research (Dul, 2022). However, to the best of our knowledge, there is no account in entrepreneurial decision-making studies. Particularly in our framework, we have found that causation, effectuation, preparedness, and agility are all relevant determinants and necessary conditions of resilience. This not only confirms the existence of an interplay between causation and effectuation logic (Dew et al., 2009), but this interplay also seems essential. We believe that this multimethod approach is valuable for different reasons. First, it advances theory testing by combining different views of statistical causality (sufficiency and necessity logics), and it provides results with a high practical value in identifying factors producing the best possible outcome (should-have factors) and factors critically relevant to achieve a certain outcome (must-have factors). Second, it can enrich the entrepreneurial resilience research field, finding the combination of necessary elements to have resilience and identifying the level of each determinant to achieve the outcome. Finally, the combined usage of PLS-SEM and NCA could lead to greater precision and theoretical clarity in the definition of sufficiency and necessity logics, which are often used interchangeably, although they represent two completely different logics (Richter *et al.*, 2020).

6. Conclusion

The outbreak of the COVID-19 virus poses an unexpected major challenge to economies and societies. Firms, in particular, have been tremendously affected by the stringent lockdown measures imposed, especially the hospitality sector. Therefore, empirical analysis and guidelines are needed to support entrepreneurs in managing the crisis. This work offers an analysis of entrepreneurial responses to the COVID-19 first wave, investigating the crucial role of entrepreneurial decision-making in a firm's resilience, focusing in particular on causation and effectuation. Results reveal how the synergic

combination of the two logics, together with agility and preparedness, are key ingredients to cope with tremendous crisis disruption.

As with any other study, this study also has its limitations that, however, may create interesting avenues for further research. First, our study focuses on the first COVID-19 wave in Italy, a period in which the lockdown restrictions were particularly cogent and enforced, and the months immediately following. These results thus may be bound to the strong regulations and restrictions imposed. However, it would be interesting to conduct further studies in the post-Covid period to evaluate whether entrepreneurs used or not the same approach in consequential waves and discuss similarities or differences obtained. Second, our research was conducted in the hospitality sector involving a relatively small number of entrepreneurs. Whilst this ensures the reliability of results and detailed insights, increasing the sample size and expanding the scope of analysis to different sectors could enrich the topic's knowledge. Third, the COVID-19 context is one-of-a-kind; therefore, additional research also outside the COVID-19 context may be useful to expand our results to the more general crisis management field. Nevertheless, this study represents an important step in understanding how and what impact entrepreneurial decision-making has in shaping resilience during disruptive crises. Entrepreneurs operating in completely new and disruptive scenarios face the challenge of assessing the extraordinary nature of the situation while simultaneously breaking free from consolidated cognitive schemata. By recognising the need for new and flexible strategies (causation logic), entrepreneurs can foster innovative thinking and envision novel solutions. However, they also anchor their cognitive processes to familiar processes (causation logics) that can be translated from previous experiences, providing stability and guidance amidst the turbulence of disruptive scenarios. The ability to strike a balance between novelty and familiarity is crucial for entrepreneurs to successfully navigate the challenges and seize the opportunities presented by disruptive environments (Pellegrini and Ciappei, 2015). The entrepreneurs during the Covid period used a cognitive-rational compass—"a permanent gravitational centre" as it was famously put by the Italian music songwriter Franco Battiato—that helped them to navigate the unknown while inventing new scenarios that are unbounded by the initial constraints.

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the moderating role of linear and nonlinear thinking styles", *Management Decision*, Vol.59 No.5, pp.973-994.

Tables and figures

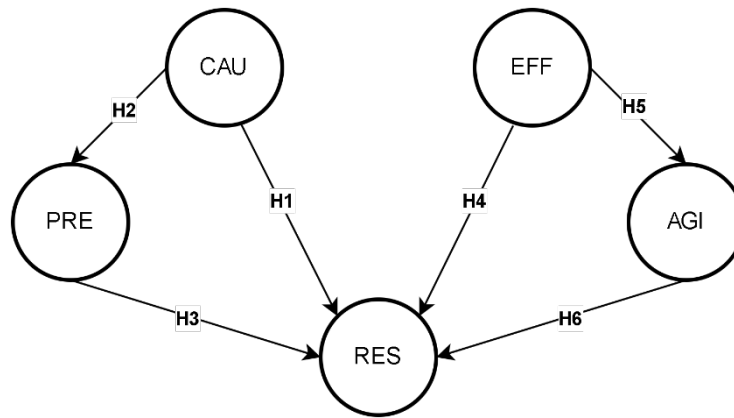**Figure 1.** Path diagram depicting the hypotheses.

Figure 2. Path diagram displaying estimated path coefficients and R^2 of endogenous constructs. '*': p-value<0.05; '**': p-value<0.01.
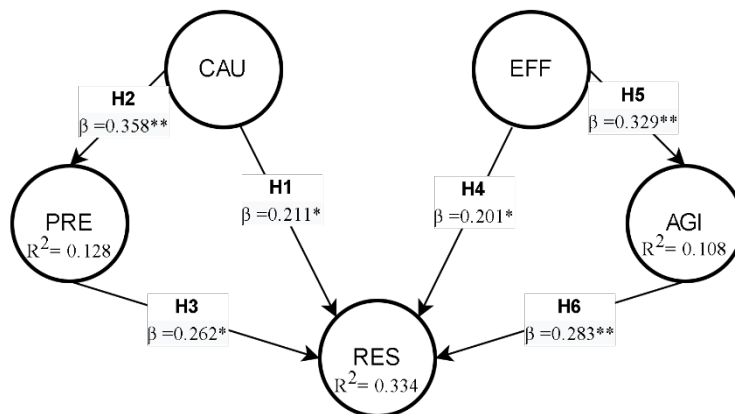
Figure 3. NCA plots with resilience (RES) as dependent variable and each other construct in turn as independent variable: causation (CAU, top left), effectuation (EFF, top right), agility (AGI, bottom left), and preparedness (PRE, bottom right). CE-FDH and CR-FDH are shown, respectively, in red and in orange. The ordinary least squares line is shown in green.
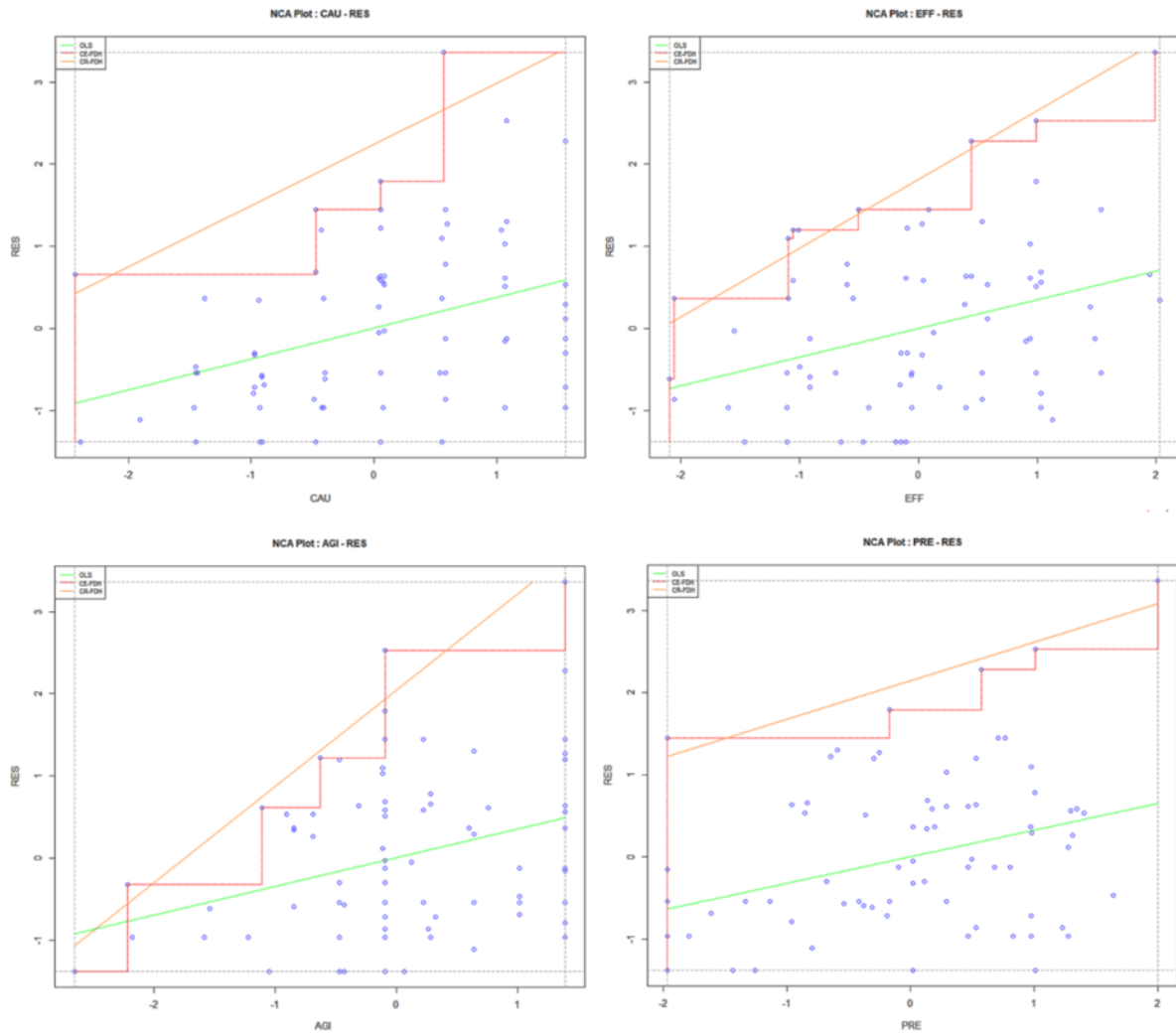
Table I. Measurement model

Construct	Item	Loading	AVE	CR	Cronbach alpha
CAU	CAU_1	0.648	0.510	0.757	0.514
	CAU_3	0.778			
	CAU_4	0.712			
EFF	EFF_2	0.601	0.501	0.740	0.586
	EFF_3	0.786			
	EFF_4	0.724			
AGI	AGI_1	0.747	0.542	0.780	0.533
	AGI_2	0.722			
	AGI_3	0.740			
PRE	PRE_1	0.815	0.530	0.814	0.700
	PRE_2	0.669			
	PRE_3	0.604			
	PRE_4	0.803			
RES	RES_1	0.751	0.507	0.804	0.733
	RES_2	0.761			
	RES_3	0.663			
	RES_4	0.667			

Table II. Discriminant validity. Diagonal entries show the square root of AVE values, while correlations are reported in non-diagonal entries. The last row provides HTMT ratios.

	CAU	EFF	AGI	PRE	RES
CAU	0.714				
EFF	0.191	0.707			
AGI	0.088	0.263	0.736		
PRE	0.323	0.026	0.081	0.727	
RES	0.295	0.200	0.292	0.291	0.712
HTMT ratio	0.473	0.295	0.269	0.274	0.585

Table III. Results of the structural model. '*': p-value<0.05; '**': p-value<0.01

Hypothesis	Causal path	Path coeff. (β)	t statistic	Result
H_1	CAU => RES	0.211	2.061 *	Supported
H_2	CAU => PRE	0.358	3.412 **	Supported
H_3	PRE => RES	0.262	2.585 *	Supported
H_4	EFF => RES	0.201	1.996 *	Supported
H_5	EFF => AGI	0.329	3.097 **	Supported
H_6	AGI => RES	0.283	2.813 **	Supported

Table IV. Results of mediation analysis. '*': p-value<0.05; '**': p-value<0.01

Causal path	Type of effect	Estimate	t-statistic	% total
CAU => RES	Direct	0.211	2.061 *	69.2
	Indirect	0.094	2.006 *	30.8
	Total	0.305	2.723 **	100.0
EFF => RES	Direct	0.201	1.996 *	68.4
	Indirect	0.093	2.025 *	31.6
	Total	0.294	2.673 **	100.0

Table V. Results of NCA with RES as dependent variable and each other construct in turn as independent variable: CAU, EFF, AGI, and PRE. '*': p-value<0.05; '**': p-value<0.01.

	CE-FDH		CR-FDH	
	Effect size	p-value	Effect size	p-value
CAU	0.375	0.049 *	0.305	0.049 *
EFF	0.386	0.002 **	0.333	0.002 **
AGI	0.514	0.002 **	0.436	0.002 **
PRE	0.314	0.018 *	0.255	0.018 *

Table VI. Bottleneck table (percentages).

Resilience	Causation	Effectuation	Agility	Preparedness
0	NN	NN	NN	NN
10	NN	NN	10.7	NN
20	1.0	NN	10.7	NN
30	1.0	NN	38.2	NN
40	24.2	NN	38.2	NN
50	24.2	49.1	50.0	NN
60	61.5	62.3	63.2	45.3
70	61.5	75.1	63.2	64.0
80	74.7	75.1	63.2	75.0
90	99.0	75.1	63.2*	75.0*
100	99.0	75.1	63.2*	75.0*

Note: (*) The maximum possible value of the condition for the particular level of RES according to the ceiling line is lower than the actually observed maximum value, thus we put the highest observed level of AGI and PRE.