



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Founder role identity and firms' strategic responses to crises

Citation for published version:

Bunduchi, R, Crisan-Mitra, C & Cooper, SY 2025, 'Founder role identity and firms' strategic responses to crises', *International Journal of Entrepreneurial Behavior & Research (IJEBR)*, vol. 31, no. 10, pp. 2421–2453. <https://doi.org/10.1108/IJEBR-05-2024-0484>

Digital Object Identifier (DOI):

[10.1108/IJEBR-05-2024-0484](https://doi.org/10.1108/IJEBR-05-2024-0484)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

International Journal of Entrepreneurial Behavior & Research (IJEBR)

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



Founder role identity and firms' strategic responses to crises¹

Raluca Bunduchi, University of Edinburgh & Babes-Bolyai University

[corresponding author, raluca.bunduchi@ed.ac.uk]

Catalina Crisan-Mitra, Babes-Bolyai University

Sarah Cooper, University of Edinburgh

Abstract

Purpose: This study adopts an identity perspective to investigate the cognitive and behavioral processes by which founders' role identity shapes their firms' responses to crisis through considering its function as an interpretative lens and as an information filter, and the influence these cognitive functions have on founders' decision-making behavior to respond to crises.

Design/methodology: Founders of 15 high-technology firms were interviewed to investigate their expectations defining their role within their firms, how these expectations filter and frame the information they perceive relative to the impact of the COVID-19 pandemic on their firm, the ensuing response behaviors and their outcomes on the firm.

Findings: The analysis distinguishes three crisis response behaviors: surviving, mitigating and aligning, each leading to a different degree of change in firms' product development: minor, incremental and major. Two mechanisms connect founders' role identity with their response behaviors and outcomes: identity as a cognitive schema shaping the information founders perceive from their environment, and identity affirmation encouraging decision-making behaviors that re-affirm the salient identity.

¹ Authors manuscript – manuscript accepted for publication (June, 2025) in *International Journal of Entrepreneurial Behavior and Research*

Originality/value: These findings contribute to entrepreneurial behavior research at the intersection of identity and crisis management studies. They show empirically the different pathways (interpretation and filter focus) through which entrepreneurial cognition links founders' identity with their firms' responses to crises. The findings indicate that crises encourage founders to double down on their identity, rather than triggering identity changes.

Keywords: crisis response; role identity; high-technology firms

Introduction

In recent years, research has begun to link the identity of founders – reflecting who they think they are (Radu-Lefebvre *et al.*, 2021) - with their firms' responses to adverse environmental changes, including crises, either directly (Powell and Baker, 2014; Zuzul and Tripsas, 2020) or indirectly (Guckenbiehl and Corral de Zubielqui, 2022; Mathias and Williams, 2017), through its effect on entrepreneurial cognition and behaviors. This research is important as it offers an alternative explanation to the organizational-level accounts of diversity in firms' crisis response strategies, helping to explain why similar organizations may respond differently to crises (e.g., Guckenbiehl and Corral de Zubielqui, 2022). Organizational-level accounts predominate in recent investigations of how small and medium enterprises and start-up ventures respond to crises (Newman *et al.*, 2022). These accounts highlight organizational attributes such as age (Miklian and Hoelscher, 2022) and resources (Bergami *et al.*, 2021) to explain differences in firm responses to environmental changes, and the outcomes that such responses have on the firm. In contrast, an identity lens offers a cognitive-based explanation for variations in firms' crisis responses, foregrounding the individual entrepreneurs whose sense of self influences how they interpret environmental cues (Radu-Lefebvre *et al.*, 2021), encouraging different behaviors which produce different firm-level outcomes (Wagenschwanz, 2021). Such a micro-level perspective on firms' response to environmental changes, including crises, is more relevant for founder-led firms where key individuals – i.e., founders - play a pivotal role in

shaping their firms' strategic decision-making (Shepherd *et al.*, 2015). A focus on founders' identity rather than organizational attributes to explain firms' crises response is important in entrepreneurship research, where the traits, behaviors, and processes characterizing individual entrepreneurs affect their firms' ability to manage crises (Korber and McNaughton, 2018; Waehning *et al.*, 2023) to a larger extent compared with organizational structures, processes and resources (Branicki *et al.*, 2018; Newman *et al.*, 2022). This study adopts an identity lens to investigate the role of individual founders' cognition and behavior in explaining their firms' responses to crises.

Research linking founders' identity to their firms' crises responses draws from different fields. On one hand, entrepreneurship and organizational scholars studying identity conceptualize identity as a cognitive schema that filters the information that founders notice from their environment (Radu-Lefebvre *et al.*, 2021) and influences how founders make sense of this information (Stryker and Burke, 2000). What information founders focus their attention on and how they interpret it affects their decision-making behavior within their firm (Wagenschwanz, 2021). Thus, identity can be conceptualized as an attribute of individual entrepreneurs associated with specific cognitive and behavioral outcomes (Radu-Lefebvre *et al.*, 2021). On the other hand, crises management and resilience scholars highlight the importance of cognitive and behavioral responses to understand how firms react to crises (Williams *et al.*, 2017). Cognitive responses refer to key decision makers' ability to notice and make sense of environmental changes, for instance to interpret their favorability vis-à-vis their firm (Kirtley and O'Mahony, 2020), while behavioral responses consider key decision makers' actions in the aftermath of a crisis, for instance accepting versus avoiding changes (Hillman and Guenter, 2021). At the intersection of identity and crisis management research, a few empirical studies have examined the cognitive and behavioral processes linking founders' identity to their firms' responses to crises. Such linkages emphasize either identity affirmation, connecting the different interpretations of founders' role (Zuzul and Tripsas, 2020) or social position (Teyi *et al.*,

2023) to decision-making behaviors which reaffirm their identities, or identity structure, where the degree of congruence between founders' role and social identities affects founders' interpretations of the crisis, encouraging different narrative-building behaviors to respond to the crisis (Powell and Baker, 2014).

This work opens up further research opportunities to elucidate the mechanisms that explain how founders' identity translates into different cognitive and behavioral responses to crises, with different firm-level outcomes. While scholars have argued that identity affects both what information founders focus their attention on (Mathias and Williams, 2017), and how they make sense of this information (Wry and York, 2017), empirical research emphasizes the latter, highlighting the role that founders' interpretations of information favorability (Power and Baker, 2020), and of their role (Zuzul and Tripsas, 2020) and social position (Teyi *et al.*, 2023) within a particular context, play in shaping their behavior, and thus, the firm-level impact of environmental changes (see also Kirtley and O'Mahony, 2020). In contrast, empirical investigation of how identity filters the information founders notice and how this filter focus affects their crisis responses has been neglected. However, what information key decision makers notice determines the scope of opportunities they consider, informing their decision-making, such as the markets they decide to target (Mathias and Williams, 2017). Building on this research, this study seeks to examine more fully the cognitive and behavioral processes through which founders' role identity shapes their firms' responses to crisis through considering its function both as an interpretative lens and as an information filter, and the influence these functions have on founders' decision-making behavior to respond to crises.

To do so, this study employs a qualitative research design studying 15 founders leading firms developing software and hardware products during the COVID-19 pandemic. The findings show that behaviors are explained first and foremost by the filter focus (wide on institutional aspects versus narrow on resource limitations) exhibited by founders with different role identities (Entrepreneur

versus Technical Expert). Different filter focuses encourage different decision-making behaviors in how founders respond to environmental changes (aligning to environmental changes versus surviving them), leading to different firm-level outcomes (major versus minimal changes to their offerings and activities). We find that interpretability matters in shaping behavior only when founders' filter focus is the same (market issues): identity frames founders' interpretation of information favorability (positive versus negative), encouraging different decision-making behaviors (aligning versus mitigating), generating different firm-level outcomes (major versus incremental changes). Apart from identity, the crisis also matters in explaining crisis responses. The COVID-19 crisis required firms to accommodate remote work focusing their attention on the transition of internal processes to online. This focus is associated with mitigating decision-making behavior, to maintain efficiency in operations, which generates incremental changes at firm-level.

These findings contribute to investigations of entrepreneurial behavior at the intersection of identity research and crisis management studies in two ways. First, they show empirically the different pathways (interpretation and filter focus) through which entrepreneurial cognition links variation in founder identity with their behavior (relative to their approach to respond to environmental changes), leading to different firm-level outcomes. Identity shapes not only founders' perception of the favorability of the information (Powell and Baker, 2014, see also Guckenbiehl and Corral de Zubirlqui, 2002; Nikiforou *et al.*, 2023), but also what kind of information founders focus their attention on to inform their decision-making. Second, the findings indicate that crises encourage founders to double down on their identity, engaging in behaviors that reaffirm their role identity, rather than acting as a trigger for switching between multiple activities or seeking to change their identity. This provides a counter-story of identity focus and persistence to the research documenting changes in founders' identity as a result of organizational (van Lancker *et al.*, 2023) and institutional (Jain *et al.*, 2009) changes, suggesting that crises may be less prone to trigger role identity change.

The paper is organized as follows. First, theoretical foundations are introduced by reviewing the literatures on founder identity and crisis response. The next sections describe the research design, present the findings and discuss their implications. The Conclusion highlights the contributions to research and practice.

Theoretical background

Founders' identity and its effect on firm-level outcomes

Taking an identity perspective, entrepreneurial scholars have studied founders not simply as individuals setting up new ventures, but as individuals who in founding and running a new venture, pursue activities which provide self-meaning (Mmbaga *et al.*, 2020). Entrepreneurial identity - comprising the set of meanings and behaviors that define individuals when acting in an entrepreneurial role (Wagenschwanz, 2020) - has been examined both as a property that an individual entrepreneur has and as a process through which individuals become entrepreneurs. While the former emphasizes the persistence of founders' identities which, once acquired, shape their behaviors, the latter conceptualizes identities as dynamic (Radu-Lefebvre *et al.*, 2021), with founders changing their identities in response to external triggers, such as changes in their firms as they grow (van Lancker *et al.*, 2023), and institutional pressures (Jain *et al.*, 2009). Seeing our interest in founders' behaviors as they respond to adverse environmental changes, such as crises, we focus here on the former which has been widely deployed in existing research to explain entrepreneurial action and firm-level outcomes (Radu-Lefebvre *et al.*, 2021). Identity as a property of the entrepreneurs has been examined from both a social theory perspective, which emphasizes the social groups to which individuals belong, and a role identity perspective, which concerns how individuals see themselves in relation to the roles they take on (Hogg *et al.*, 1995). Social identities indicate who founders see themselves as representatives of from distinctive groups within society, for instance based on religion, family or ethnicity (Mmbaga *et al.*, 2020), and echo their social motivations and basis for self-evaluation as

founders of new ventures (Fauchart and Gruber, 2011). Role identities incorporate the perceptions and actions that accompany the position founders fulfill within their venture (Mathias and Williams, 2017), reflecting the activities they see as necessary to perform within their daily work as an entrepreneur (Mmbaga *et al.*, 2020). Scholars have linked both role and social identities of firm founders to firm-level outcomes through their effect on founders' cognition and, subsequently, their behavior (Radu-Lefebvre *et al.*, 2021; Wagenschwanz, 2020).

Both theories link identity to an individual's cognition, either by viewing roles as self-reference cognitions that individuals apply to themselves, affecting what information they perceive as relevant, or through conceptualizing self-categorization within social groups as a cognitive process that focuses individuals' attention to specific aspects of their experience (Hogg *et al.*, 1995). Identity, thus, functions as a cognitive schema – internally-stored information and meanings – which increases sensitivity to particular environmental cues and serves as a frame of reference for interpreting these cues (Stryker and Serpe, 1994). Identities act both as cognitive filters, focusing founders' attention on information consistent with their identities (Radu-Lefebvre *et al.*, 2021), and as cognitive frames, shaping how individuals interpret information and define the new situations they encounter (Stryker and Serpe, 1994). By cognitively filtering and framing environmental cues, founders' role and social identities have significant behavioral implications (Alsos *et al.*, 2016; Teyi *et al.*, 2023). First, by filtering information, identity directs what kinds of information founders focus their attention on when making decisions. Empirical studies have shown that identity acts as a cognitive filter by affecting the source of information identities consider (e.g., business or non-business sources) (Kaish and Gidal, 1991), and the scope of their opportunity search (e.g., wide or narrow market range), which in turns informs decision-making behaviors concerning, for instance, which markets they target (Mathias and Williams, 2017). Second, by framing how founders make sense of environmental changes, for instance as opportunities to embrace, challenges to counter, or as threats to accommodate

(Powell and Baker, 2014), identity directs their decision-making behavior. Empirical research has linked founders' sense making efforts to a range of behaviors, including opportunity development (Wry and York, 2017), narrative building to respond to crises (Powell and Baker, 2014), resource allocation (Wagenschwanz, 2020), and avenues for creating new ventures (Cardon *et al.*, 2009). In turn, these entrepreneurial decision-making behaviors generate firm-level outcomes (Wagenschwanz, 2020), such as firms' strategic responses to crisis (Powell and Baker, 2014), their commitment to novel business models and technologies (Zuzul and Tripsas, 2020), and the types of firm founders create (Wry and York, 2017).

Consequently, identity theory offers a micro-level, individual-focused explanation of firms' crisis responses as it connects the identity of individual founders – who are the key decision makers in founder-led firms – with firm-level outcomes – such as their firms' responses to crises – through its effects on cognition and decision-making behavior. Empirically, this connection has been made by leveraging two identity theory constructs: identity structure (Powell and Baker, 2014) and identity affirmation mechanisms (Teyi *et al.*, 2023; Zuzul and Tripsas, 2020).

Identity structure refers to the degree of congruence between the identities an individual holds (Powell and Baker, 2014). Founders exhibit multiple identities by virtue of their varied roles and social positions they occupy (Mmbaga *et al.*, 2020), and the degree of congruence between these identities encourages different behaviors with distinct firm-level outcomes (Wry and York, 2017). Within the context of firms' responses to adverse events, Powell and Baker (2014) demonstrate how the degree of congruence between founders' role and social identities influences how they interpret the favorability of this information, e.g., whether they perceive it as an opportunity, challenge or threat to their firm, which in turn directs narrative building behavior to justify their firms' responses to the crisis, e.g., embracing, countering or accommodating the adversity.

A key implication of individuals holding multiple identities is that different identities are salient, i.e., likely to be enacted (Stets and Burke, 2000), in different situations (Stryker and Burke, 2000). Which identity is salient within a particular context matters as the knowledge associated with a salient identity focuses attention on cues consistent with that particular identity (Stryker and Burke, 2000). Salience relates to the second construct through which identity has been connected to firms' responses to environmental changes – identity affirmation. Identity affirmation refers to the fact that individuals engage in behavior that is consistent with the goals and meanings that form their identity and reject behaviors that are inconsistent with their self-views (Stryker and Burke, 2000). This means that behavior follows the identity that is salient in specific situations (Stryker and Burke, 2000). Within the context of firms' responses to environmental changes in a new industry, Zuzul and Tripsas (2020) find that founders who see their role as identifying externally created opportunities will adapt to environmental changes, re-affirming their self-views as opportunity discoverers. Founders who perceive their role as doing something novel will persist with their original course of action regardless of environmental changes (Zuzul and Tripsas, 2020). In a similar vein, Teyi *et al.* (2023) find that entrepreneurs operating in an informal economy will engage in behavior that perpetuates their social identity: guardian entrepreneurs succumb as they prioritize their position in the community over their business success, survival entrepreneurs improvise as they concentrate on keeping the business afloat, while canvasser entrepreneurs push the boundaries of what is possible as they focus on opportunity-seeking.

This work has demonstrated the role that identities – through their structures and affirmation effects - play in providing founders with the cognitive basis for interpreting adverse environmental change, either in relation to perceiving the favorability of these changes as positive or negative (Powell and Baker, 2014), or with respect to understanding their own role and social position within the context in which they operate (Teyi *et al.*, 2023; Zuzul and Tripsas, 2020). In contrast, the role that identities

play in filtering the environment cues founders perceive when facing crises, through focusing their attention on certain information at the expense of others, has been neglected. This study aims to investigate the role of founders' identity in shaping their crisis response behavior and the firm-level outcomes of this behavior through considering its function both as an interpretative lens and as a filter to focus attention.

We follow here Zuzul and Tripsas (2020) in considering role identity and identity affirmation mechanisms, as both have been linked not only directly, but also indirectly (Guckenbiehl and Corral de Zubielqui, 2022; Mathias and Williams, 2017) to firms' responses to adverse environmental changes in general, and crises in particular. Moreover, role identities are associated with knowledge and competencies that are relevant to a specific domain within which this role is performed (Wry and York, 2017). Seeing crisis responses are examined here in the context of product development, role identities are likely to have a stronger influence in shaping decision-making relevant to product development compared with social identities.

Research has defined founder role identities in relation to the role of the founder vis-à-vis the different stages of venture creation, i.e., founder, inventor, developer (Cardon *et al.*, 2009), running the business, i.e., entrepreneurs, managers, investors (Mathias and Williams, 2017), and developing businesses in a novel industry, i.e., as discoverers of new opportunities versus revolutionaries driving radical change (Zuzul and Tripsas, 2020). Given the focus on crisis response strategies, which relate to the founders' efforts to run a business, the paper follows Mathias and Williams' (2017) classification which differentiate between entrepreneur role identity, concerned with finding and refining opportunities, manager role identity, focused on operating the business, and investor role identity, reflecting decisions associated with investing scarce resources.

The research question (RQ) is: How does the founder role identity salient at the time of crisis affect their behavior to respond to crises and the firm-level outcomes of this behavior?

The next section examines the different types of crisis response strategies that firms can pursue.

Crisis response strategies and firm-level outcomes:

In recent decades, increased global turbulence has led to the proliferation of crises, defined as events perceived by organizational members as sudden, unexpected and massively disruptive (Miklian and Hoescher, 2022), across various domains, including economics, e.g., the 2008 financial crisis; public health, e.g. the 2003 SARS outbreak; and socio-political arena, e.g. the 2011 Syrian civil war and the ensuing migration crisis. These events affected global markets, national economies and individual businesses, leading to a surge in research on crisis management across different management fields, with most empirical studies focused on investigating firms’ responses to crises (Hillmann and Guenther, 2021; Newman *et al.*, 2023; Williams *et al.*, 2017; Wenzel *et al.*, 2020). These studies have proposed various categories of crisis responses strategies, summarized in Table 1.

Table 1. Crisis response categories in existing research

Type of response	Categories	Author
Crisis management strategic responses	<p><u>Retrenchment</u>: reductions in costs, assets, products and overheads</p> <p><u>Persevering</u>: measures aimed at sustaining a firm’s business activities</p> <p><u>Innovating</u>: the realization of strategic renewal</p> <p><u>Exit</u>: the discontinuation of a firm’s business activities</p>	Wenzel <i>et al.</i> (2020)
Modes through which organizations exhibit strategic flexibility in the face of change	<p><u>Reactive</u>: responding to change</p> <p><u>Proactive</u>: creating new opportunities</p> <p><u>Internally</u>: through resource deployment</p> <p><u>Externally</u>: via competitive actions</p>	Herhausen <i>et al.</i> (2021)
Abilities to exhibit organizational resilience	<p>22 dimensions, amongst which the most common are:</p> <p><u>The ability to adapt</u>: adapting resources, interpersonal processes and organizational routines to address the impacts of a disruptive event</p> <p><u>The ability to cope</u>: developing feasible solutions in the shortest period of time, and to make do with whatever is at hand</p> <p><u>The ability to reinvent/reconfigure</u>: proactive change of an organization before the change is desperately necessary, and constant renewal through innovation</p>	Hillman and Guenther (2021)
Entrepreneurial responses to unexpected events	<p><u>Persevering</u>: reinforcement of the entrepreneur’s venture idea through the maintenance and extension of their earlier choices of technologies, offerings, customers and partners</p>	Berends <i>et al.</i> , 2021

	<u>Pivoting</u> : major change in the venture idea, involving changes in technologies, offerings or relationships with customers and partners, such that some of these elements remain whereas others are discontinued or replaced	
Entrepreneurial responses to crises	<p><u>Transforming</u>: enacting the adversity in a manner that defines the crisis as an opportunity to be embraced by changing what they are doing, treating their firms as a vehicle for role creation in support of who they want to be</p> <p><u>Sustaining</u>: enacting the adversity in a manner that defines the crisis as a challenge to be countered by continuing mostly the same things the firm was already doing, treating their firms in a manner that allows them to behave in accordance with their identities</p> <p><u>Accepting</u>: enacting the adversity as a threat to the financial aspirations that could not be averted but could be accommodated through cost reductions, treating their firm in accordance with their singular identity</p>	Powell and Baker, 2014
Small and medium enterprises' responses to crises	<p><u>Passive coping</u>: simply waiting and seeing how the crisis develops and relying on government support to survive the crisis</p> <p><u>Active coping</u>: closing down or reducing the scope of their businesses, laying off their employees and reducing their costs, to mitigate the financial impact of the crisis. Alternatively, it may involve using existing resources to diversify into new industries, products or customer segments or adapting their business model so that the business develops further, and becomes more competitive and more resilient to future external shocks</p>	Newman <i>et al.</i> , 2022
Small and medium enterprises' responses to COVID-19 pandemic	<p><u>Business model adaptations</u>: the process by which management actively aligns the firm's business model to a changing environment</p> <p><u>Business model innovations</u>: where the business model instead of products or processes is the subject of innovation</p>	Guckenbiehl and Corral de Zubielqui, 2022
Small and medium enterprises' responses to COVID-19 pandemic	<p><u>Reactive</u>: focusing on internal adaptations</p> <p><u>Proactive</u>: developing capabilities through reconfiguration</p> <p><u>Confirming</u>: involving stable market position</p> <p><u>Creative / Innovative</u>: developing new product/ solution</p>	Puthuserry <i>et al.</i> , 2022
Small and medium enterprises' responses to COVID-19 pandemic	<u>Reactive, Proactive, Strategic, Instinctive, Pivoting, Networking</u> (not clearly defined)	Miklian and Hoelscher, 2022

Source: Authors' own creation drawing on frameworks of authors cited within the table

Different characteristics underpin these categories of crisis responses: including motivation (Newman *et al.*, 2022); execution mode (Herhausen *et al.*, 2021), and firm-level outcome (Berends *et al.*, 2021; Hillman and Guenther, 2021; Powell and Baker, 2014; Wenzel *et al.*, 2020), with the latter being the most prevalent (Hillman and Guenther, 2021), and the focus of this study.

Firm-level outcomes are conceptualized as types of organizational change associated with crisis responses, such as the degree of alignment with current status (persevering or pivoting) (Berends *et al.*, 2021), degree of novelty involved in the change (conforming versus innovating) (Puthusserry *et al.*, 2022), content of change (products and processes versus business models) (Guckenbiehl and Corral de Zubielqui, 2022), and direction of change (retrenchment, coping or accepting versus adaptation, sustaining, pivoting, transforming or reconfiguring, and exit or addition) (Hillman and Guenther, 2021; Kirtley and O'Mahony, 2023; Powell and Baker, 2014; Wenzel *et al.*, 2022). This study is inspired by innovation research, where a typical way of conceptualizing the nature of change involves considering the degree of novelty involved. In this understanding, change varies from incremental improvements in existing products, activities and business models to radical innovations involving major transformations leading to the creation of something new (Tidd and Bessant, 2021). Thus, one can distinguish between minimal, incremental, and major change strategies.

Minimal changes involve solutions requiring minimal efforts, such as quickly reallocating financial resources (Bergami *et al.*, 2021). They often reduce firm size, through measures like staff redundancies (Puthusserry *et al.*, 2022) and cutting products or markets to mitigate the financial impact of the crisis (Newman *et al.*, 2022).

Incremental changes entail modifications of resources, processes, or business models to sustain activities following a disruptive event (Bergami, 2021). They seek to adapt firm activities to the new context, for instance by altering fundraising strategies (Guckenbiehl and Corral de Zubielqui, 2022), adjusting product packaging and exploring new distribution channels (Waehning *et al.*, 2023), without altering the firm's trajectory (Berends *et al.*, 2021).

Major changes involve reconfigurations of firm resources, processes, and business models which result in the transformation of key activities (Powell and Baker, 2014), such as pivoting to a new

market or technology (Berends *et al.*, 2021), introducing new products or services, and diversifying into new markets (Guckenbiehl and Corral de Zubieli, 2022; Puthusserry *et al.*, 2022).

A key focus in crisis management research is explaining the diversity of these crisis responses and associated firm-level outcomes. Generally, such explanations rely on organizational-level factors (Newman *et al.*, 2021), such as resource and capability endowments (Bergami *et al.*, 2021) to account for differences in firms' strategic capability to respond to environmental changes. For instance, recent studies investigating the responses of small and medium firms to crises, including those relative to the COVID-19 pandemic, relate variation in crisis responses to variation in organizational attributes such as slack resources (Verreyne *et al.*, 2023), networks (Nikiforou *et al.*, 2023), social capital (Puthusserry *et al.*, 2022), size (Guckenbiehl and Corral de Zubieli, 2022) and age (Miklian and Hoelscher, 2022). Such organizational-level perspective neglects the entrepreneur, who is the key decision maker in small and medium firms, and whose decision-making drives their firm's responses, leading to recent studies advocating for an entrepreneur-focused, micro-level perspective on how small and medium firms respond to crisis (Newman *et al.*, 2022). Entrepreneurship studies taking such a micro-level perspective are mostly concerned with the resilience of entrepreneurs and how it connects with their firms' ability to respond to crisis (Branicki *et al.*, 2018; Korber and McNaughton, 2018). However, more broadly, organizational resilience literature highlights the cognitive and behavioral bases of crisis response strategies (Williams *et al.*, 2017). Cognitive responses relate to how key decision makers perceive the favorability of crises, which explains firm-level outcomes such as changes in firms' business models (Guckenbiehl and Corral de Zubieli, 2022) and financials (Newman *et al.*, 2022). Behavioral responses relate to how key decision makers engage with the crisis, for instance by accepting or avoiding the new reality, which distinguishes between firm-level outcome responses such as renewal, adaptation or learning (Hillman and Guenter, 2021).

The research discussed above draws attention to the role that the cognition and behavior of key individuals in firms, such as founders in founder-led firms, play in explaining firms' crisis response. This link with cognition and behavior to understand firms' crisis responses explains why this study turns to identity theory to develop a micro-level, individual-focused explanation of variations in firms' crisis response as it connects the role identity of individual entrepreneurs – which provides the cognitive schema for understanding the crises– with specific behaviors, such as decision-making with respect to responding to adverse environmental change, which in turn generates firm-level outcomes.

Methodology

The research question of this study is: How does the founder role identity salient at the time of crisis affect their behavior to respond to crises and the firm-level outcomes of this behavior? To answer this question, this study examined 15 leaders of high-technology (software and hardware), founder-led firms in developed economies (United States (US) and Western Europe) during the COVID-19 pandemic. As the impact of COVID-19 varied across different economies and industries, focusing on a particular industry and economy was important. Fourteen firms were led by their founder, with one firm led by the founder's daughter, who succeeded her father. Most firms were young and very small, developing a variety of software and hardware products. To ensure consistency in the analysis of founders' crisis situational interpretations across firms, the scope of decision-making was narrowed by considering only founders' behaviors and firms' responses related to one area of activity, which is critical in high-technology firms: product development. Interviews were conducted with one of their founders between November 2021 and January 2022, with each lasting around 50 minutes. Where firms had multiple founders, the founder interviewed was the one responsible for product development. Questions examined the founder's expectations and behaviors in relation to their role of setting up and running the firm in general, and in the context of COVID-19 pandemic in particular, their perceptions of the challenges and opportunities brought about by the crisis, and their firms'

responses to these challenges and opportunities in relation to their product development activities.

Table 2 describes the cases.

Table 2. Characteristics of sample firms

Case	Location	Age: years	Size: no of employees	Product offering	First-time or serial entrepreneur	Founding team
EntrPlatform	US	<10	2-10	Data infrastructure platform for communities of founders and investors	SE	Team
BrainDevice	US	3	11-50	Medical device (helmet) for traumatic brain injuries	E	Team
VideoSales Platform	UK	1	2-10	Video-based sales engagement platform for real estate	SE	Team
IoTSpectrometer	US	8	11-50	Handheld spectroscopy device with IoT integration (optical scanners)	SE	Team
StudentMg	US	27	201-500	Student management system	E	Team
MobServices	Sweden	7	51-200	Software service company specialising in developing mobile apps	SE	Team
DigMarketing	US	1	1	Digital marketing service	SE	Team
SoftConsult	US	5	2-10	Software consultancy	E	Single founder
SensSafe	US	9	501-1000	Automatic/sensor-based, safe access monitoring handgun	E	Team
ITPlatform Service	US	21	2-10	Software platform for enterprises + managed service of existing company software	SE	Single founder
Implement Service	US	3	11-50	Customizing Microsoft software for enterprises	E	Single founder
CommPlatform	US	16	51-200	Data-driven platform to support communities	SE	Team
Knolwedge Platform	US	15	11-50	Publishing and learning content platform	E	Team
GamesFor Learning	US	3	11-50	Educational service and educational software	SE	Single founder
BreathDevice	US	3	11-50	Medical device for respiratory diseases, clinical trial services, digital services	E	Single founder

*SE = serial entrepreneur (the founder had set up other firms in the past) / E = entrepreneur (the firm is the first that the founder had set up)

*Location, Size, Age, Product description and serial entrepreneur validated by triangulating interviews and LinkedIn information on the firm

Source: Authors' own creation

To analyze the data, the authors moved iteratively between coding, validation against a new set of empirical data, and refinement against existing literature (Miles and Huberman, 1998). Coding involved three categorization stages (generating initial categories, refining tentative categories and stabilizing categories) and the deployment of specific analytical moves (Grodal's *et al.*, 2021). NVivo was used to facilitate coding and analysis.

Data analysis began by generating the initial descriptive categories inductively in order to make sense of the data. A list of broad categories of codes, developed based on existing literature and informed by the RQ, was utilized. This list included: (1) founder identity, investigating how founders explained their role with respect to running the business (Mathias and Williams, 2017), (2) product offering (software, hardware, service), (3) founders' perceptions of the impact of COVID-19 crisis on product development (Powell and Baker, 2014), and (4) firms' responses to the crisis, including changes to either the firms' products or services, or to their product development activities (informed by Tidd and Bessant, 2021). At this stage, the authors relied on the definition of these concepts from the literature, while also allowing for the emergence of these codes where the data did not fit the pre-existing category. For instance, we used Mathias and Williams' (2017) definition of founder role identity to elicit the expectations of the founders, but did not force these into the manager, investor and entrepreneur pre-defined categories. The analytical moves (Grodal *et al.*, 2021) deployed were asking questions, for instance what expectations and behaviors did founders associate with their responsibility of running the business, and dropping and merging categories: for instance, "reducing margins" and "accommodating work from home restrictions", both part of the crisis responses, were eventually merged into minimal change outcomes.

Once these initial categories were generated, the analysis moved to refining these tentative descriptive categories (Grodal *et al.*, 2021) to arrive at the interpretative codes, by iteratively going back to the literature and (re)applying these analytical moves to match them with existing theory. Merging and splitting categories were the key analytical modes deployed at this stage (Grodal *et al.*, 2021). In some cases, multiple descriptive codes were merged into one theoretically defined category as they reflected different aspects of an existing construct, e.g., “taking risks” and “being in control” were merged and matched with the Entrepreneur role identity. In other cases, the iterative matching with the literature led to the identification of a new interpretative category. For instance, while the founder’s perspective on the crisis was originally assessed by considering their interpretation of its favorability (e.g. opportunities, threats, challenges, Powell and Baker, 2014), gradual iterations with the literature (Guckenbiehl and Corral de Zubielqui, 2022; Kirtley and O’Mahony, 2021; Mathias and Williams, 2017) led to both refining this category into opportunities, threats and no impact, and splitting it by considering also the filter focus reflecting how identity focuses founders’ attention on certain information (i.e. on a range from narrow to wide focus: resources limitations to support current activities, internal operations to support transition to remote work, current market context, and broader institutional context). Gradual iterations with literature (Powell and Baker, 2014; Teyi *et al.*, 2023) also led to splitting firms’ crisis responses into behavior responses (e.g., aligning, mitigating and survive) and firm-level outcomes to better conceptualize the process through which cognition explains how firms respond to crises.

These iterations between data, theory, and refinement of descriptive codes eventually led to the stabilization of these interpretative categories (Grodal *et al.*, 2021). These categories reflect the theoretical concepts that inform the RQ: types of founder identity in relation to their role of running a business during crisis (a development of Mathias and Williams’ (2017) original categorization); types of response strategy (minimal change, incremental change and major change responses); and

founders' focus of attention (information favorability, i.e. opportunity, threat or neutral, and information filter focus, i.e. broad context, market, internal process and resources).

To move from interpretative to pattern coding, the research team relied on tools such as matrix building, and narratives (Miles and Huberman, 1998) to facilitate two main analytical moves: relating and contracting categories to identify patterns in the data, for instance between role identity and focus of attention, and developing and dropping working hypotheses (Grodal *et al.*, 2021). For instance, initially coding built on Powell and Baker (2014) to examine how identity shapes firms' responses through considering its role in how founders define the favorability of the changes brought by the crisis. However, as the analysis progressed, the evidence did not support a clear pattern, leading researchers to re-examine the data to consider alternative explanations. Narratives were built to depict how founders with different identities defined the crisis. These narratives were then compared to surface the possible explanations for variations across identities and were instrumental in identifying the type of entrepreneurial behaviors that connect the founders' cognitive filter focus and their interpretation of information favorability, with firm-level outcomes reflecting their crisis responses (decision-making emphasizing aligning, mitigating and surviving changes). Analytical moves and narrative comparison led to the identification of patterns in the data linking interpretative codes. These patterns reveal how identity directs founders' attention to different sources of information, and shapes their perceptions of its favorability, leading to variations in founders' decision-making to respond to the crisis which in turn explain variations in firm-level outcomes. Table 3 lists the final codes.

Table 3. Coding table

Descriptive coding & exemplary quotes	Interpretative coding	Pattern coding
<p>Identify problems and find new solutions (exploit opportunities)</p> <p>“I think probably the largest reason we founded this business was the fact that there was a gap in execution for companies. So, we always had a propensity for developing strong strategies using digital marketing, using analytics and advanced analytics-based approaches to problems for our clients, but even if you can come up with a great concept, strategy, idea, there is always two areas where companies failed to grow or achieve their initiatives, and that was having the right people in place at the right time, so speed to human capital, and two, having the experience and being able to execute. And I think, if you look at the market overall, really that’s what the managed service engagement style is really developed to address, and then on the human capital side, it’s how do you get people into place very, very quickly. So, we’ve developed a tech innovative platform and system, way of doing business to help address those two business problems. So, that’s really the purpose why we started the company and how we’re going to market.” (ITPlatformService)</p>	Entrepreneur role identity	Role identity
<p>Be in control of your own life</p> <p>“I think entrepreneurship allows you to kind of create your own future, it allows you to work as hard or as little as you want and it also allows you to optimize the way that you work, so I think the best entrepreneurs not only work very hard, they work very smart, they figure out ways to continually improve the way they look at things, the process and it gives them the opportunity to continually grow, which I love.” (DigMarketing)</p>		
<p>Fulfil the dream / take risks</p> <p>“I think the one thing that matters is, a dream is a reality, and usually, the dream becomes a roadmap towards breaking it down into tiny chunks that you can execute, but it’s a lot of work and you’ve got to be relentless in it, and I think that the spirit of entrepreneurship is relentless work and, even when everything seems like it’s going wrong, you keep going at it and, more often than not, you succeed, you know?” (VideoSalesPlatform)</p>		
<p>Create more value for the company</p> <p>“So I was basically an ‘intrapreneur’ turned entrepreneur, so I worked for several companies before and as an ‘intrapreneur’ I was always looking at how could I create more value for the company and how could I find certain solutions that would help our customers and make it easier for [the] operational [side]” (MobService)</p>	Manager role identity	
<p>Apply specialist knowledge to affect change</p> <p>“For me, being an entrepreneur is about using my creativity to make a positive impact on somebody’s life in a way that nobody’s done before, so like I mentioned before, I do come from a disadvantaged background. I’m very much self-made in that regard, and still, in the making process, in the self-making process. I don’t know if I would say that I’m made yet. But the idea for this particular company</p>	Technical Expert role identity	

<p>started back in middle school for me, so that was almost 10 years ago. I come from a family of amateur horticulturalists, amateur growers, and I grew up around the Boston area, and so there, the winters are even more harsh than they are in Rochester, so we have to bring all the plants indoors and there's a lot of science and also just artistic technique in knowing how to winter plants over and how to grow well in that kind of harsh environment. So, that's what got me interested in agriculture and agricultural technology as a way to improve our results there.” (IoT Spectrometer)</p>		
<p>Apply specialist knowledge to bring your vision to fruition</p> <p>“I have a background in neurosurgery research, and the first time that I'd ever thought about entrepreneurship was in college when one of my hobbies, which was to develop different neurosurgery medical devices, that one of the inventions that I had was promising financially and research-based. So, that was the first time I'd ever even thought of entrepreneurship, so this is really my first venture. But for personally, what my venture is to me is more of a way to test a new treatment for traumatic brain injury in a world where you don't necessarily have to be a doctor to invent medical technology.” (BrainDevice)</p>		
<p>Portfolio investment</p> <p>“I became an angel investor; I started a gaming accelerator and became a very big advocate for start-ups in upstate New York. I'm an entrepreneur resident at Rensselaer Polytech and I teach a class there and it was through that as a mentor, I'm a judge for all the business plan competitions and things like that, and it was through that that I was guiding this young entrepreneur at RPI and he actually worked and came up with these crazy ideas and he won a few dollars and went home over the summer and actually worked all summer and came back with a prototype of an incredible product. So, with my coaching and advice – and I was one of the judges – he won the New York State business plan competition out of 2,200 teams. So that day, I walked up and I said ‘let's really do it’, so we started the company there and that was in 2016.” (SensSafe)</p>	<p>Investor role identity</p>	
<p>Global context impacting the supply chain for components essential to their product</p> <p>“That being said, what happened in the pandemic is that because there was panic buying of electronic components because of shortages, predicted shortages, some of our components have been driven to obsolete earlier than we wanted, so that has affected [us]. We've just used the opportunity to stock up on stuff that should have been going obsolete in four years, but now maybe obsolete in one year.” (BreathDevice)</p>		<p>Focus of cognitive filter – what information do founders focus their attention on to inform decision making in relation to the changes to product development brought about by the pandemic</p>
<p>Changes in wider context which limits the product value</p> <p>“...because [of COVID] everything was suddenly closed or suddenly this funding program disappeared, and all of these changes that, like, usually would happen at a very low rate within an ecosystem all suddenly started to happen, so our algorithms [which rely on collecting data on these programs] are, like, flying off the wall.” (CommPlatform)</p>	<p>Broader context issues</p>	
<p>Wider changes in labor market in terms of global research</p> <p>“The pandemic has made it possible for us to transition into a global start-up, and then open up opportunities to get more talent from abroad in ways that weren't available when our office was in London and we were battling for the same scarce talent with everyone else.” (VideoSalesPlatform)</p>		

<p>Aspects related to the productivity of work and/or the ability for decision making when working from home</p> <p>“...no question, collaboration was an issue, no question that our architects, our software architects and solution architects probably struggle the most, just because they, quite often, are part of an iterative development process. So, they’ll work with a developer, see what’s going on, go back to the product manager or the business, evolve the approach. So, I think that iterative process was definitely a challenge. Also, especially in some of the parts of the world where speed of internet, availability of power and infrastructure at people’s homes were an issue, and what do I mean by that, so say a family of four was absolutely fine with one of them working from home, but now with four people all trying to work from home at the same table, same internet connection, all of a sudden became an issue, became more of a volume issue.” (ITPlatformService)</p>	<p>Internal processes issues</p>	
<p>Aspects related to the social and wellbeing of your employees in relation to working from home</p> <p>“...the largest challenges were the effects that the pandemic had on our contributors and our clients, because from a mental health standpoint... We all worked remote anyway. I mean, we’re globally diverse, technical, remote-enabled workforce, so working remote was not the issue. The issue was more related to a contributor that was living in a very small apartment for extended periods of time, really limited interaction with their family, a lot of times there was other stress and challenges that they had going on personally. It was very much unrelated to being able to execute their job. It was more around the circumstances in which they were asked to be isolated or in quarantine, in most cases.” (ITPlatformService)</p>		
<p>Aspects related to work flexibility in relation to work from home</p> <p>“I sort of feel like the pandemic was a catalyst to this business even existing. The new kind of shape of the world where everybody’s working from home and timelines are a little bit more flexible, allowed me to be able to service other clients in sort of my own respect while continuing to maintain a full-time career at an established business. So I think kind of the extra gaps in time and the flexibility in my schedule has allowed me to kind of have the meetings that I need to have when I need to have them, and still continue to get my day job done.” (SoftConsult)</p>		
<p>Aspects related to the changes in working with partners in an online environment</p> <p>“...what’s interesting is that, when we used to depend on face-to-face interactions to build trust, what you really ended up basing your opinion on was more, do I like this person, do I get along with this person? What’s our energy, what’s the dynamic, right? And it wasn’t necessarily, can this person effectively do the work, is this person the right fit for my business, is this person able to deliver what we need to deliver to the client? Now, I’m not necessarily looking for the same warm and fuzzies that I was looking for back in the day, right? Now it’s like, yes, we have... it’s enough, if you’re on video, it’s enough to feel comfortable, but I’m not all that worried about feeling connected. I don’t know, right? And so, it opens up the possibilities a little bit and maybe makes us a little bit more strategic in who we actually want to work with.” (ImplementService)</p>		
<p>Aspects related to changes in existing markets due to uncertainty in custom behavior and lost sales</p> <p>“We had several contracts cancelled because people had cashflow problems and we had to then spin down teams and put things on hold. We had products that we built with clients that were supposed to launch at trade shows that just never launched because the trade shows were cancelled. We had clients who went out of business during this and then we had other clients who had all kinds of great ideas but</p>	<p>Market issues</p>	

<p>then had no time for us because they were in healthcare. And their entire organization had to pivot and be completely focused on the public health crisis and then put the development of other materials on the back burner.” (GamesForLearning)</p>		
<p>Opportunities in existing (increase demand) or new markets (reach new product areas and new geographies)</p> <p>“...because people were staying home and because people were on their digital devices so much more, the platforms changed very quickly, everything from the uptick in social media usage, which actually probably was an opportunity for us because there’s more audience that we can serve ads to, but like Zoom taking over the virtual meeting space and making sure that we had all of our technology in place so that we can communicate to clients or communicate to one another from our employee side. So I think that that was the hardest thing, was staying up to date with what was happening in that really fast changing technology space, but I would actually argue that it was mostly good for an agency like us from a technology standpoint because so many more people were using the platforms that we serve ads on, so we had a bigger audience to serve those ads to.” (DigMarketing)</p>		
<p>Limited funds to buy the components required to support product development in the face of shortages</p> <p>“...then small supply chain issues started hitting, so our product was a month late, and when you're a small start-up running on fumes and we were already out of product for two months because we sold out, how adding another month of burn onto that with revenue coming in was significant again. [...] the chip shortage hit, so then not only now we have all this money tied up in this big inventory but we can't get boards. And the way that, you know, when you start hearing Elon Musk can't get boards and GM can't get boards and chips, the right chips, you know, our board makers, the prices are going through the roof and they want you to commit two years in advance and pay these crazy prices! And I said ‘well am I for sure going to get it October?’, they said ‘no, could be October, it could be a year from October, we don't know’, so yeah, it’s a business killer, it’s a business killing environment, it’s a start-up killing environment.” (SensSafe)</p>	<p>Resource scarcity issues</p>	
<p>Limited financial and human capital resources (lack of revenue, limited investments) to resource product development activity</p> <p>“...other problem that we had was that it was harder to get resources. So, for example, we will very often need to hire voice talent and translators and so, because I don’t keep voice talent on staff, we had a harder time sourcing some of those external experts and it was certainly harder for us to get access to epidemiologists and virologists who could provide a detailed input that we needed to make sure that our material was accurate. And we had to pay more for some of that because there was a lot of demand. So, those are just some of the things that we had to navigate.” (GamesForLearning)</p>		
<p>Definition of contextual change as having a positive impact on the business, e.g. offering new opportunities to exploit</p> <p>“In this business, we’re building software, which is inherently digital, doesn’t really care where you are, what time zone you’re in or when are you working, because it operates 24/7, so I’m seeing software significantly easier to build, and maybe more resistant to the change that we’ve seen over the past couple of months, I mean, let’s say, 12, 16 months since the pandemic started.” (EntrPlatform)</p>	<p>Information perceived as an opportunity</p>	<p>Information favorability</p>
<p>Definition of contextual change as having a negative impact on the business, e.g. raising challenges to address</p>	<p>Information perceived as a threat</p>	

<p>“...building a team during the pandemic was just impossible, right? Like, hey, we’re going to move really, really quickly, but everyone is having a mental health crisis and we’re never going to see each other in person. Like, that was definitely the hardest non-technical aspect, but it relates to the technical, just engineering-wise.” (CommPlatform)</p>		
<p>Accept that the environment has changed, and redesign the course of action to reflect the new context to maintain effectiveness of actions</p> <p>“...in terms of the challenges faced by the pandemic, so we were lucky in that, business-wise, we benefited. We got a lot of customers because of the pandemic, and so with that, the biggest technical challenge was just building the product quickly enough to be able to meet those needs. I would say the biggest technical challenge was just building it quickly enough to keep up with the demands of our customers, and the level of features and support that these big organizations need.” (CommPlatform)</p>	<p>Align with perceived changes brought by the pandemic</p>	
<p>Accept that the environment has changed, but maintain the existing course of action while counteracting / correcting for these changes to maintain efficiency of actions</p> <p>“...so over the past 18 months, we were at the stage in the company development where we were applying to as many government grant programs as we could, and all of our life was remote, so we couldn’t go into the lab and perform physical prototyping together, at least, [...] and so the only work we were able to do in developing both the technology and the company, [...] So, technically, it really did force us to shift from doing hands on prototyping to addressing the technical and scientific foundations of the technology that we’re working on.” (BrainDevice)</p>	<p>Mitigate against perceived changes brought by the pandemic</p>	<p>Entrepreneurial behavior decision-making to respond to the crisis</p>
<p>Avoid addressing the changes in the environment, choosing to persist in the current course of action with only minimal adjustments only when strictly necessary</p> <p>“I hope that the word-of-mouth growth that I’ve seen so far continues up to my capacity. There are definitely times where I don’t have any clients. There have been months throughout this year where I didn’t have any clients, just based on need. There were no projects of the right size and shape for my company to help with, so I hope that the more work that I end up doing, the more word of mouth spreads. Again, I’m not trying to grow it into a giant corporation or hire more people necessarily so I would like to kind of just grow up to my capacity and not have these dry spells where I have no clients.” (SoftConsult)</p>	<p>Surviving perceived changes brought by the pandemic</p>	
<p>Retrenchment of activities involving reactive management of resources to survive (increase salaries while reducing margins to retain staff, release staff, careful management of resources, sell part of the company to resource ongoing activities)</p> <p>“...we laid a couple of people off. We stopped paying the C level, we put everyone else down to half time, like, we made the decision of let’s go into drastic measure and try to get through to the other side where we will have product availability, because without a consistent supply chain, I can’t engage a larger customer because they want to know that the product’s going to be on their dock, you know, whatever it is, March 3rd, and I can’t guarantee that. So, yeah, we’re in emergency mode, we’re still selling, we put our marketing on like a slow trickle, so basically our burn is what we’re selling, you know, at that low, low reduced burn, and we’re just trying to make it out the other side, so we put ourselves up for sale, we put the company for sale, we’re like ‘well we either got to raise money, which that’s probably not going to happen right now, or sell the company or getting into a partnership’, so we have pursued all three.” (SensSafe)</p>	<p>Minimal changes to respond to crisis (in activities)</p>	<p>Firm level outcomes reflecting their crisis responses in relation to product development activities and content</p>

<p>Accommodating changes in work context (work from home) with minimum change, e.g. focus on frequency of communication, reducing expectation</p> <p>“...because it’s all remote at this point, the communication is a little bit more asynchronous and it can make for misunderstanding. You can increase the likelihood of misunderstanding. In a lot of ways I think that, you know, we would defer to email or a chat of some sort as opposed to just hopping on a call and communicating with one another face to face. I think if I had those opportunities to go see somebody face to face and maybe even plan some things out on a whiteboard or draw things out in person, maybe some of the communication would have been a little bit clearer.” (SoftConsult)</p>		
<p>Reallocation of resources to different activities to speed up or maintain product development activities</p> <p>“What the pandemic has done is.... accelerate acceptance of digital health and telemedicine. And so, with that in mind, I would say we accelerated the launch of our digital health service where we would have done it in 2022, we bought it forward to 2021.” (BreathDevice)</p>		
<p>Improvements of existing work processes and activities to better suit to challenges of operating in online environment (e.g. reliance on online technology to support existing processes in ways not foreseen previously, strengthen relationships within employees and with customers)</p> <p>“...the priorities right now in the tech field I would say for us is what we call ‘employee engagement’, you know, in this flexible, hybrid, remote – how do you stay connected and engaged with your employee base? And there’s such a high need for highly skilled technical people that how do we keep them? What differentiates us, from our competition and how do we instil our culture in this remote? So we have a lot of initiatives in which we run town halls, which we give more communication and updates, we have more social committee events where we maybe get a food truck in, so it’s all around check-ins, 30, 60, 90 days to our employees – are they getting what they need from us? So it’s a lot more of employee engagement than we’ve done in the past and we feel it’s necessary to stay connected with our employees and make sure they are getting from us what they need.” (StudentMg)</p>	<p>Incremental changes to respond to crisis (in activities and products)</p>	
<p>Changes to existing products to better accommodate the online context (i.e. rapid changes to product to respond to heightened uncertainty, and consider adding digital functionality to match demand for online products)</p> <p>“...[COVID] created a demand for new things because people needed to educate healthcare practitioners about how to handle COVID and, you know, a bunch of other things. So, we did a series of educational things that were translated in Spanish, Cantonese, English, a huge list of languages just to educate patients and providers on how to prevent COVID.” (GamesForLearning)</p>		
<p>Major changes in activities involved in the product development (e.g. develop new processes and new tools to better organize product development; diversification into new markets)</p> <p>“I think really the first thing was just prioritizing our people and their ability to do their job and so we did a couple of things, probably the most significant was we created an in-house CRM during the pandemic, we had tried a lot of different CRM tools to manage our clients and manage our process, but we realized that the ones that we were using that were out of the box were just not set up for our business, like, they couldn't customize certain things, so we had to just do it on our own, so we created our own CRM and that has worked incredibly well because it’s built for our agency and that was probably the most important thing we did.” (DigMarketing]</p>	<p>Major changes to respond to crisis (in activities and products)</p>	

<p>Major changes to products (develop new products, or significant changes to their offerings to better fit new context)</p> <p>“All live events stopped! So yes, so no longer could we be with our clients, we could no longer be at their events and support them, so obviously all revenue from the live events, on site events completely stopped. However, we have always been very innovative, we introduced indoor beacon solutions, indoor navigation technology, ... and we've always been on the cutting edge with certain things, so virtual communication for us has always been very, very standard ... Zoom or Webex, go to meetings, Skype, all of these things, it's something that we'd been working with every day. So, what we started to do was talk to our clients and help them to understand how to use these types of video technology also for their meetings. And rather quickly, we built out a platform with our customers directly and we've used 3-D visualization solutions, but also just enhancing how it's all integrated, so we've integrated a few other video platforms as well into our overall events solution. So actually, for us, it presented a great opportunity as well to support our customers and we've created a whole new career fair solution which we now run in two countries, we basically help all the high schools in Sweden and Norway and we're now starting to expand that product line as well to other countries around the world.” (MobService)</p>		
---	--	--

Source: Authors' own creation

Findings

The findings are reported in three parts. The first describes the founders' role identities and their role in filtering and framing the information founders perceive from their environment. The second describes how cognition encourages founders to engage in different crisis response behaviors reflecting their decisions on how to position their firm vis-à-vis the environmental changes. The last examines the outcomes that these behaviors result in for firm. The relation between founders' role identities and entrepreneurial cognition, its consequences on decision-making behavior, and its impact on the degree of change in their firms are summarized in Table 4 and detailed in the rest of this section.

Table 4. Role identity, focus of attention and firms' crisis response strategies

Founder identity	Case	Filter focus and information favorability interpretation => decision-making behavior	Areas of change within the firm
Entrepreneur	CommPlatform	Broad context – Threat => aligning Market – Opportunity => aligning	Major changes in activities
	VideoSales Platform	Broad context – Opportunity => aligning Market – Opportunity => aligning	Major changes in products and activities
	DigMarketing	Market – (mostly) Opportunity & Threat => aligning & mitigating Internal processes – Threat => mitigating	Major changes in activities Incremental changes in activities
	BreathDevice	Broad context – Threat => aligning Market – Opportunity & Threat => aligning & mitigating	Major changes in activities Incremental changes in activities & mitigating
	ITPlatform Service	Internal processes – Threat => mitigating	Incremental changes in activities
	EntrPlatform	Internal processes - Opportunity & Threat => mitigating	Incremental changes in activities
	Knowledge Platform	No impact	None
Technical Expert	BrainDevice	Internal processes – Threat => mitigating	Incremental changes in activities
	StudentMg	Internal processes – Threat => mitigating Market – Threat => mitigating	Incremental changes in products and activities
	SoftConsult	Internal processes – Opportunity & Threat => mitigating Resources – Threat => survival	Incremental changes in activities Minimal changes in activities

	IoT Spectrometer	Internal processes – Threat => mitigating Resources – Threat => survival	Incremental changes in activities Minimal changes in activities
	Gamesof Learning	Internal processes – Threat => mitigating Market – Opportunity & (mostly) Threat => mitigating Resources – Threat => survival	Incremental changes in products and activities Minimal changes in activities
Manager	MobServices	Internal processes – Threat => mitigating Market – Opportunity => aligning	Incremental changes in activities Major changes in products
	Implement Service	Internal processes – Threat => mitigating Market – Opportunity => aligning	Incremental changes in activities Major changes in products and activities
Investor	SenseSafe	Resources – Threat => survival	Minimal changes in activities

Source: Authors' own creation

Role identities and entrepreneurial cognition

The first step of the analysis involved identifying the role identity salient to the crisis and its role in shaping founders' cognition. The analysis revealed four role identities: entrepreneur (seven), technical expert (five), manager (two) and investors (one), each associated with different set of expectations regarding the founder's role in managing the business (see Table 3 for the descriptions of these roles and exemplary quotes). The latter two² were present only in very small numbers, limiting the ability to link them robustly to different cognitive schemas. For this reason, the analysis considers the entrepreneur and technical expert identities only.

The **entrepreneur** identity comprised founders who defined their role as identifying novel solutions to existing problems through seeking and exploring new opportunities. Such entrepreneurs saw their firm as a vehicle to develop and/or capture these new opportunities.

“We saw huge opportunity in a new wave of e-commerce happening and, for a long time, it's always been a bandwidth problem [...] and when social media came in place and they

² Contrary to Entrepreneurs, Managers viewed their role as coordinating activities to create value for others stakeholders, customers or employees rather than identifying new opportunities, while Investors defined their role as allocating resources across a portfolio of ventures to generate return on their investment.

started doing immersive videos, all of a sudden there is a new type of interaction that keeps us glued to the screen for hours. We wanted to recreate the same capability for businesses to be able to have the same immersive video experience on their own domains and be able to sell products or homes or whatever else, and we basically built that e-commerce infrastructure that is powered by video.” (VideoSalesPlatform)

Founders with an entrepreneur identity also discussed expectations that founding a business allows them to be in control of their choices, sometimes out of necessity (e.g., losing their job), and noted risk taking and pursuing their dreams despite adversity as typical behaviors that they associated with running a business.

The **technical expert** identity comprised founders who viewed their role as applying their scientific knowledge to enact change on a wider scale, e.g., disrupt education (GamesForLearning), to fulfil a personal vision in relation to a particular field, make precision agriculture possible (IoTSpectrometer), or to find a market application for their scientific research (BrainDevice). For these founders, creating their venture was part of their pursuit of scientific advancement around a particular field of knowledge or was aimed at developing specialized technical solutions for clients.

“When I went back into the classroom, I had this observation that I was working in the 21st Century but I was using Stone Age technology, I was literally making marks on a chalk board with a piece of chalk [...] And when I was doing that, I started looking at the gap between education and the disruption that technology had brought and the innovation that technology had brought in other industries and so[...] it occurred to me that I had an opportunity to create something that would actually be able to impact many more students than I could as an individual. So, I created [my company].” (GamesForLearning)

Technical experts’ emphasis on a specific field of knowledge was tied to their professional and educational background. All technical experts saw their firms as a means to exploit their field-specific knowledge to develop a product/technology within that field.

Although some founders mentioned meanings and behaviors associated with different role identities, as the analysis progressed it became clear that while running their business during the crisis, these expectations were subordinated to one salient role identity which informed their perceptions of and

reactions to the crisis. For instance, IoT Spectrometer, a technical expert identity founder, also talked about their responsibility to identify opportunities for their firm, but these opportunities were related to exploiting their research activities to enable them to apply science to advance precision agriculture techniques, a behavior associated with their salient technical expert identity:

“...it started out as a middle school science project about using different precision agriculture techniques to improve growth and improve yield, and that turned into my research here at the University [anonymized], with Professors [anonymized] in the optics department, and through that research and other ideas and opportunities coming from that, we were able to launch our company.” (IoT Spectrometer)

The analysis revealed two ways in which the salient role identity founders exhibited during the crisis shaped their cognition: through filtering what information they focused on to understand the impact of the crisis on their product development (filter focus), and through framing how they interpreted this information (information favorability).

Identity and filter focus

First, founders with different role identities focused their attention on different areas within their environment when searching for information about the impact of the crisis on their business (see Table 3 for descriptions of these concepts and exemplary quotes).

Entrepreneur role identity is associated with seeking out new solutions to problems and identifying new opportunities, regardless of whether or not such opportunities align with their business. This focus on exploration outside the current scope of their business encouraged entrepreneur founders to pay attention to the **broader impact** that the crisis has on the institutional context of the firm, well beyond the confines of their current activities and existing product markets. Such a wider filter focus led entrepreneur founders to consider the crisis impact on issues ranging from increasing competition in the global job market and creating bottlenecks in the global supply chain, to changes in people’s behavioral patterns. Such issues were seen as both opportunities and threats. For instance, noticing increased job competition led founders to identify new opportunities for hiring outside their typical

job markets (VideoSalesPlatform, see quote below). Bottlenecks were perceived by founders as threatening their firms' commercialization activity, demanding that they consider different avenues for reaching their customers (BreathDevice). Customer behavioral changes questioned the viability of their current approach to product development, requiring founders to consider options outside their current value proposition (CommPlatform). While not all founders with entrepreneur identities considered broader issues (three out of seven), they were the only identity to do so.

"I would say that [the pandemic] actually worked in our favor, funnily enough, because what the pandemic has done is enabled us to now be much easier, a global start-up, and then allow us to get more talent from abroad than it would have been possible before when we had our office in London and we were very much battling the same talent with everyone else, that was quite scarce. ... For us, it worked out as an opportunity. It could have been maybe, for some people, a problem, depending if you need to be, you know, depending on what field you're working on, obviously remote doesn't necessarily work all the time. But for us, it did and it was, as I said, it was actually a huge improvement rather than a problem." (VideoSalesPlatform)

The technical expert identity expectations around exploiting their current knowledge to develop a particular product/technology focused their attention on issues specifically related to their current products and business. This means they prioritized information closely related to their ability to support current product development and commercialization, by considering narrowly the impact that the crisis had on the **availability of resources** to conduct their business (see quote below).

"...the week we were set to launch that programme that we were working on for quite a while, it didn't get launched obviously because the world shut down. What that led to was our biggest sales channel that we were planning has now cut off. So what that also led to was much higher overhead for employees that were not now producing and we're a small start-up company and being a product company you not only have to pay your staff and your overhead, you've got to pay for products, so as you're growing you need to pay early for a product you're not going to sell for four months and then that just, that obligation gets bigger. So it affected us pretty significantly on the cashflow side, both from an unused overhead standpoint as well as unrealised sales that we were planning on." (SenseSafe)

Such narrow filter focus led technical expert founders to consider the financial and human capital constraints due to the crisis's adverse impact on revenues as customers cut demand (IoTSpectrometer; SoftConsult), their ability to retain staff to support product development due to increased job market

competition (GamesForLearning), and sourcing critical product components due to price inflation (SensSafe). While not all technical founders exhibited a narrow filter focus (three out of the five), none of those with an entrepreneur identity did.

Identity and information interpretability

Second, founders with different role identities interpreted the favorability of the same information differently. Identity was relevant in shaping founders' interpretation only in relation to information about current **market issues**, which involved founders focusing their attention on the impact of the crisis on existing customers' behavior, for instance in terms of heightened uncertainty, lower/higher demand, and the emergence of new markets (see Table 3 for exemplary quotes). All founders, regardless of their identity, considered information related to current markets. They however assessed the favorability of this information, i.e., whether it represents as an **opportunity** that the firm could exploit to generate more value, or a **threat** that could lead to loss of value unless addressed, differently. Although both founders with an entrepreneurial and technical expert identity perceived such information as both opportunities and threats, the former more commonly defined market changes in a positive light, while the latter tended to emphasize their negative implications for their firm. For instance, even potentially negative changes, such as heightened market uncertainty, were defined by founders with an entrepreneur identity in a positive light, e.g., stimulating the development of online products targeting different markets (see quote below), or were accompanied by positive impacts that compensated the negative effects.

“...we focused initially on the real estate sector and [...] when [the pandemic] happened, [...] we had a lot of clients that we worked with before coming to us for a solution. The main problem was their inability to showcase spaces in person, and everything else out there was way too complicated, so our solution came in place perfectly for them. We didn't know, as well, how long this would take, we didn't know what's going to happen, so actually, yes, that was a big deal because all of a sudden we stopped our business because it wasn't fully digital at the time, it was a little bit of a combination, and this [change to digital] really was driven by people coming to us to solve that issue and we put together an MVP.” (VideoSalesPlatform)

Nature of crisis and filter focus

All founders, regardless of their identity, focused their attention on information related to the crisis's impact on their **internal operations**, mostly involving changes in communication and work processes due to the shift to online work. This focus was related to the nature of the COVID-19 pandemic, which involved restrictions on people's movements, forcing a shift to remote work. Internal operations concerned information on the impact the crisis had on coordinating product development activities in the context of remote work, generally related to difficulties associated with physically performing the work or supporting cross-team collaboration online.

“...collaboration is a key component to software development and so overnight going from people in an office that was [...] designed for a lot of collaboration to automatically, immediately, be remote overnight was a very difficult challenge. When we develop software, we develop software in what are called weekly sprints. So, on a Monday you're talking about what you're going to accomplish for the week and then on Friday you have a deliverable product. Now you picture how much collaboration there is between the different engineering groups in that period of time and now they're all at home.”
(StudentMg)

Other internal process issues related to remote working, included employee wellbeing, e.g., lower productivity due to limited social contact (EntrPlatform; ITPlatformService), improved flexibility in working arrangements due to remote work (SoftConsult), and the advantages in terms of data availability (EntrPlatform) and challenges in terms of lack of trust (ImplementService) related to online interaction with external partners.

Founders' cognition and identity affirmation decision-making behavior

By filtering and framing information about the crisis, founders' role identity, together with the characteristics of the pandemic, encouraged founders to make decisions concerning firms' positioning

relative to the changes brought by the crisis which re-affirm their identity. The analysis identified three types of such behaviors: surviving, mitigating or aligning with the perceived changes³.

Filter focus and behavior

Founders' cognitive filter focus, reflecting the information they notice, encouraged different decisions on how to respond to the crisis which aligned with their identity expectations. By focusing their attention on information on the broader impact of the crisis, entrepreneur identity encouraged founders to extend their sense-making efforts beyond the immediate constraints of their existing products or activity, considering instead whether these perceived contextual changes afforded their firms the chance to do things differently to align better with their new environment, rather than to do the same more efficiently (see quote below).

“I think, if anything, this transition [to online] made us not only more efficient but allowed us to get access to a world pool of talent that we didn't necessarily consider before. I think, if anything, it wasn't a problem, it was sort of a revelation that things can be done differently now.” (VideoSalesPlatform)

This emphasis on doing things differently reflected founders' efforts to act on this information by **aligning** to the new environment to accommodate the new context brought by these wider institutional changes. Founders' aligning behavior was underpinned by a belief that the environmental changes required them to figure out how to do “*things [...] differently now*”, regardless of whether these changes were perceived favorably, and pivot to match this new environment (see quote below). Such behavior confirmed their entrepreneur identity's expectations for identifying novel solutions.

³ Findings also revealed that some founders perceived the crisis to have little or no impact in specific areas. This was related less to their identity and more to the organizational context in which they operated prior to the crisis. For instance, some founders mentioned being well-prepared for remote working, thus transitioning during the pandemic posed minimal challenges (see quotation below). For others, the crisis had no discernible impact on their product, as it affected neither product usage nor customer demand. Only one founder (KnowledgePlatform) noted that the crisis impacted neither their product nor their product development activities.

*“One of the core things that we have to do is make sure the data that we gather stays updated and that’s the big core of our algorithmic technology, is a way to keep this data perpetually updated, and COVID just really f****d with that, because everything was suddenly closed or suddenly this funding program disappeared, and all of these changes that usually would happen at a very low rate within an ecosystem, suddenly started to happen, so our algorithms are, like, flying off the wall. And it was just like, if you have an algorithm that’s focused on seeing whether or not a program is closed or a space is open, and suddenly everything closes, you have to then sort it through and pivot.” (CommPlatform)*

The attention focus of founders with a technical expert identity was squarely on resource constraints that hampered their ability to conduct their current activities, regardless of from where these constraints arose. Such resource limitations were internalized by founders as threats to their firm, giving them no room for maneuver to mitigate against them, only to acquiesce (see quotes below).

“...because of the limited resources in time and money and distance we just got fewer tries (product iterations).” (IoT Spectrometer)

This narrow focus on the threats that the crisis brings to existing resources encouraged acquiescence, with founders acting on this information by attempting to **survive** these changes while the limitations persisted. This survival behavior involved accepting the negative implications of the crisis, by lowering margins or reducing activity to allow them to continue delivering on their expectations to apply their scientific knowledge to a particular product or market.

“We also saw a huge inflationary pressures on wages during the project, [which] certainly undercut our achieved margin because as inflation started to hit [...] we didn’t want to lose the key team members because there’s a shortage of people with computer science backgrounds right now in the United States because all of the companies that had before only been employing people in San Francisco or Austin or New York City, they were now allowing remote employment. [...]. And so, all of a sudden, my competitive matrix for my talent was much bigger and so, I had to increase my wages to stay competitive without increasing my prices to my clients because I’d already made that commitment. So, it meant that my achieved margin was smaller.” (GamesForLearning)

The nature of the crisis directed the attention of both identities onto information related to changes in internal processes, which was perceived in positive and negative lights, regardless of identity type. In all cases, a focus on internal processes encouraged efforts to compensate for the transition to remote

work by adjusting existing processes to **mitigate** these challenges. Founders' mitigation behavior was underpinned by expectations that responding to the crisis required them to figure out how to maintain (or regain) efficiency in existing work operations within the remote environment.

“Being a service based industry, our product is our people, right, like, the thing that we offer is our really talented staff and so, you know, obviously there was a disruption in the way that we did things because everyone went home, we’re used to working in the office all the time being able to collaborate, and so we had to really focus like so many people on the transition to remote work and how do we collaborate in your team amongst, you know, cross-departmentally, how do we have company-wide meetings, how do we stay efficient at communication when we’re not Zooming, you know, Slack and email and all these things became critical and we had to figure out solutions on how to communicate in the most efficient way. So that was probably the biggest challenge from an organizational standpoint, how can we organize the service that we do and communicate the most efficiently.” (DigMarketing)

Information favorability and behavior

Founders' cognitive framing of the same perceived information, reflecting how they interpreted the favorability of the information related to market changes, encouraged different behavioral responses to these changes. By emphasizing expectations related to identifying novel solutions and exploring new opportunities, even when risks were involved, entrepreneur identity encouraged founders to see opportunities where others saw adversity, explaining why they generally adopted a positive outlook on market changes. Such a positive perception of environmental changes encouraged them to adapt their current course of action to the perceived changes in their environment. This **aligning** behavior allowed them to reaffirm their identity associated with expectations to continue to exploit the new opportunities (see quote below).

“A big part of being an entrepreneur is how you take what seems like a negative, like the pandemic, and turn it into a positive. [...] for us it was trying as hard as we could, but then understanding that we had to keep customers warm and just wait a little bit. But also understanding how the environment has changed [and] how we adapt and meet that? For us, it was really accelerating the digital health trend.” (BreathDevice)

Technical experts defined their role in terms of exploiting current products and knowledge within a particular field. This focus on current operations may explain why, when they did consider market

aspects, their assessment was mostly negative. Even when opportunities were noted, for instance increasing demand for their digital products, they were accompanied by further negative assessments, such as heightened market uncertainty, rapid shifts in product usage, and demand fluctuations due to customers' financial difficulties. This negative outlook steered founders' decisions towards efforts to **mitigate** against the perceived threat resulting from market changes by compensating for these changes to maintain efficiency in existing operations, rather than seeking to alter the course of action to better align with the new environment.

“I would say by and large, our relationships with customers got closer because there was, unfortunately, a crisis mentally and we both needed to figure out how to stay in business and achieve our goals in the face of adversity and so, we used this crisis as a way of continuing to deliver excellence in a way that was focusing on being very compassionate with our customers and respecting the difficulties that they were all encountering.” (GamesForLearning)

Founders' behavior and firm-level outcomes

The last step of the analysis involved examining the impact that founders' crisis response behaviors had on their firms (see Table 3 for exemplary quotes).

Survival-focused decision-making (four cases), involving persisting with the current course of action with only minimal efforts to accommodate the inevitable constraints brought by a lack of resources, led to **minor change** in product development activities, and no change in the products themselves. Examples of minor changes included switching to remote work, but without any other changes in communication and work practices, cutting back new product development initiatives to save resources (see quotation below), reducing margins by increasing salaries to retain staff even when clients were cancelling orders or delaying payments (GamesForLearning), and in one case, selling the firm to avoid closure (SensSafe). Such minor changes involved contracting firms' activities to save resources and ensure firm survival.

“It forced us to be a lot more careful about how we did things [...] in the kinds of engineering decisions we made, to make stuff count. I think it was almost a ... I don't

want to say it was a regression, but look back to a time before computers, before you could just run calculations, run simulations and try a bunch of things all at once. I mean, we were still doing that, right, but the overall, the grand plan was much more methodical and much more well thought out because of the limited resources in time and money and distance.” (IoTspectrometer)

Mitigating decision-making behavior, involving efforts to maintain efficiency in operations in response to disruptive changes whether in the market or in the current operations, translated mostly into **incremental changes** in product development activities (eleven cases), such as adapting work processes to better suit the remote working environment, beyond simply transitioning existing processes online. Such improvements included efforts to offset the downsides of remote working by enhancing online communication and looking to develop closer customer relationships online to sustain product development activity. Occasionally, incremental changes entailed minor modifications to existing products (StudentMg; GamesForLearning), mostly to mitigate heightened uncertainties and the surge in demand for online products during the crisis. As with the incremental changes in product development activities, such modifications to products sought to sustain product activity within the same parameters as before the crisis, reflecting a focus on efficiency.

“We sell to the educational market and pretty quickly we were realizing how our software was being utilized, changed overnight. [...] taking attendance could mean they’re taking attendance remotely from home, students attending classes from home or it could mean there’s a hybrid schedule [...] So it put a lot of effort on development staff to quickly understand the changing needs of our customer base and then how to make those changes within our software, test properly so we didn’t break anything and then deliver a product within a strict timeframe to those school districts so that they could conduct the business they needed.” (StudentMg)

Alignment decision-making behavior involving efforts to achieve a better fit with the new – changed - environment, led to **major changes** in the form of the development of new products and major transformations in product development activities (six cases). A few firms developed entirely new products for online consumption to capitalize on the new market opportunities the crisis presented, including a virtual property tour service (VideoSalesPlatform), an online video careers fair solution (MobServices), and a new service for firms to improve online work productivity (ImplementService).

In other firms, major changes involved transformations in their product development activities by introducing new tools and processes to support online working and to accelerate product development. Some major process changes were driven by shifts in the broader environment, for instance in the global job market, leading to changes in hiring patterns (VideoSalesPlatform), or in customers behavior, requiring firms to alter their product development activities (CommPlatform). Some other major changes were made in response to heightened market uncertainty, for instance involving the diversification of marketing and commercialization activities (BreadthDevice; ImplementService) and developing new ways to manage customers (DigPlatform). In contrast to incremental changes, major changes were underpinned by efforts to improve process effectiveness to support growth in the post-crisis environment, rather than on maintaining process efficiency within the pre-crisis parameters.

“[the pandemic has] broken down those barriers that we used to have geographically. I just started partnering with a company in South Africa. And I would have been somewhat resistant to that in the past, I think because clients would have been more resistant to it, but the reality is there’s no real difference between someone in South Africa and someone in Chicago, right? They’re still not here.” (ImplementService)

Discussion

This study has developed a micro-level, individual-focused explanation for variations in firms’ crisis response strategies by investigating how founders’ role identity filters and frames the information they perceive from their environment concerning the impact the crisis has on their firms, and in so doing encourages decision-making behaviors to respond to these changes that re-affirm this identity, leading to distinct firm-level outcomes. The analysis identifies different pathways through which role identity connects to firm-level outcomes, depending on how role identity and the crisis influence the cognition of founders, encouraging different response behaviors (see Figures 1a/1b).

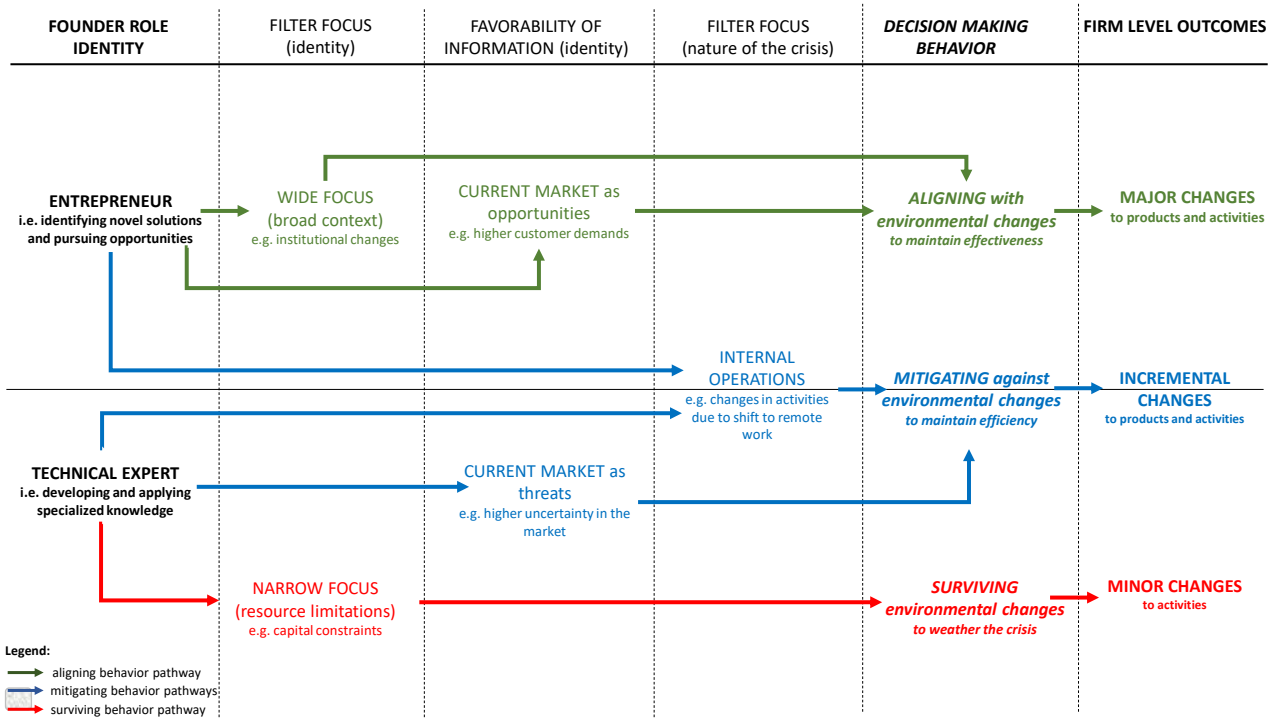


Figure 1a: Summary of findings

Source: Authors' own work

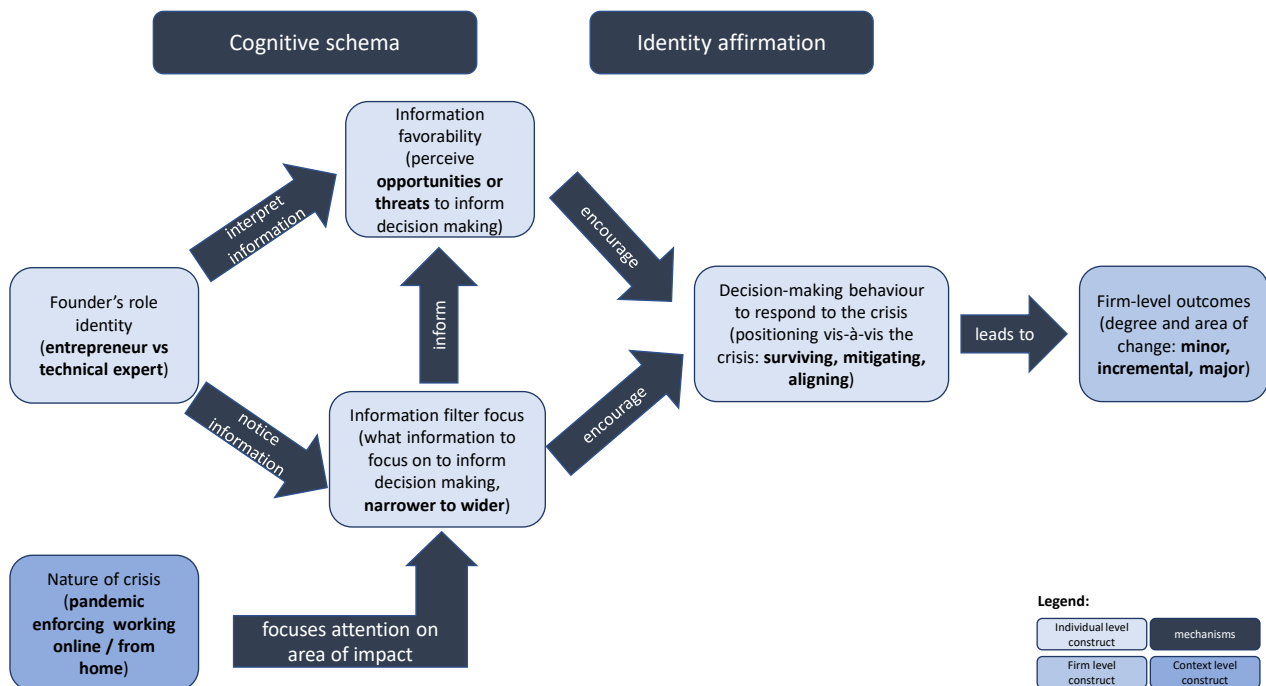


Figure 1b: Role identity and firms' crisis responses: the role of cognition and identity affirming behavior

Source: Authors' own work

The findings point to two mechanisms that underpin this identity-focused explanation of firms' responses to crisis: identity as a cognitive schema filtering and framing the information founders perceive, and identity affirmation driving decision-making behaviors.

First, existing research taking an identity lens to examine firms' responses to adverse environmental changes, such as crises, has emphasized the role that identity – either a type of identity (Zuzul and Tripsas, 2020; Teyi *et al.*, 2023) or the degree of congruence between different identities (Powell and Baker, 2014) – has on shaping the founders' cognitive frames. These cognitive frames shape founders' interpretation of the information they perceive about environmental changes, encouraging different behaviors to reaffirm their identities or match their identity structure. In contrast, this study finds that the behaviors founders engage in to respond to crisis are explained first and foremost by the different cognitive filter focuses (wide versus narrow) exhibited by different role identities (entrepreneur versus technical expert), rather than by their approach to interpreting the environmental changes. Different filter focuses direct founders' attention to different areas in their environment to notice information about the crisis impact on their firms, which encourages different response behaviors to environmental changes (aligning to environmental changes versus surviving them), leading to distinct outcomes at firm-level (major versus minimal changes to their offerings and activities). Thus, role identity not only filters the scope and breath of information that founders look for during their search for new opportunities (Mathias and Williams, 2017) and the kind of information they recognize as an opportunity (Wry and York, 2017), but also the areas in their environment, whether close to their business or further a field, where they look for information to inform their decisions to respond to crises.

Apart from identity, the findings show that the crisis also shapes founders' filter focus. The COVID-19 pandemic required firms to accommodate remote work focusing their attention on information related to internal processes, specifically in relation to remote work. This focus on internal processes

directs founders towards efforts to maintain efficiency in operations, reflecting mitigating behavior. This aligns with existing research that finds that crises direct attention towards particular areas of impact, leading to responses which address those concerns (Wei *et al.*, 2024).

Furthermore, the study finds that interpretability matters in shaping behavior only when founders' filter focus is the same (market issues): different identities lead to different interpretations of information favorability (positive versus negative), encouraging different behaviors (aligning versus mitigating), with different outcomes (major versus incremental changes). While Powell and Baker (2014) link interpretability of information favorability with founders' identity structure, our findings show that this interpretation also follows from particular role identities. This finding provides empirical support to recent studies of crisis management in small and medium enterprises which linked firms' interpretations of the favorability of crisis with their firm-level outcomes and suggested that identity may explain this connection (Guckenbiehl and Corral de Zubielqui, 2022).

Second, aligned with existing research (Zuzul and Tripsas, 2020), the study finds that founders engage in behaviors that re-affirm their salient identity. Existing research has mapped the crisis response behaviors founders exhibit to reaffirm both their role identity, within the context of a new industry (Zuzul and Tripsas, 2020), their social identity within the context of information economy (Teyi *et al.*, 2023), and to match their identity structure in the context of an established industry (Powell and Baker, 2014). This study maps the crisis response behaviors that follow from founders' efforts to affirm their role identities in the context of an established industry – high-technology. Such behaviors represent the way in which founders decide to position their firm vis-à-vis the changes their firm faces: surviving, mitigating and aligning with the changes brought about by the crisis. While existing identity-focused research focuses on founders' behaviors, this study follows through to examine the outcomes that such behaviors deliver at firm-level, particular the degree of change in firms' product development, which is the context in which the crisis impact is examined here.

Conclusions

Contributions to research and practice

This study contributes to investigations of entrepreneurial behavior at the intersection of identity research and crisis management studies in two ways.

First, the study shows empirically the different pathways (interpretation and filter focus) and mechanisms (cognitive schema and identity affirmation) through which entrepreneurial cognition links variation in founder identity with their crisis response behavior, leading to different firm-level outcomes. Identity shapes not only founders' perception of the favorability of the information (Powell and Baker, 2014, see also Guckenbiehl and Corral de Zubirlqui, 2002; Nikiforou *et al.*, 2023), but also the kind of information founders focus their attention on to inform their decision-making. Furthermore, this linkage between identity and response behavior is underpinned by the role that founders' identity plays as a cognitive schema (Alsos *et al.*, 2016; Radu-Lefebvre *et al.*, 2021), directing the information founders notice about the impact of the crisis on their firm and the interpretation of this information, and by the founders' efforts to engage in behaviors that re-affirm their identity (Zuzul and Tripsas, 2020). This study expands research developing an identity explanation of crisis responses (Powell and Baker, 2014; Teyi *et al.*, 2023; Zuzul and Tripsas, 2020) by identifying a distinct set of response behaviors characterizing founders operating within an established industry context.

Second, the findings indicate that the pandemic has encouraged founders to double down on one salient role identity, engaging in behaviors that reaffirm their identity, rather than acting as a trigger for switching between multiple activities or seeking to change their identity. This provides a counter-story of identity focus and persistence to the research documenting changes in founders' identity because of organizational (van Lancker *et al.*, 2023) and institutional (Jain *et al.*, 2009) changes, suggesting that crises are not necessarily triggers for role identity change.

The study highlights the important role that identity and the nature of the crisis have in shaping founders' focus of attention which underpins their decision-making, leading to different firm strategies. This has practical implications for actors assisting entrepreneurial firms to navigate uncertainty such as governmental support agencies and private incubators. While changing salient identity is difficult, encouraging entrepreneurs to reflect on what they see as their role in the firm may lead to a better understanding of how decisions are made in their firms and what alternatives exist. This could be achieved for instance through dedicated training programs that encourage entrepreneurs to reflect on their role within their firm, and on what they prioritize when making decisions, and raise their awareness of the consequences for the development of their firms. Moreover, understanding the cognitive filter of their founders would enable such support organizations to allocate resources more effectively, for instance by ensuring that technical experts receive complementary support and tailored training on market strategies and broader context, and entrepreneur founders benefit from support for product development and engineering. Ultimately, knowing the role that identity plays in shaping their behaviors and their firms' responses will deepen understanding of decision-making dynamics within firms, empowering founders to explore taking alternative perspectives to achieve the desired organizational outcomes.

Limitations and future research

This study has limitations. First, it investigates only one founder per firm. While the founder responsible for product development was interviewed, considering the identities present in the entire team is important. Second, the study explored firms' crisis response strategies, not their success. Considering the performance of these strategies is important to understand what they should be: for instance, while both Entrepreneurs and Technical Experts respond to a focus on internal processes through incremental changes, it may be that some are better at directing their firm to make incremental changes, while others may be more successful at responding through major or minimal changes.

Lastly, the study examined these strategies at one point in time: however, crisis responses unfold over time (Waehning *et al.*, 2023), requiring a longer-term perspective to capture fully the organizational changes involved (Verreynee *et al.*, 2023). A longitudinal research design would capture both their evolving nature, and their implications for firm performance.

References

- Alsos, G.A., Clausen, T.H., Hytti, U. and Solvoll, S. (2016), "Entrepreneurs' social identity and the preference of causal and effectuation behaviours in start-up processes", *Entrepreneurship & Regional Development*, Vol. 28 No. 3-4, pp. 234-258, doi: [10.1080/08985626.2016.1155742](https://doi.org/10.1080/08985626.2016.1155742).
- Berends, H., van Burg, E. and Garud, R. (2021), "Pivoting or persevering with venture ideas: Recalibrating temporal commitments", *Journal of Business Venturing*, Vol. 36 No. 4, pp.106-126, doi: [10.1016/j.jbusvent.2021.106126](https://doi.org/10.1016/j.jbusvent.2021.106126).
- Bergami, M., Corsion, M., Daood, A. and Giuri, P. (2021), "Being resilient for society: evidence from companies that leveraged their resources and capabilities to fight the COVID-19 crisis", *R&D Management*, Vol. 52 No. 2, pp.235-254, doi: [10.1111/radm.12480](https://doi.org/10.1111/radm.12480).
- Branicki, L.J., Sullivan-Taylor, B. and Livschitz, S.R. (2018), "How entrepreneurial resilience generates resilient SMEs", *International Journal of Entrepreneurial Behavior & Research*, Vol. 24 No. 7, pp.1244-1263, doi: [10.1108/IJEER-11-2016-0396](https://doi.org/10.1108/IJEER-11-2016-0396).
- Cardon, M.S., Wincent, J., Singh, J. and Drnovsek, M. (2009). "The nature and experience of entrepreneurial passion", *Academy of Management Review*, Vol. 34 No. 3, 511-532, doi: [10.5465/amr.2009.40633190](https://doi.org/10.5465/amr.2009.40633190).
- Fauchart, E. and Gruber, M. (2011), "Darwinians, Communitarians, and Missionaries: The role of founder identity in entrepreneurship", *Academy of Management Journal*, Vol. 54 No. 5, pp.935-957, doi: [10.5465/amj.2009.0211](https://doi.org/10.5465/amj.2009.0211).
- Grodal, S., Anteby, M. and Holm, A.L. (2021), "Achieving rigor in qualitative analysis: The role of active categorization in theory building", *Academy of Management Review*, Vol. 46 No. 3, pp. 591-612, doi: [10.5465/amr.2018.0482](https://doi.org/10.5465/amr.2018.0482).
- Guckenbiehl, P. and Corral de Zubielqui, G. (2022), "Start-ups' business model changes during the COVID-19 pandemic: Counteracting adversities and pursuing opportunities", *International Small Business Journal*, Vol. 40 No. 2, pp.150-177, doi: [10.1177/02662426211055447](https://doi.org/10.1177/02662426211055447).
- Herhausen, D., Morgan, R., Brozovic, D. and Volberda, H.W. (2021), "Re-examining strategic flexibility: A meta-analysis of its antecedents, consequences and contingencies", *British Journal of Management*, Vol. 32 No. 2, pp.435-455, doi: [10.1111/1467-8551.12413](https://doi.org/10.1111/1467-8551.12413).
- Hillmann, J. and Guenther, E. (2021), "Organizational resilience: A valuable construct for management research?", *International Journal of Management Reviews*, Vol. 23 No. 1, pp.7-44, doi: [10.1111/ijmr.12239](https://doi.org/10.1111/ijmr.12239).
- Hogg, M.A., Terry, D.J. and White, K.M. (1995), "A tale of two theories: A critical comparison of identity theory with social identity theory", *Social Psychology Quarterly*, Vol. 58 No. 4, pp.255-269, doi: [10.2307/2787127](https://doi.org/10.2307/2787127)

- Jain, S., George, G. and Maltarich, M. (2009), “Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialisation activity”, *Research Policy*, Vol. 38 No. 6, pp.922-935, doi: [10.1016/j.respol.2009.02.007](https://doi.org/10.1016/j.respol.2009.02.007)
- Kaish, S. and Gilad, B. (1991), “Characteristics of opportunities search of entrepreneurs versus executives: sources, interests, general alertness”, *Journal of Business Venturing*, Vol. 6 No. 1, pp.45-61, doi: [10.1016/0883-9026\(91\)90005-X](https://doi.org/10.1016/0883-9026(91)90005-X)
- Kirtley, J. and O’Mahony, S. (2023), “What is a pivot? Explaining when and how entrepreneurial firms decide to make strategic change and pivot”, *Strategic Management Journal*, Vol. 44 No. 1, pp. 197-230, doi: [10.1002/smj.3131](https://doi.org/10.1002/smj.3131).
- Korber, S. and McNaughton, R.B. (2018), “Resilience and entrepreneurship: a systematic literature review”, *International Journal of Entrepreneurial Behavior & Research*, Vol. 24 No. 7, pp.1129-1154, doi: [10.1108/IJEER-10-2016-0356](https://doi.org/10.1108/IJEER-10-2016-0356).
- Van Lancker, E., Knockaert, M., Collewaert, V. and Breugst, N. (2023), “Preparing for scaling: A study on founder role evolution”, *Journal of Business Venturing*, Vol. 38 No. 4, article no. 106315, doi: [10.1016/j.jbusvent.2023.106315](https://doi.org/10.1016/j.jbusvent.2023.106315)
- Mathias, B.D. and Williams, D.W. (2017), “The impact of role identities on entrepreneurs’ evaluation and selection of opportunities”, *Journal of Management*, Vol. 43 No. 3, pp.892-918, doi: [10.1177/0149206314544747](https://doi.org/10.1177/0149206314544747).
- Mmbaga, N.A., Mathias, B.D., Williams, D.W. and Cardon, M.S. (2020), “A review of and future agenda for research on identity in entrepreneurship”, *Journal of Business Venturing*, Vol. 35 No. 6, article no.106049, doi: [10.1016/j.jbusvent.2020.106049](https://doi.org/10.1016/j.jbusvent.2020.106049)
- Miklian, J. and Hoelscher, K. (2022), “SMEs and exogenous shocks: A conceptual literature review and forward research agenda”, *International Small Business Journal*, Vol. 40 No. 2, pp.178-204, doi: [10.1177/02662426211050796](https://doi.org/10.1177/02662426211050796).
- Miles, M.B. and Huberman, A.M. (1998), *Qualitative Data Analysis: An Expanded Sourcebook*, Sage Publications, Thousand Oaks.
- Newman, A., Obschonka, M. and Block, J. (2022), “Small businesses and entrepreneurship in times of crisis: The renaissance of entrepreneur-focused micro perspectives”, *International Small Business Journal*, Vol. 40 No. 2, pp.119-129, doi: [10.1177/02662426211063390](https://doi.org/10.1177/02662426211063390).
- Nikiforou, A., Lioukas, S., Chatzopoulou, E-C. and Voudouris, I. (2023), “When there is a crisis, there is an opportunity? SME’s capabilities for durability and opportunity confidence”, *International Journal of Entrepreneurial Behavior & Research*, Vol, 29 No. 5, pp. 1053-1074, doi: [10.1108/IJEER-11-2021-0939](https://doi.org/10.1108/IJEER-11-2021-0939).
- Powell, E.E. and Baker, T. (2014), “It’s what you make of it: founder identify and enacting strategic responses to adversity”, *Academy of Management Journal*, Vol. 57 No. 5, pp.1406-1433, doi: [10.5465/amj.2012.0454](https://doi.org/10.5465/amj.2012.0454)
- Puthusserry, P., King, T., Miller, K. and Khan, Z. (2022), “A typology of emerging market SMEs’ COVID-19 response strategies: The role of TMTs and organizational design”, *British Journal of Management*, Vol. 33 No. 2, pp.603-633, doi: [10.1111/1467-8551.12591](https://doi.org/10.1111/1467-8551.12591).
- Radu-Lefebvre, M., Lefebvre, V., Crosina, E. and Hytti, U. (2021), “Entrepreneurial Identity: A Review and Research Agenda”, *Entrepreneurship Theory and Practice*, Vol. 45 No. 6, pp.1550-1590, doi: [10.1177/10422587211013795](https://doi.org/10.1177/10422587211013795).

- Shepherd, D.A., Williams, T.A. and Patzelt, H. (2015), "Thinking about entrepreneurial decision making: review and research agenda", *Journal of Management*, Vol. 41 No. 1, pp.11-46, doi: [10.1177/0149206314541153](https://doi.org/10.1177/0149206314541153).
- Stets, J.E. and Burke, P.J. (2000), "Identity theory and social identity theory", *Social Psychology Quarterly*, Vol. 63 No. 3, pp. 224-237, doi: [10.2307/2695870](https://doi.org/10.2307/2695870).
- Stryker, S. and Burke, P.J. (2000), "The past, present, and future of identity theory", *Social Psychology Quarterly*, Vol, 63 Nr. 4, pp. 284-297, doi: [10.2307/2695840](https://doi.org/10.2307/2695840).
- Verreynee, M-L., Ford, J. and Steen, J. (2023), "Strategic factors conferring organizational resilience in SMEs during economic crises: a measurement scale", *International Journal of Entrepreneurial Behavior & Research*, Vol. 29 No. 6, pp.1338-1375, doi:[10.1108/ijebr-07-2022-0681](https://doi.org/10.1108/ijebr-07-2022-0681).
- Teyi, S.S., Larsen, M.M. and Namatovu, R. (2023), "Entrepreneurial identity and response strategies in the informal economy", *Journal of Business Research*, Vol. 165 No. October, article no. 114047, doi: [10.1016/j.jbusres.2023.114047](https://doi.org/10.1016/j.jbusres.2023.114047)
- Tidd, J. and Bessant, J. (2021), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 7th Edition, Wiley, Hoboken, N.J.
- Waehning, N., Bosworth, G., Cabras, I., Shakina, E. and Sohns, F. (2023), "Resilient SMEs and entrepreneurs: evidence from the UK craft brewing sector", *International Journal of Entrepreneurial Behavior & Research*, Vol. 29 No. 3, pp.665-686, doi:[10.1108/ijebr-06-2021-0496](https://doi.org/10.1108/ijebr-06-2021-0496).
- Wagenschwanz, A.W. (2020), "The identity of entrepreneurs: providing conceptual clarity and future directions", *International Journal of Management Reviews*, Vol. 23 No. 64-84, pp. 64-84, doi:[10.1111/ijmr.12241](https://doi.org/10.1111/ijmr.12241).
- Wei, A., Boudreaux, C.J., Su, Z. and Wu, Z. (2024), "Natural disasters, personal attributes, and social entrepreneurship: an attention-based view", *Small Business Economics*, Vol. 62 No. 4, pp.1409-1427 doi:[10.1007/s11187-023-00822-x](https://doi.org/10.1007/s11187-023-00822-x).
- Wenzel, M., Stanske, S. and Lieberman, M.B. (2020), "Strategic responses to crisis", *Strategic Management Journal*, Vol. 41 No. Virtual, V7-V18, doi:[10.1002/smj.3161](https://doi.org/10.1002/smj.3161).
- Williams, T.A., Grueber, D.A., Sutcliffe, K.M. and Zhao, E.Y. (2017), "Organizational response to adversity: fusing crisis management and resilience research streams", *Academy of Management Annals*, Vol. 11 No. 2, pp.733-769, doi:10.5465/annals.2015.0134
- Wry, T. and York, J.G. (2017), "An identity-based approach to social enterprise", *Academy of Management Review*, Vol. 42 Nr. 3, pp. 437-460, doi:[10.5465/amr.2013.0506](https://doi.org/10.5465/amr.2013.0506).
- Zuzul, T. and Tripsas, M. (2020), "Start-up inertia versus flexibility: The role of founder identity in a nascent industry", *Administrative Science Quarterly*, Vol. 65 No. 2, pp.395-433, doi:[10.1177/0001839219843486](https://doi.org/10.1177/0001839219843486).