2021

# Weathering a Crisis: A Multi-Level Analysis of Resilience in Young Ventures

Ali Anwar
*Wilfrid Laurier University*, aanwar@wlu.ca

Nicole Coviello
*Wilfrid Laurier University*, ncoviello@wlu.ca

Maria Rouziou
*HEC Montreal*, maria.rouziou@hec.ca

*Paper submission to a special issue*

# Weathering a Crisis: A Multi-Level Analysis of Resilience in Young Ventures

Entrepreneurship Theory and Practice
2021, Vol. 0(0) 1–29

DOI: 10.1177/10422587211046545
journals.sagepub.com/home/etp


**Ali Anwar[1], Nicole Coviello[1], and Maria Rouziou[2]**

**Abstract**

In the context of the external disruption presented by the COVID-19 pandemic, we investigate (1) how individual-level resilience and inter-functional coordination relate to organizational resilience and (2) the link between organizational resilience and firm performance. We view organizational resilience as a resource-based capability and draw on insights regarding psychological capital and relational resources to inform our hypotheses. Our hypotheses are tested with a time-lagged, multi-level study of young technology ventures. The results show that when such firms are resilient, they tend to perform significantly better in a crisis. Further, organizational resilience is positively influenced by the individual resilience of top management team members, as well as inter-functional coordination. We discuss implications for theory and practice and suggest avenues for research on resilience in entrepreneurship.

**Keywords**

crisis, individual resilience, organizational resilience, inter-functional coordination, firm performance, young ventures, entrepreneurship

## Introduction

Organizations can sometimes be exposed to external disruptions that are difficult to anticipate or prepare for (Williams & Shepherd, 2016). One such event occurred in early 2020, when the novel coronavirus disease (COVID-19) was declared a pandemic, spreading rapidly and triggering a global crisis (Giones et al., 2020). This quickly led to efforts to better understand how resilient individuals, organizations, and even nations might cope more effectively with, and recover from, adversity. Our interest lies with young ventures because they are highly likely to be impacted by external events (Doern et al., 2019), and COVID-19 has the potential to be particularly disruptive for such organizations (Brown & Rocha, 2020; Giones et al., 2020).

[1]Lazaridis School of Business and Economics, Wilfrid Laurier University, Waterloo, ON, Canada
[2]HEC Montréal, Montréal, PQ, Canada

**Corresponding Author:**
Nicole Coviello, Lazaridis School of Business and Economics, Wilfrid Laurier University, 75 University Ave W, Waterloo, ON N2L 3C5, Canada.
Email: ncoviello@wlu.ca

As explained by Williams et al. (2017), resilience is the process by which either an individual or organization develops and leverages its capability endowments to interact with adverse disruptions. Consistent with this view, we follow Ortiz-de-Mandojana and Bansal (2016) to define organizational resilience as a set of capabilities that equip it with tendencies that can facilitate its reaction to unexpected disruptions. Conceptually, resilience can be developed by capitalizing on the cumulative psychological strengths of human capital in the firm (Lengnick-Hall et al., 2011). One example of this psychological strength or capital is individual-level resilience. Surprisingly however, there is little empirical evidence to support Lengnick-Hall et al.'s (2011) multi-level argument, with Linnenluecke (2017, p. 25) observing there are "few insights into how these different levels of analysis are linked to each other."

Discussions on resilience also tend to emphasize positive adjustments made by the firm under adversity; adjustments involving effective coordination and knowledge integration (Lengnick-Hall & Beck, 2005; Williams et al., 2017). This reflects the potential role of a firm's internal relational resources (De Clercq et al., 2016) and in particular, relational coordination. Relational coordination entails effective communication and integration across roles and functions and is argued to be central to an organization's resilient response to adversity (Gittell, 2008). Yet, although some entrepreneurship scholars explore the role of relationships in addressing challenges at the community level (Grube & Storr, 2018; Shepherd & Williams, 2014), there is limited understanding of how relational, that is, inter-functional, coordination might benefit young firms during a crisis.

Following from the above, our research is guided by two questions set in the context of the COVID-19 pandemic. First, do resource endowments in the form of individual resilience and inter-functional coordination make young ventures more resilient? Second, does organizational resilience influence the performance of young ventures during a crisis? Our view of organizational resilience follows Chandler and Hanks (1994) arguments regarding the capabilities of new ventures. We therefore conceptualize organizational resilience as a resource-based capability, driven by psychological capital and relational resources. Specifically, we first propose that individual-level resilience—one form of psychological capital—is central to the development of firm-level resilience. To then account for within-firm communication and relationships (Gittell, 2008; Gittell et al., 2006), or relational resources, we argue that inter-functional coordination enhances organizational resilience. Finally, we reason that organizational resilience enables young ventures to mitigate the performance impact of an external adverse disruption.

Our research reports on data collected from 111 top management team (TMT) members in 65 young technology ventures based in Canada. It was collected over two time periods: (1) in the year before the initial emergence of COVID-19; and (2) in the first year of the pandemic. Our findings show that both individual resilience and inter-functional coordination have a significant and positive effect on organizational resilience. Further, organizational resilience significantly and positively affects firm performance. These findings, as well as our conceptualization and testing of organizational resilience as a resource-based capability, help advance entrepreneurship research on resilience. We also build on single-level studies with a multi-level and time-sensitive analysis, contextualized by a significant external shock.

## Theoretical Background

Linnenluecke (2017) argues that the concept of resilience is inconsistently conceptualized and operationalized. Resilience also pertains to both individuals and organizations, yet prior research tends to emphasize the former, that is, "individual" resilience. For example, studies show that individual-level resilience can help navigate uncertainty (Bullough & Renko, 2013), and it has a positive influence on the perceived success of entrepreneurs (Santoro et al., 2018). Individual resilience also develops entrepreneurial intentions even under conditions of war (Bullough et al., 2014).

It can help to better manage grief related to firm failure (Jenkins et al., 2014), and resilient nascent entrepreneurs tend to cope better with initial stressful circumstances (Chadwick & Raver, 2020).

If we consider the firm level, Doern et al. (2019) review entrepreneurship research on crisis management. Yet, although crisis management and resilience work together in practice (Doern, 2021), prior studies do not appear to investigate "organizational resilience" per se. One possible exception is Herbane's (2019) operationalization of "resilience formalisation," defined as the degree of preparedness that enables effective response to challenges. More typically however, researchers tend to study how various types of organization respond to a crisis. Examples include how local community members engage in venture creation after a natural disaster (Williams & Shepherd, 2016) or how young technology firms leverage their slack and technological resources to deal with significant setbacks (De Carolis et al., 2009). Pertinent too is that rather than operationalize "organizational resilience" as a construct, there is a tendency to use performance outcomes as a proxy measure (e.g., Ortiz-de-Mandojana & Bansal, 2016; Smallbone et al., 2012).

Drawing these levels together, entrepreneurship research on resilience rarely considers the link between individuals and the broader entities within which they are nested. A similar argument is made by Williams and Shepherd (2016), while Lengnick-Hall et al. (2011) note the limited understanding of individual-level characteristics that develop the organization's capacity to deal with adversity. Given the central importance of human capital to young firms (Jin et al., 2017; Shrader & Siegel, 2007), we reason that individual resilience, as a resource, will contribute to the firm's capability for resilience.

Further, although we find arguments that relational resources are key to a resilient response (Gittell et al., 2006; Sutcliffe & Vogus, 2003; Williams et al., 2017), there is a notable dearth of insight on how efforts to coordinate and integrate areas within an organization might support firm-level resilience. This means that we overlook the heterogeneity that may exist among organizational groups, such as functional units (Arregle et al., 2007). As a consequence, we argue that during an external adverse disruption, higher levels of inter-functional coordination (cf. Atuahene-Gima, 2005) will facilitate the access and exchange of knowledge and internal resources within the firm. We expect the role of inter-functional coordination to be particularly pronounced during the pandemic, given most organizations switched to a "work-from-home" policy. Finally, it is important to understand how young ventures survive through crises (Davidsson & Gordon, 2016; Kuckertz et al., 2020). This makes pertinent any research on the relationship between organizational resilience and performance.

## *Theory*

We view organizational resilience as a resource-based capability, that is, the capacity of a firm to leverage its resources to survive and grow (Chandler & Hanks, 1994; Grant, 1991). Further, this capability is embedded in both individual and organizational-level resources (Rodríguez-Sánchez et al., 2019). In this study, we view individual resilience and inter-functional coordination as two such resources. Our interest in individual resilience reflects Lengnick-Hall et al.'s (2011) position that the relationship between individual and organizational resilience can be understood in terms of how systems and subsystems interact. Thus, in the same way that individual abilities (e.g., managerial cognitions) are key organizational resources (Volberda et al., 2010), individual-level attributes related to resilience can collectively influence organizational resilience (Lengnick-Hall et al., 2011). So too can relationships given they facilitate the access to and exchange of resources (Williams et al., 2017). This leads to our interest in inter-functional coordination of relationships internal to the organization. Our central thesis is that a young venture's resilience, and its performance under adversity, is driven by the resilience of those managing it, as well as the degree of inter-functional coordination within the firm (see Figure 1 for our conceptual model).

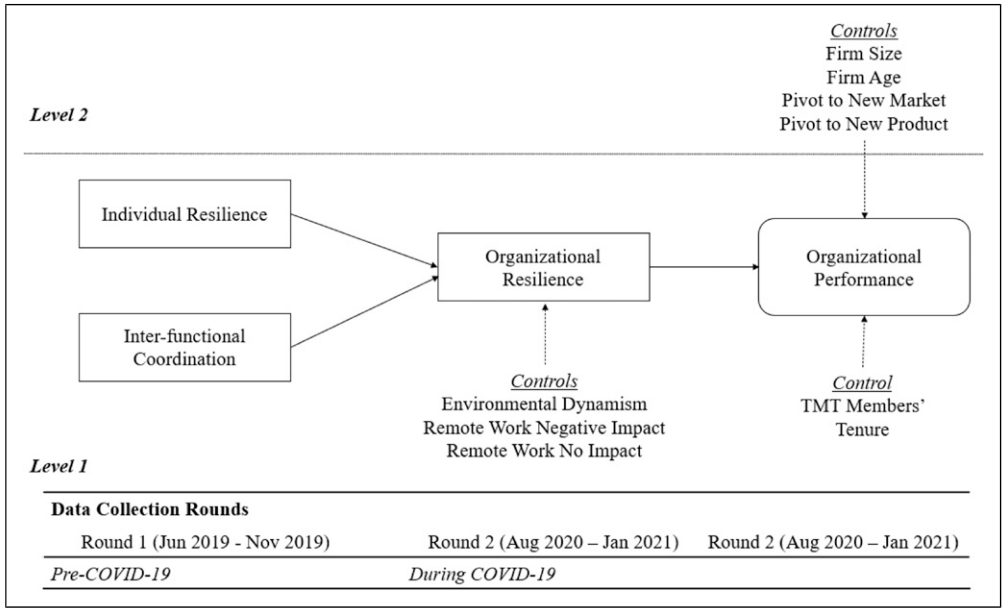


**Figure 1.** Conceptual model.

## Hypotheses

The resilience of any organization is embedded in the various resource endowments that it possesses; resource endowments that facilitate a firm's ability to adjust and respond to adversity (Bonanno et al., 2010; Sutcliffe & Vogus, 2003; Williams et al., 2017). These resources, such as the personnel in the organization (Lengnick-Hall et al., 2011), enable positive adjustments to disruptive challenges. They can also enhance organizational resilience (Williams et al., 2017). In this study, we use one dimension of psychological capital from Luthans and Youssef (2007) and Luthans et al. (2010): individual resilience. We reason that the individual resilience of TMT members is instrumental to organizational resilience given their leadership role in a young firm (cf. Jin et al., 2017; Shrader & Siegel, 2007).

Individual resilience is a process through which individuals cope with and come back from adversity (Luthans & Youssef, 2007; Vanhove et al., 2016). Resilient individuals tend to maintain positive functioning when faced with difficulties and can even use those setbacks as opportunities for development (Bonanno, 2004; Reivich & Shatté, 2002). Because resilient managers are more adept at regulating, expressing, and appropriately using their emotions in line with the given situation (Bonanno, 2004; Fredrickson, 2001; Tugade et al., 2004), they can provide their venture with the capability necessary to respond to external change (Wooten & Crane, 2004). Furthermore, their flexibility during a crisis (Tugade et al., 2004) can be helpful in terms of making sense of, and assigning new meaning to, the changing environment (Weick et al., 2005). This is because resilient individuals tend to use creativity and problem-solving to navigate challenges (Lengnick-Hall et al., 2011; Lengnick-Hall & Beck, 2005). Together, these arguments suggest that young ventures with resilient TMT members may be better equipped to cope with a crisis than those without. Resilient TMT members may be quicker to anticipate and accept the gravity of the situation and find creative strategies for the firm to adapt to a changing environment. Our first hypothesis is as follows:

**H1.** : *High levels of individual resilience in TMT members will have a positive effect on the organizational resilience of young ventures.*

Relational resources also influence the outcomes of entrepreneurial ventures (Kellermanns et al., 2016; Yli-Renko et al., 2001). Because organizations differ in their levels of integration and coordination across areas (Han et al., 1998), one such variation can come from the relationships among different groups within the firm (Morgan & Hunt, 1999). Inter-functional coordination entails the interaction, communication, and coordination across an organization's functional areas (Jaworski & Kohli, 1993; Narver & Slater, 1990). Pertinent here is that it can make task integration and resource exchange easier. Inter-functional coordination is therefore a mechanism of knowledge integration (Atuahene-Gima, 2005) and is positively associated with the innovativeness-related outcomes of young ventures (Renko et al., 2009).

We consider inter-functional coordination particularly relevant in times of crisis, that is, when a firm requires sense-making in a fluid environment, and must be able to combine and deploy knowledge to creatively address its challenges (Lengnick-Hall et al., 2011; Weick, 1995; Weick et al., 2005). The firm also needs the ability to coordinate across the organization in the form of frequent, timely, and accurate information sharing (Brandon-Jones et al., 2014; Gittell, 2008). This is further emphasized during COVID-19 given its implications for remote work. We therefore argue that if the young venture's internal areas are coordinated to interact, communicate, and integrate across functional boundaries, it is likely to be more resilient and thus, better equipped to cope with a major disruption. We hypothesize:

**H2.** : *High levels of inter-functional coordination will have a positive effect on the organizational resilience of young ventures.*

Finally, we consider the performance impact of organizational resilience. Recall that in this study, we view organizational resilience as a process whereby the young venture utilizes its resource endowments (here, individual resilience and inter-functional coordination) to positively adjust and continue performing at acceptable levels when confronted by crisis (as per Williams et al., 2017). Considering organizational resilience as a process, rather than outcome (cf. Sutcliffe & Vogus, 2003; Williams et al., 2017), is consistent with how capabilities are understood; that is, they are firm processes that leverage firm resources to gain a competitive advantage (Teece et al., 1997). Thus, we regard organizational resilience as a resource-based capability. Like other capabilities discussed by Chandler and Hanks (1994), it can benefit various aspects of a young firm, including performance. In the context of a crisis, Sutcliffe and Vogus (2003) suggest that developing resilience as a capability could help firms become less vulnerable to adversity, and others argue that resilient firms are more likely to survive disruptions (Ortiz-de-Mandojana & Bansal, 2016) and are quicker to recover from major crises (DesJardine et al., 2019). Therefore, the young venture that is resilient can be expected to be more adept at weathering COVID-19. This leads to our final hypothesis:

**H3.** : *During an external disruption, higher levels of organizational resilience will have a positive effect on the performance of young ventures.*

## Method

### *Sample and Data Collection*

We study a panel of young technology ventures headquartered in Canada. Our interest in young firms reflects arguments that such organizations are likely to be impacted by external disruptions (Brown & Rocha, 2020; Doern et al., 2019; Giones et al., 2020). Further, we know there is a practical need to understand how firms recover from a crisis like COVID-19 (Reeves & Whitaker,

2020; Shepherd, 2020). This might be especially so for technology ventures given their economic and societal potential (Kuckertz et al., 2020).

Consistent with prior entrepreneurship research (Yli-Renko et al., 2001), the sample comprises independent technology ventures. Our data collection process is part of a larger, long-term project that involved building a unique dataset using online surveys administered through Qualtrics. Various data were collected at the firm and individual levels at different points in time. For the current study, we use data from two periods, temporally separated by the advent of the COVID-19 crisis in early 2020. Round 1 data were collected in June–November 2019. Round 2 data were collected from August 2020–early January 2021.

To identify participants for the larger project, we built a list from the websites of accelerator and incubator centers in Ontario, Canada. Our focus was firms in the "Toronto-Waterloo Region Corridor" (the geographical span between Toronto and Kitchener–Waterloo) given it has a similar technology talent density to Silicon Valley. This search was augmented and checked with data from lists generated through the Hockeystick, Business Development Corporation, and PitchBook databases. To meet our initial selection criteria, firms needed to be (1) founded no earlier than 2009, (2) independent, (3) generating revenue, and (4) with at least five full-time employees. This ensured we would study young ventures with infrastructure and market traction.

We initially identified 372 firms, but this number was reduced to 206 after ensuring all four selection criteria were met. Using data collection procedures similar to others (e.g., Domurath et al., 2020), we personally contacted individuals at each organization, by telephone and email, to explain the study and invite the participation of their firm. Participants were emailed a link for the survey, followed by weekly reminders to those who had not yet completed. From the base of 206 potential firms, 103 agreed to participate (involving 268 TMT members). At the firm level, this is an initial response rate of 50%. This is quite high given we needed firms and their employees to participate over a 2-year time frame. However, individuals were incentivized with the opportunity to win US$100 Amazon gift cards, and we provided each firm with customized results after every round of data collection.

In Round 1 (2019, pre-COVID-19), we had usable responses from 217 TMT members in 98 ventures. In Round 2 (2020, during COVID-19), we had responses from 141 TMT members in 67 ventures. For the current sample, we then considered the two data pools and excluded any firm that withdrew, went out of business, or was acquired during the data collection periods. We also excluded individual respondents who did not participate in the second round of data collection, for any reason. Finally, we excluded any respondent who did not provide data for any of the four focal constructs in our research model. As a result, the final data set includes responses over two data collection periods from 111 TMT members in 65 ventures. At the firm level, this is a final response rate of 31.5%.

At the start of data collection in 2019, the average age of participating firms was 6.5 years. 97% of the firms were 10 years old or less and they had an average of 32 employees. They are a mix of hardware (9%), software (26%), hardware plus software (28%), SaaS (28%), and marketplace (9%) firms. Our respondents include a variety of members of each firm's TMT, that is, founders and members of the C-suite. 21% of the respondents were female. 33% of the respondents were 34 years old or younger, 28% between 35 and 44 years old, and 39% were 45 years and older. They represent a range of educational fields, with 42% from engineering, software, or other technical area, 38% from business, and 20% from other educational backgrounds.

Given the nature of our sampling process, it is important to rule out concerns of survivorship bias. We therefore ran six group comparison tests. As shown in Appendix A, we compare the final sample used in our study (Group 1, $N = 111$) against groups of respondents that were excluded from the final sample because, for example, they withdrew from the study and/or there were missing data. For example, rows 5 and 6 in Appendix A compare our sample with the group for

which we had data for the independent variables (Round 1), but not for the mediator and dependent variable measured after the advent of COVID-19 (Round 2). None of the group comparison results were statistically significant ($p > .05$), indicating that a survivorship bias is unlikely to be present in our data set.

## Measures

All constructs were assessed with established scales or minor adaptations thereof. The details on our measures can be found in Appendix B.

## Dependent variable

The dependent variable is firm performance. It is measured with TMT perceptions of performance relative to objectives, for three outcomes: sales revenue, sales revenue growth, and customer retention. We take this multi-item approach because in entrepreneurship research, firm performance is a multidimensional construct measured with various indicators (Stam et al., 2014). It is also beneficial to incorporate different aspects of performance (Wiklund & Shepherd, 2005). We included perceived performance of sales revenue and sales growth (relative to objectives) because such measures are common in entrepreneurship research (Covin et al., 2006; Rutherford et al., 2008) and highly pertinent to technology ventures. We also measured TMT perceptions regarding customer retention given it is a key market-based outcome (Coviello et al., 2006; Walter et al., 2006). Young firms are unlikely to have publicly available data (Flatten et al., 2015), and that is the case here. As such, we had no access to objective performance data. Nevertheless, we reason that in the context of resilience, using perceptions of firm performance relative to objectives is suitable when indicating a response to adversity. As Sutcliffe and Vogus (2003, p. 95) note: "…to ascertain resilience requires both a judgement that an entity is 'doing okay' or 'better than okay' with respect to a certain set of expectations for behavior."

## Independent Variables

We measured the two independent variables in 2019, the year prior to COVID-19. Individual resilience is assessed with Sinclair and Wallston's (2004) four-item brief resilience coping (BRC) scale. This is an established measure of individual resilience used in prior entrepreneurship studies (e.g., Bullough & Renko, 2013; Bullough et al., 2014). Our measure for relational resources is inter-functional coordination. This firm-level variable is captured with the six-item scale from Atuahene-Gima (2005). We made minor modifications to the scale to suit our sample because it is comprised of young technology ventures that may or may not be manufacturers. Given their importance to technology firms, we also focused specifically on the marketing, sales, and product development (R&D) areas within the firm.

After COVID-19 emerged in 2020, we measured organizational resilience with an adapted version of the scale from Brandon-Jones et al., (2014). Because the original was developed for a supply chain management context, we modified it, as necessary. For example, we replaced "the supply chain" with "our firm." This four-item scale is aimed at measuring an organization's ability to recover from external disruptions by maintaining its operational and functional flows.

## Control variables

We control for environmental dynamism, that is, the degree of uncertainty in the environment in which new ventures operate (Baron & Tang, 2011; Miller, 2007). This is an important

consideration when studying venture outcomes (McKelvie et al., 2018) and the effectiveness of managerial responses may be influenced by it (Ensley et al., 2006). Environmental dynamism is assessed with an adapted version of Miller and Friesen's (1982) five-item scale.

Given the potential performance implications of TMT experience in new ventures (Ensley et al., 2002), we control for the TMT members' tenure in their firm. At the organizational level, we control for firm age and firm size. Firm age is measured as the number of years since foundation (Ensley et al., 2006) and firm size by the number of employees in the venture (Domurath et al., 2020). Both measures were log transformed to make the firm age and size data more interpretable, and to meet the assumptions of inferential statistics.

Given the second round of our data collection was conducted while the potential impact of COVID-19 was unfolding, we control for a set of context-relevant variables that could potentially influence our proposed relationships. First, every firm in our sample was impacted by government-mandated remote work (RW) policies. Accordingly, we control for the impact of remote work on firm productivity. Because remote work is a direct implication of COVID-19, we reason that its negative impact on productivity (or a lack of impact) may influence the TMT's perceptions of organizational resilience. This categorical variable had three possible responses: no impact, negative impact, and positive impact. With the expected outcome of such disruptive policies being generally negative, we used "positive impact" as a reference point.

We also learned prior to the second round of data collection that some firms were reacting to the pandemic by pivoting to sell new products or serve new markets. Although studying the ability and/or decision to pivot are beyond the scope of our investigation, we expect that pivoting is likely to have a positive impact on performance in the context of COVID-19. We therefore control for both "pivot to new market" and "pivot to new product," operationalizing them as dummies (0 or 1).

## Data Analysis

We conducted a confirmatory factor analysis (CFA) using AMOS 27 to assess construct adequacy. With our small sample size, we do not rely heavily on model fit indices to establish the adequacy of the measures given they tend to over-reject true-population models with small samples (Hu & Bentler, 1999). Nonetheless, the CFA indicates that for our data, the model fits well: $X^2_{df = 142} = 195.79$ ($p = .002$), comparative fit index (CFI) = .943, standardized root mean residual (SRMR) = .075, and all the factor loadings are significant ($p < .0001$).

To determine the quality of our measures, we emphasize factor loadings, composite reliability estimates, and average variances extracted (AVE). Items from original scales that show low factor loadings (such as individual resilience item 2 and environmental dynamism items 2 and 3) were removed from our analysis. Table 1 reports the mean (M), standard deviation (SD), composite reliability (CR), average variance extracted (AVE), variance inflation factors (VIF), and correlations for each construct. CR ranged from .74 to .94 (thus, all CRs > .7). AVE ranged from .55 to .78 (thus, AVEs > .5) as per Hair et al., (2010), aside from that of the control variable of environmental dynamism which was marginally low (.49). However, the low AVE for environmental dynamism is not overly concerning for four reasons: (1) the scale is well-established in entrepreneurship research (Alsos et al., 2006; Lumpkin & Dess, 2001), (2) based on the CFA, we dropped two items that loaded poorly, (3) the CR is acceptable, and (4) the square root of the construct AVE is found to exceed the construct correlations (Fornell & Larcker, 1981). Detailed items and loadings are reported in Appendix B.

The constructs appear to be orthogonal; none of our independent variables are highly correlated with each other. In addition, the diagnostic measures (VIF) are substantially below the suggested cut-off (e.g., VIF values of 3–5). This rules out multicollinearity issues (Hair et al., 2010). Given

**Table 1.** Descriptive Statistics, Construct Validity, and Correlations.

| Constructs | M | SD | CR | AVE | VIF | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Firm performance | 3.62 | 1.26 | .89 | .75 | - | **.82** | | | | | | | | | |
| 2. Organizational resilience | 5.24 | 1.19 | .94 | .78 | 1.33 | .151 | **.88** | | | | | | | | |
| 3. Individual resilience | 5.99 | 0.7 | .79 | .55 | 1.11 | −.045 | .06 | **.74** | | | | | | | |
| 4. Inter-functional coordination | 5.39 | 1.11 | .91 | .62 | 1.3 | .166 | .222* | −.081 | **.79** | | | | | | |
| 5. Environmental dynamism | 4.16 | 1.02 | .74 | .49 | 1.16 | .035 | −.091 | .234* | -.04 | **.7** | | | | | |
| 6. Tenure | 2.68 | 0.02 | - | - | 1.5 | .111 | .113 | −.11 | .222* | −.1 | - | | | | |
| 7. Firm size | 1.14 | 0.57 | - | - | 1.56 | -.053 | .302* | .015 | −.017 | −.005 | .168 | - | | | |
| 8. Firm age | 6.54 | 2.6 | - | - | 1.9 | .192 | .156 | −.042 | −.131 | .042 | .445* | .529** | - | | |
| 9. Pivot to new market | .37 | .46 | - | - | 1.69 | .055 | −.097 | −.173 | .070 | −.087 | .223* | .138 | .219* | - | |
| 10. Pivot to new product | .57 | .47 | - | - | 1.64 | .028 | −.19* | −.104 | −.004 | −.003 | .184 | .119 | .137 | .584** | - |

Diagonal entries represent the Squared Root of AVE. Significance = **$p < .01$ and *$p < .05$. $N = 111$.

we measured our constructs using self-reported data, we conducted Harman's single factor test (Podsakoff et al., 2003) to rule out the possibility of common method bias. According to this test, if a substantial amount of variance is present, a single factor emerges from the factor analysis. Our results reveal that the variance explained by a single factor is about 24% (i.e., less than 50%), indicating a lack of common method bias in our data. In addition, data collection was temporally separated, and most firms had multiple members of the TMT as respondents. If single respondents were present, this was accommodated by our use of hierarchical linear modeling (HLM)—see next section.

## Model Development

The 111 respondents in our sample are all TMT members and nested in 65 different young technology ventures. Thus, we use HLM because it is appropriate for analyses involving nested data (Raudenbush & Bryk, 2002). In samples like ours, where different levels of analysis exist simultaneously, HLM is particularly useful because it enables analysis of the hypothesized relationships by isolating the effects of the different levels (Covin et al., 2018; Maula & Stam, 2020) and increases insight into the sources of variation (Autio et al., 2013). Additionally, research in model simulations from McNeish (2017) shows that multi-level models such as HLM are more trustworthy with smaller samples than is multi-level structural equation modeling.

Our unit of analysis at Level 1 (L1) is the TMT members' perceptions of individual and organizational constructs. This accounts for individual-specific heterogeneity. The second level of analysis (L2) includes constructs measured at the firm level (e.g., firm size, firm age, pivot to new market, and pivot to new product). This accounts for firm-specific heterogeneity. The first set of analyses examines the two paths leading to organizational resilience: (1) individual resilience and (2) inter-functional coordination. The second set of models examines the effect of organizational resilience on firm performance. It is worth noting that although the first set of models (i.e., the antecedents of organizational resilience) do not include predictors measured at the firm level (L2), HLM accounts for the nesting of TMT respondents in different firms.

## Testing the Paths to Organizational Resilience

All the constructs in our first analysis are individual perceptions (L1) and subscribed *ij* to indicate that each measure is from individual *i* working in firm *j*. The coefficients $\beta$ are firm-specific having a *j* subscript. Aside from the intercept term which varies by firm, we model the other coefficients as fixed effects. Therefore, to test Hypotheses 1 and 2, controlling for environmental dynamism, the negative impact of remote work, and no impact of remote work, we estimate the following HLM model:

Level 1

$$\begin{aligned} Organizational\ Resilience_{ij} = {} & \beta 0j + \beta 1j(Individual\ Resilience_{ij}) \\ & + \beta 2j(Inter\text{-}functional\ Coordination_{ij}) \\ & + \beta 3j(Environmental\ Dynamism_{ij}) \\ & + \beta 4j(Remote\ Work\ Negative_{ij}) \\ & + \beta 5j(Remote\ Work\ No\ Impact_{ij}) + r_{ij} \end{aligned} \tag{1}$$

Level 2

$$\beta_{0j} = \gamma_{00} + u_{0j} \tag{2}$$

$$\beta_{qj} = \gamma_{q0} \quad \text{for} \quad q = 10,\ 20,\ 30,\ 40,\ 50 \tag{3}$$

Equation (2) describes the coefficient $\beta_{0j}$ as a function of $\gamma_{00}$ and a firm-specific random error component. As the fixed effects HLM approach dictates, the mean value of organizational resilience varies by firm, allowing us to control for the effects of firms' heterogeneity. Equation (3) indicates that the slopes for the effects of the remaining variables are the same for all individuals and firms. The mixed model (which combines the equations above to include both individual-specific variance term ($r_{ij}$) and firm-specific variance term ($u_{0j}$)) estimates the effects of individual resilience, inter-functional coordination, and the control variables of environmental dynamism and remote work impact (negative, no impact). Thus, it accounts for both individual- and firm-specific differences.

### *Testing the Effect of Organizational Resilience*

To test Hypothesis 3, we estimate a second set of HLM models in which we evaluate the influence of organizational resilience on firm performance. We control for TMT tenure in the firm and include the four control variables measured at the firm level (L2): firm size, firm age, pivot to new market, and pivot to new product. Equations (4–6) describe the examined model.

Level 1

$$Firm\ Performanceij = \beta 6j + \beta 7j(Organizational\ Resilienceij) + \beta 8j(Tenureij) + rij \tag{4}$$

Level 2

$$B6j = \gamma 60 + \gamma 61j(Firm\ Sizej) + \gamma 62j(Firm\ Agej) + \gamma 63j(Pivot\ to\ New\ Marketj) + \gamma 64j(Pivot\ to\ NewProductj) + u0j \tag{5}$$

$$\beta kj = \gamma q0 \text{ for k } = 60,\ 70 \tag{6}$$

## Results

As noted earlier, we evaluate the null model using HLM, that is, a multi-level model with no predictors, intended only to dissect the variance accounted within firm (L1) and between firms (L2). Our results show that 80% of the total variance in organizational resilience (first set of analyses) resides at the within-firm level, with 20% residing at the between-firms level. 63% of the total variance in firm performance (second set of analyses) resides at the within-firm level, with 37% residing at the between-firms level. In addition, the intraclass correlation coefficients (ICCs) denote the proportion of variance related to between-firm differences (L2) (Aguinis et al., 2013). The ICCs in this study are .20 for the first set of analyses and .37 for the second set of analyses, both above the .05 threshold for multi-level analysis. These results provide compelling justification for our use of HLM (Raudenbush & Bryk, 2002) because each level of analysis contributes significant variance to our mediator (organizational resilience in the first set of models) and our dependent variable (firm performance in the second set of models).

The results of the HLM-estimated effects of individual resilience and inter-functional coordination on organizational resilience are reported in Table 2. In addition to the path coefficients for

**Table 2.** Paths Leading to Organizational Resilience.

| | DV: Organizational Resilience | | |
|---|---|---|---|
| Variables | Null Model | Model with Controls | Full Model |
| Intercept | 5.22***(.28) | 5.45***(.49) | 2.99**(1.23) |
| *Control variables* | | | |
| Environmental dynamism | | −.10(.11) | −.13(.11) |
| RW negative (Covid-19) | | .16(.35) | .23(.11) |
| RW no impact (Covid-19) | | .34†(.23) | .46*(.22) |
| *Main effects* | | | |
| Individual resilience | | | .19†(.15) |
| Inter-functional coordination | | | .26**(.10) |
| *Variance components* | | | |
| $\sigma^2$(within-firm variance) | 1.13 | 1.14 | 1.09 |
| $\tau$ (between-firms variance) | .28 | .28 | .26 |
| Model deviance | 352.43 | 351.88 | 348.9 |
| ICC | .199 | | |
| *N* | 111 | 111 | 111 |

RW= remote work.
Standard errors in parentheses. Significance is based on one-tailed tests. †$p$<.1, *$p$<.05, **$p$<.01, ***$p$<.001.

these two predictors, we follow prior research using HLM (Domurath et al., 2020; Rouziès & Hulland, 2014) that reports inter alia the model deviance (−2 times the value of the log-likelihood function), $\sigma^2$ (the within-firm variance), and $\tau$ (the between-firms variance). "Model with Controls" (Table 2) reports the results when only the control variables of environmental dynamism (n.s., ($\beta = -.10$)), RW negative impact (n.s., ($\beta = .16$)), and RW no impact (marginally significant, ($\beta = .34$, $p < .1$)) are included. The "Full Model" reports results for the fully specified model in equations (1–3). The results indicate a positive effect of individual resilience on organizational resilience, even though this path is only marginally significant ($\beta = .19$, $p < .1$). The results also demonstrate a significant, positive path from inter-functional coordination ($\beta = .26$, $p < .01$) to organizational resilience. Thus, we find support for both H1 and H2 albeit with a relatively lenient threshold of statistical significance for H1. Finally, the full model shows a significant positive effect of RW no impact on organizational resilience ($\beta = .46$, $p$<.05).

Table 3 reports the results of the second set of analyses as prescribed in equations (4–6). In this set of models, we examine the effect of organizational resilience on firm performance, accounting for control variables measured at the individual and firm levels. "Model with Controls" (Table 3) reports the results when only tenure (L1), and firm size, firm age, pivot to new market, and pivot to new product (L2) are included. In this model, tenure in the firm has a positive and significant effect on performance ($\beta = .27$, $p < .01$), while firm age has a negative and significant effect ($\beta = -.16$, $p < .01$). The "Full Model" reports a significant and positive effect ($\beta = .17$, $p < .05$) for organizational resilience on firm performance. This provides support for H3. In addition to the main effect, we find that consistent with "Model with Controls," there is a significant positive effect for TMT tenure on performance ($\beta = .26$, $p < .01$). There is also a significant negative effect for firm age ($\beta = -.16$, $p < .01$).

As an extension to the main model, analyzing cross-level interactions can generate additional informative findings. Interaction effects should be based on theoretical rationale (Aguinis et al., 2013) and given the important role of entrepreneurial ventures' size and age in shaping

**Table 3.** Effects of Organizational Resilience on Firm Performance.

| | | DV: Firm Performance[a] | | |
|---|---|---|---|---|
| Variables | Null Model | Model with Controls | Full Model | Model with Cross-Level Interactions |
| Intercept | 3.64***(.14) | 3.67***(.43) | 2.92***(.63) | 2.23*(1.44) |
| *Level 1 control variables* | | | | |
| Tenure | | .27**(.10) | .26**(.10) | −.15(.34) |
| *Level 2 control variables* | | | | |
| Firm size | | .17(.25) | .04(.25) | .73(1.12) |
| Firm age | | −.16**(.06) | −.16**(.06) | −.07(.25) |
| Pivot to new market (Covid-19) | | .20(.36) | .21(.35) | −1.7(1.58) |
| Pivot to new product (Covid-19) | | .02(.35) | .10(.35) | .61(1.63) |
| *Main effects* | | | | |
| Organizational resilience | | | .17*(.10) | .4*(.22) |
| *Interaction effects* | | | | |
| Tenure x Pivot to new market (Covid-19) | | | | .63*(.3) |
| *Variance components* | | | | |
| $\sigma^2$(within-firm variance) | 1.02 | .99 | 1 | .97 |
| $\tau$ (between-firms variance) | .60 | .58 | .53 | .60 |
| Model deviance | 361.68 | 358.65 | 361.04 | 367.99 |
| ICC | .370 | | | |
| *N* | 111 | 111 | 111 | 111 |

Standard errors in parentheses. Significance is based on one-tailed tests; $^{\dagger}p<.1$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.
[a]In the broader conceptual model, organizational resilience is a mediator (see mediation analysis, Table 5).
All possible interactions between Level 1 variables and Level 2 variables are included in the model but are omitted from the table to improve clarity (they are not significant).

performance outcomes (Arend, 2014), we expect firm size and age will influence the strength of the proposed L1 relationships. Similarly, our context-relevant L2 variables ("pivot to new market" and "pivot to new product") are likely to modulate the performance outcomes amidst potential challenges posed by COVID-19. Thus, although we did not hypothesize for these effects, we tested an additional model to account for the interactions between the L1 variables (organizational resilience and tenure in the firm) and L2 variables (firm size, firm age, pivot to new market, and pivot to new product). HLM provides the ability to check for cross-level interactions and the results are reported as "Model with Cross-level Interactions" (Table 3). The results reveal a positive and significant interaction between TMT members' tenure and the firm's pivot to a new market in response to COVID-19 ($\beta = .63, p < .05$). Figure 2 illustrates the cross-level interaction.

## *Supplementary Analyses*

*Mediation Analysis.* We hypothesized that TMT member resilience and inter-functional coordination will lead to organizational resilience in young firms. In turn, organizational resilience will lead to higher levels of firm performance. Therefore, based on our conceptual model, organizational resilience also serves as a mediator. This led us to conduct a mediation analysis. We followed Zhang et al.'s (2009) recommendations regarding HLM mediation to implement Baron and Kenny's (1986, p. 1176) three conditions for establishing mediation: (1) "variations in the

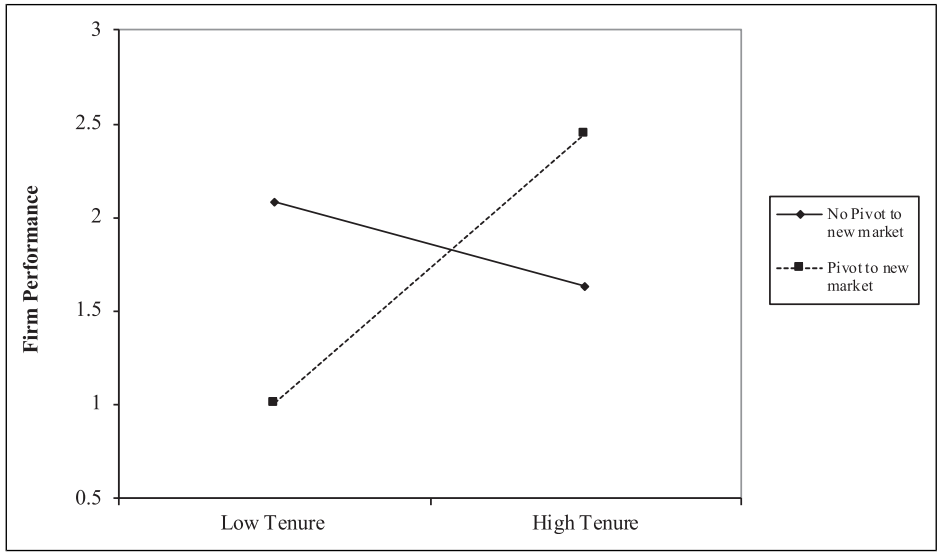


**Figure 2.** Cross-level interaction between TMT tenure and firm pivot to new market.

levels of the independent variable significantly account for variations in the presumed mediator", (2) "variations in the mediator significantly account for variations in the dependent variable," and (3) "when step 1 and 2 have been controlled, a previously significant relation between the independent variable and dependent variable is no longer significant, with the strongest demonstration of mediation occurring when step 3 is zero." The models are previously specified by equations (1–3) for the first step and equations (4–6) for the second step. Accordingly, the third step involves the integration of steps 1 and 2, resulting in the following equations (7–9):

Level 1

$$\begin{aligned} Firm\ Performance_{ij} = {} & \beta 9j + \beta 10j(Individual\ Resilience_{ij}) \\ & + \beta 11j(Inter\text{-}functional\ Coordination_{ij}) \\ & + \beta 12j(Organizational\ Resilience_{ij}) \\ & + \beta 13j(Tenure_{ij}) + \beta 14j(Environmental\ Dynamism_{ij}) \\ & + \beta 15j(Remote\ Work\ Negative_{ij}) \\ & + \beta 16j(Remote\ Work\ No\ Impact_{ij}) + r_{ij} \end{aligned} \tag{7}$$

Level 2

$$\begin{aligned} B9j = {} & \gamma 90 + \gamma 91j(Firm\ Size_j) \\ & + \gamma 92j(Firm\ Age_j) + \gamma 93j(Pivot\ to\ New\ Market_j) \\ & + \gamma 94j(Pivot\ to\ New\ Product_j) + u0j \end{aligned} \tag{8}$$

$$\beta kj = \gamma q0 \text{ for k} = 100, 110...160 \quad (9)$$

Mediation effect: $\gamma_{10} * \gamma_{160}$ *or* $\gamma_{10} - \gamma_{160}$ (L1 effect confounded with L2 effect).

None of our main effects constitutes an L2 variable, making the process relatively straightforward. Table 4 reports the results of the models specified above. The main effects of individual resilience (β = −.14) and inter-functional coordination (β = .01) on firm performance are not statistically significant. However, the performance effect of organizational resilience remains positive and significant (β = .21, $p < .05$) establishing its mediating role. Indeed, as indicated by the logic of Baron and Kenny's (1986) steps, organizational resilience predicts firm performance and it fully mediates the paths of individual resilience and inter-functional coordination to firm performance.

Given potential confounding in such models often arises, we replicated the mediation analysis by differentiating the between- and within-firm mediation relationships (Zhang et al., 2009). This differentiation, using "centered within context with reintroduction of the subtracted means" variables (i.e., CWC(M)) sheds light on the mediation mechanism at each level of analysis. This includes the possibility of completely equivalent effects across both within- and between-firm levels. None of the results at L2 are significant and thus, given our sample size, we rely on the simpler analysis as described earlier.

## *Replication Analysis: Bayesian Inference*

HLMs are estimated with maximum likelihood (ML) methods that produce asymptomatically unbiased estimates as the sample size approaches infinity (McNeish & Stapleton, 2016). Keeping

**Table 4.** Mediation Analysis for HLM Paths.

| Variables | DV: Firm Performance |
|---|---|
| Intercept | 3.29**(1.14) |
| *Level 1 control variables* | |
| Tenure | .25*(.13) |
| Environmental dynamism | .14(.11) |
| RW negative (Covid-19) | −.26(.32) |
| RW no impact (Covid-19) | −.47*(.24) |
| *Level 2 control variables* | |
| Firm size | .01(.25) |
| Firm age | −.17**(.07) |
| Pivot to new market (Covid-19) | .32(.32) |
| Pivot to new product (Covid-19) | −.01(.31) |
| *Main effects* | |
| Individual resilience | −.14(.15) |
| Inter-functional coordination | .01(.1) |
| Organizational resilience | .21*(.1) |
| *Variance components* | |
| $\sigma^2$ (within-firm variance) | 1.08 |
| $\tau$ (between-firms variance) | .42 |
| Model deviance | 362.39 |
| *N* | 111 |

Standard errors in parentheses. Significance is based on one-tailed tests; $^{\dagger}p$=.1, *$p$<.05, **$p$<.01, ***$p$<.001.

in mind the risk of drawing biased conclusions due to a small sample, we followed Brinkerink and Rondi's (2021) additional examination of their nested data to conduct a Bayesian inference analysis.

Bayesian analysis typically provides unbiased estimates with small sample sizes (Rouziou & Dugan, 2020) and is particularly valuable where more conventional statistical techniques fail to provide an answer, such as non-significant results (Dienes, 2014). Considering that our H1 was only supported at a relaxed threshold of statistical significance (i.e., $p < .1$), conducting additional analysis may be worthwhile. We therefore respecified our multi-level models (equations (1–6)) relying on Bayes' theorem, according to which the likelihood and prior distributions determine the posterior distributions of our predictors. Once again, we modeled our parameters as fixed effects (aside from the intercept which varies per firm) using non-informative priors (0, var = 1e4). We executed 50,000 draws, the first 40,000 of which were model training estimates, yielding 10,000 draws of the Markov Chain Monte Carlo (MCMC) chain, obtained for every parameter. In the end, the convergence diagnostic checks indicated that the chains reached their stationary distributions.

Table 5 summarizes the posteriors that result from the MCMC-based HLM procedure. All results of prior analyses were confirmed. In addition, the effect of individual resilience on organizational resilience, which was marginally significant in our HLM analysis, becomes fully significant (CI = [.29–.72]). This enhances our confidence in supporting H1, that is, high levels of individual resilience will have a positive effect on organizational resilience. Overall, the general consistency in results for both the HLM analysis and Bayesian analysis is an indication of the robustness of our findings (Brinkerink & Rondi, 2021).

### *Endogeneity Analysis*

Finally, endogeneity is an increasing concern in academic research that aims to draw causal inferences from analysis of non-experimental data (Lehmann et al., 2011). It arises when an explanatory variable correlates with the error term of a specified model (Rutz & Watson, 2019). There are three main sources of endogeneity: omitted variables, simultaneity, and measurement error (Wooldridge, 2010). Simultaneity is not an issue in our data (we collected data at different points in time) and given our analysis accounts for potential survivor bias (see Appendix A), measurement error can be ruled out. However, the omitted variables issue (due to data unavailability) may signal potential endogeneity in our statistical analysis.

To address this, we use the instrumental variables approach. Our analysis (see Appendix C) indicates that our predictor variables are not correlated with the error term, and we can safely conclude that our original HLM and Bayesian models are unbiased. A plausible explanation for the exogeneity of our models stems from the unexpected exogenous shock presented by COVID-19, given it occurred naturally between our two waves of data collection. Indeed, we note that econometricians recommend non-random exposure to exogenous shocks (as part of the randomization protocol in true experiments) to avoid omitted variables bias in models (Borusyak & Hull, 2020). In this study, COVID-19 acts as a random exogenous shock that does not originate from the economic system (i.e., endogenously).

## Discussion

If Shepherd (2020, p. 1751) is correct in his observation that the emergence of COVID-19 suggests that the "magnitude and frequency of adverse events—as disruptions—are on the rise, and there will be a series of 'new normals' rather than an extended period of *a* new normal," then

**Table 5.** Replication Analysis Using Bayesian HLM Model with Unknown Priors.

| Variables | DV: Organizational Resilience | | DV: Firm Performance | |
|---|---|---|---|---|
| Intercept | .54(.18) | [.23−.90] | .80(.3) | [.30−1.40] |
| *Level 1 control variables* | | | | |
| Environmental dynamism | −.08(.12) | [−.31−.16] | | |
| RW negative (Covid-19) | .32(.36) | [−.38−1.02] | | |
| RW no impact (Covid-19) | .58(.25) | **[.11−1.07]** | | |
| Tenure | | | .37(.13) | **[.11−.62]** |
| *Level 2 control variables* | | | | |
| Firm size | | | .07(.35) | [−.63−.73] |
| Firm age | | | −.08(.73) | [−.22−.07] |
| Pivot to new market (Covid-19) | | | .21(.42) | [−.62−1.02] |
| Pivot to new product (Covid-19) | | | .54(.39) | [−.20−1.34] |
| *Main effects* | | | | |
| Individual resilience | .51(.11) | **[.29−.72]** | | |
| Inter-functional coordination | .39(.09) | **[.22−.57]** | | |
| Organizational resilience | | | .49(.09) | **[.33–.67]** |
| *N* | | 111 | | 111 |

Note. RW = remote work.
The numbers in parentheses are standard deviations of the estimates. Parameters in bold indicate significance at the 95% level.

we need to understand the antecedents and outcomes of organizational resilience. Accordingly, in the context of the COVID-19 pandemic, we (1) propose and test two different paths to organizational resilience and (2) examine how organizational resilience influences the performance of young technology ventures.

Our findings show that both individual resilience and inter-functional coordination underpin organizational resilience. Further, organizational resilience positively impacts organizational outcomes pertaining to sales revenue, sales growth, and customer retention. In addition to the main findings, there is an interaction effect for TMT "tenure in the firm" and "pivot to a new market" (as a response to COVID-19) on performance. All findings are supported by both HLM and Bayesian analyses.

## *Theoretical Implications*

Following from the above, we offer a number of contributions. At a general level, by building on the idea that resilience occurs at multiple levels (Sutcliffe & Vogus, 2003), and showing relationships across levels, we begin to offer a better understanding of the multi-level nature of resilience called for by Linnenluecke (2017) and Williams et al. (2017). This benefits entrepreneurship research given scholars tend to emphasize individual-level resilience alone (e.g., Bullough & Renko, 2013; Chadwick & Raver, 2020; Jenkins et al., 2014).

We conceptualize and operationalize resilience as a resource-based organizational capability and then demonstrate that it enables young ventures to cope with external disruptions. This provides new insights for two reasons. First, our approach differs from those using performance as a proxy for resilience (e.g., Ortiz-de-Mandojana & Bansal, 2016; Smallbone et al., 2012). Second, despite organizational resilience being considered vital when a firm encounters unexpected adversity (Doern et al., 2019; Linnenluecke, 2017; Williams et al., 2017), it is often approached rather abstractly in entrepreneurship research. Perhaps the fragmented (Linnenluecke, 2017) and

metaphorical operationalization of organizational resilience has inhibited its empirical investigation to date. As a result, our empirical validation of this capability's antecedents and outcomes is informative.

Following from Gittell et al.'s (2006) argument about the importance of relational coordination for organizational resilience, we show that when core functional areas of young technology ventures are better integrated and coordinated, the firm tends to be more resilient. This finding allows us to contribute to entrepreneurship research on the role of internal relational resources as related to venture outcomes (e.g., De Clercq et al., 2016). In particular, we acknowledge the group heterogeneity and complexity of interconnections among different functional groups (Arregle et al., 2007), and draw on research from marketing (Atuahene-Gima, 2005; Kohli & Jaworski, 1993; Narver & Slater, 1990) to consider inter-functional coordination as a resource for organizational resilience. This reflects arguments that relational resources are associated with resilient responses to adverse challenges due to their potential to enable the flow of information and resources during crises (Gittell, 2008; Lengnick-Hall et al., 2011; Williams et al., 2017). However, although prior entrepreneurship literature demonstrates the efficacy of relational resources in dealing with adversity at a broader level (Williams & Shepherd, 2016), research exploring intraorganizational mechanisms of integration and coordination remains scant. With this study, we show that stronger internal relationships across functional areas help develop organizational resilience and strengthen the performance of young ventures amidst an environmental shock.

At the individual level, we theorize and find support for a relationship between TMT members' individual resilience and organizational resilience. Although the results of our HLM analysis are only marginally significant, we are mindful of not excessively relying on significance thresholds to form our conclusions (Maula & Stam, 2020), especially when they contradict theory. Consequently, we add to the robustness of this result with additional analysis using Bayesian techniques. Our results reinforce early findings (D'Aveni & MacMillan, 1990) that TMT members' ability to respond to a crisis is central to how a firm will fare through it. That is, we demonstrate that managers' resilience—a core component of their psychological capital—contributes to their venture's capability to effectively cope with adversity.

The controls in this study also provide new insight to our research questions. Given the notable context of COVID-19, we account for the impact of remote work—one of the most salient consequences of the pandemic for organizations. When remote work did *not* influence firm productivity, there was a significant and positive impact on organizational resilience. This is understandable, as managerial perceptions of organizational resilience can be expected to be higher when COVID-19 is not perceived as a threat to productivity. Further, when TMT tenure in the firm is high, pivoting to a new market leads to higher levels of perceived performance. In contrast, when TMT tenure is low, *not* pivoting benefits performance. This can be explained by Unger et al.'s (2011) argument that experience may be more instrumental to success when the relevance of entrepreneurial tasks is high.

Finally, Doern et al. (2019) observe that prior survey-based studies on responses to crises in entrepreneurship tend to be cross-sectional. As a result, much of the extant research on the effects of external disruptions is *ex post*. This is despite the argument that "backward looking studies fail to yield much in the way of explanatory insights on how policy could proactively deal with and mitigate the impact of these crisis periods as they actually unfolded" (Brown & Rocha, 2020, p. 2). Accordingly, investigations of resilience that temporally separate antecedents from causes may be particularly insightful (cf Chadwick and Raver's (2020) time-lagged approach to study individual resilience). Our study contributes to such efforts with a

unique dataset that tracks young ventures before and during a significant global and external disruption.

## Practical Implications

COVID-19 and other macro-level events show that external disruptions are inevitable. Our findings demonstrate that by developing organizational resilience as a capability, young technology ventures can not only survive but perform well through a crisis. The goal for TMT members in such firms should be to develop organizational resilience such that functional operations and the flow of daily systems and processes quickly return to normal, even under adversity.

Our findings highlight two specific paths for doing so: (1) developing the individual resilience of the firm's TMT members and (2) inter-functional coordination. Compared to more stable personality traits, resilience is relatively malleable and thus susceptible to change and development (Luthans & Youssef, 2007; Vanhove et al., 2016). Further, Masten (2001) suggests resilience can be changed through process-focused strategies. Examples include workplace training programs aimed at building personnel resilience with regard to key health- and performance-related outcomes. Given individual resilience is directly and positively related to organizational resilience, investing in it provides a pre-emptive strike that can help the firm face unexpected external disruptions.

One way to develop individual resilience is to help managers frame a disruption positively. Managers should also be encouraged to try and address disruptions using creative and novel ways. For example, a crisis might provide the TMT with an opportunity to implement ideas that have been held on the back-burner. Related to this is the idea of allowing managers to explore new actions or different paths to deal with challenges they encounter in a crisis situation. For example, if a crisis is viewed as a learning opportunity, managers can work together to accept the new reality, learn from the change process triggered by the situation, and identify ways to offset adverse effects. This could range from quickly modifying their product offer, to adding new revenue streams, or reconsidering their business model.

The second path to building organizational resilience is through inter-functional coordination. This calls for proactive facilitation of cooperation among functional areas (in our study: marketing, sales, and R&D). A firm's inter-functional coordination pertains to a number of activities. One example is shared acquisition and use of market information about customers, technologies, and competitors. Similarly, members from different functions should work together in setting firm priorities and strategic decision-making. In young technology ventures like those studied here, inter-functional coordination across sales, marketing, and R&D is particularly important for innovation creation. We also add that well-coordinated functional areas become even more relevant given the limited physical interactions resulting from the work-from-home policies associated with COVID-19.

In addition to the above, the results for our control variables provide new insight regarding a young technology firms' decision to pivot to a new market when confronted by an environmental shock. Pivoting to a new market plausibly requires a profound understanding of the firm and the environment it operates in, and this may be provided by TMT members' tenure in their firm. Accordingly, in cases where TMT members' tenure in firm is high, pivoting to a new market is advisable. On the other hand, a lack of tenure comes with relatively less insight about the firm and the implications of changing direction. For these TMT managers, maintaining the status quo appears more beneficial.

Finally, our results offer suggestions for accelerators and investors supporting young ventures. These stakeholders should acknowledge the importance of developing organizational resilience in

such firms and provide appropriate support. For example, they could offer training to help build TMT resilience, or workshops to assess and improve cross-functional information and resource exchange. Another approach could be to help TMT members audit their firm's organizational resilience and the factors supporting it.

### *Limitations and Future Research*

Our unique, multi-level, time-lagged data allowed us to study resilience by temporally separating exogenous variables from endogenous ones. At the same time, our sample size for this study is quite small due to our selection criteria. We recognize that this impacts the explanatory value of our model and consequently, we used Bayesian inference to help address this limitation. Also, we were unable to ensure a temporal lag between measuring organizational resilience and firm performance. Future work could therefore investigate the long-term performance of resilient young ventures, after they have had a chance to absorb the pressures of the crisis. This is particularly relevant given our data is not "before and after" a crisis but "before and during." In a related vein, we note that as per Brandon-Jones et al., (2014), short-term vs. long-term differences in performance could potentially involve a distinction between organizational resilience (the ability to return to the original state) and organizational robustness (the ability to maintain functioning despite disruptions). Future research could explore the contexts where such a distinction is meaningful.

In studying two paths to organizational resilience, we recognize that there are other potential antecedents to consider. Future research could investigate the effects of the other components of psychological capital (optimism, hope, and self-efficacy) discussed by Luthans et al., (2007). As a potentially interesting extension of individual resilience, we note that because TMT members face adversity in a collective manner, they may start to identify more strongly with each other or may develop "collective resilience" (King et al., 2016). Given Stoverink et al., (2020) indicate that team resilience is distinct from individual and organizational resilience, research on how the TMTs of young ventures collectively cope with setbacks could provide valuable insight. Future research on resilience in entrepreneurship should also extend our findings regarding relational resources. It likely, for example, that relationships external to the firm are beneficial. Regardless of whether relational resources are internal or external, they will also vary in, for example, strength, durability, and trust. Research incorporating these characteristics could provide further understanding of how young firms can prepare for, and weather the storm presented by an external crisis.

## Conclusion

In this study, we use the COVID-19 pandemic as a context to study the drivers and performance outcomes of organizational resilience in young technology firms. We show that the individual resilience of TMT members and the level of inter-functional coordination among key areas are positively linked to organizational resilience. In turn, organizational resilience strengthens performance in the face of an adverse environmental shock. Such findings provide a basis for future work in entrepreneurship that explores organizational reactions to adversity and generates meaningful practical insights.

## Appendix A. Analysis to Address Survivorship Issues.

| | | Individual Resilience | Inter-Functional Coordination | Org Resilience | Org Performance | Group Size, Mean and standard Deviation | T-Test |
|---|---|---|---|---|---|---|---|
| 1 | Group 1 | ✓ | ✓ | ✓‡ | ✓ | Group 1 ($N$ = 111) = 5.24 (1.19) | t (121) = 1.4, $p$ = .164 |
| | Group 2 | ✓ | X | ✓‡ | ✓ | Group 2 ($N$ = 12) = 5.73 (.69) | |
| 2 | Group 1 | ✓ | ✓ | ✓ | ✓‡ | Group 1 ($N$ = 111) = 3.62 (1.26) | t (121) = 1.52, $p$ = .131 |
| | Group 2 | ✓ | X | ✓ | ✓‡ | Group 2 ($N$ = 12) = 4.22 (1.68) | |
| 3 | Group 1 | ✓ | ✓ | ✓‡ | ✓ | Group 1 ($N$ = 111) = 5.24 (1.19) | t (120) = .46, $p$ = .65 |
| | Group 2 | X | X | ✓‡ | ✓ | Group 2 ($N$ = 11) = 5.41 (.91) | |
| 4 | Group 1 | ✓ | ✓ | ✓ | ✓‡ | Group 1 ($N$ = 111) = 3.62 (1.26) | t (120) = 1.72, $p$ = .09 |
| | Group 2 | X | X | ✓ | ✓‡ | Group 2 ($N$ = 11) = 4.33 (1.77) | |
| 5 | Group 1 | ✓‡ | ✓ | ✓ | ✓ | Group 1 ($N$ = 111) = 5.91 (.65) | t (215) = −1.3, $p$ = .18 |
| | Group 2 | ✓‡ | ✓ | X | X | Group 2 ($N$ = 106) = 5.79 (.72) | |
| 6 | Group 1 | ✓ | ✓‡ | ✓ | ✓ | Group 1 ($N$ = 111) = 5.39 (1.11) | t (215) = −.23, $p$ = .82 |
| | Group 2 | ✓ | ✓‡ | X | X | Group 2 ($N$ = 106) = 5.35 (1.13) | |

*Notes.* Variables that are compared between groups are highlighted with ‡; Group 1 represents the sample used in this study.
✓ = variable answered by the respondents in the group; X = variable *not* answered by the respondents in the group.

## Appendix B. Measures.

| Construct | Items | Original Loadings | Improved Loadings |
|---|---|---|---|
| Individual resilience | *If you think about yourself at work, what is your level of agreement with each of the following statements?* I look for creative ways to alter difficult situations | .607 | .751 |
| | *Regardless of what happens to me, I believe I can control my reaction to it | .541 | - |
| | I believe I can grow in positive ways by dealing with difficult situations | .751 | .821 |
| | I actively look for ways to replace the losses I encounter in life | .655 | .652 |
| Inter-functional coordination | *To what extent do you agree/disagree with these statements about your firm?* The activities of functional units are tightly integrated to ensure better use of our market knowledge | .761 | .771 |
| | In the innovation process, R&D, marketing, and sales are tightly integrated as cross-functional teams | .808 | .824 |
| | R&D, marketing, and sales regularly share information about customers, technologies, and competitors | .875 | .873 |

*(continued)*

(continued)

| Construct | Items | Original Loadings | Improved Loadings |
|---|---|---|---|
| | There is a low level of cooperation among functional units in setting the priorities for this firm. (R) | .827 | .744 |
| | Top management promotes cooperation among R&D, marketing, and sales when acquiring and using market information | .823 | .814 |
| | People from marketing, R&D, and sales play important roles in major strategic market decisions | .709 | .703 |
| Organizational resilience | *Please think of major disruptions that your firm has faced. Given such a disruption, please indicate the extent to which you agree with the following statements about your firm:* | .863 | .863 |
| | The flow of our company's day-to-day systems can be quickly restored | | |
| | It does not take long to recover normal operational performance | .900 | .901 |
| | Our firm can easily recover to its original functional state | .910 | .917 |
| | Disruptions can be quickly dealt with | .873 | .860 |
| Environmental dynamism | *If you think about the main industry you compete in, to what extent do you agree with the following statements?* | .684 | .679 |
| | Our firm must frequently change its marketing practices to keep up with the market and competitors | | |
| | *The rate at which our products/services become obsolete in this industry is very high | .414 | - |
| | *The actions of competitors are quite easy to predict. [R] | .208 | - |
| | Demand and user tastes are difficult to forecast | .644 | .799 |
| | The core technology(s) we use for production or service delivery is not subject to very much change. [R] | .648 | .603 |
| Firm performance | Sales revenue | .882 | .956 |
| | Growth in sales revenue | .884 | .962 |
| | Customer retention | .722 | .631 |

*Note.* [R] = reverse-coded item.
* = item dropped due to low factor loading.

## Appendix C. Endogeneity Analysis.

We address potential issues of endogeneity with the well-established Instrumental Variables (IV) technique (Anderson et al., 2019; Antonakis et al., 2010). To select our instrumental variables, we leverage other variables in our data, considering that a potential instrumental variable first, must be correlated with the endogenous variable, and second, must not be correlated with the error term ($\varepsilon$) (Rutz & Watson, 2019). We need at least as many instruments as the maximum number of parameters in any equation (equations (1) and (4) in the manuscript). Thus, we initially identify two instrumental variables for the equation where individual resilience and inter-functional coordination are the predictor variables (equation (1) in the manuscript), and one instrumental variable for the equation where organizational resilience is the predictor variable (equation (4) in the manuscript).

We identify three variables to operate as IVs for the above. First, learning goal orientation is an individual's orientation of enhancing his/her ability and competency by acquiring and mastering new skills (Vandewalle, 1997). This is conceptually relevant to the notion of individual resilience because it leads to minimizing threats to self-esteem and enhances persistence and the tendency to learn from failure (Niiya et al., 2004). Second, strategic flexibility refers to a firm's ability to reallocate and reconfigure its organizational resources in order to respond to changes (Zhou & Wu, 2010, p. 549). It is inherently related to inter-functional coordination (Atauhene-Gima, 2005; Saini & Johnson, 2005). Third, we note that conceptually, organizational robustness and organizational resilience are distinct concepts with the former referring to an entity's ability to maintain its functioning despite disruptions or pressure (Brandon-Jones et al., 2014). On the other hand, resilience is a broader concept and entails using resource endowments to interact with the environment and perform positively before, during, and after adversity (Williams et al., 2017). In this regard, the quality of robustness may be a prerequisite for organizational resilience. We measure learning goal orientation using the scale provided by Vandewalle (1997), strategic flexibility in line with Zhou and Wu (2010), and organizational robustness using Brandon-Jones et al.'s (2014) scale.

Learning goal orientation serves as an IV for individual resilience ($r = .524$, $p < .01$), strategic flexibility serves as an IV for inter-functional coordination ($r = .248$, $p < .01$), and organizational robustness serves as an IV for organizational resilience ($r = .525$, $p < .01$). Therefore, they meet the *relevance criterion* (i.e., IV should be correlated with the endogenous predictors). Moreover, they meet the *restriction criterion*, relating to each of the dependent variables only through the endogenous predictors (Rutz & Watson, 2019). Indeed, their correlations with the dependent variables of organizational resilience (IV: learning goal orientation $r = .073$, *n*.s.; strategic flexibility $r = .114$, *n*.s.) and firm performance (IV: organizational robustness $r = .140$, *n*.s.) are low and not significant.

To employ the IV method effectively, we need strong theoretical reason or empirical evidence that one (or more) explanatory variables are actually correlated with the error term (i.e., are endogenous) (Rutz & Watson, 2019). We perform the Hausman Test (Hausman, 1978) to identify which predictors are endogenous. Specifically, we regress the predictor variables of individual resilience and inter-functional coordination on the instruments of learning goal orientation and strategic flexibility. We also regress the predictor variable of organizational resilience on the instrument of organizational robustness. The residuals ($v$) from these regressions are saved and used as explanatory variables in the main equations (1) and (4).

We hypothesize that $H_0$: our predictor variables are exogenous, while $H_1$: our predictor variables are endogenous. The effects of residuals are $v_1 = .55$, $p = .88$ for individual resilience, $v_2 = -.17$, $p = .66$ for inter-functional coordination, and $v_3 = -.17$, $p = .45$ for organizational resilience. The results of the Hausman Test indicate that none of our independent variables are endogenous. This is because we do not reject the null hypothesis of exogeneity given the parameter estimates of the residuals are not significant. Thus, our predictor variables are not correlated with the error term and we can safely conclude that our original HLM and Bayesian models are unbiased.

## Acknowledgements

We are grateful to the research support and insights provided by Anne Domurath, Sarah Wilner, Chatura Ranaweera, Asfiya Taji, and Andrea Reaume. This paper draws on research funded by the Social Sciences and Humanities Research Council, Grant 435-2017-1377.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

Nicole Coviello https://orcid.org/0000-0001-9994-5722

## References

Aguinis, H., Gottfredson, R. K., & Culpepper, S. A. (2013). Best-practice recommendations for estimating cross-level interaction effects using multilevel modeling. *Journal of Management*, *39*(6), 1490-1528.

Alsos, G. A., Isaksen, E. J., & Ljunggren, E. (2006). New venture financing and subsequent business growth in men–and women–led businesses. *Entrepreneurship Theory and Practice*, *30*(5), 667-686.

Anderson, B. S., Wennberg, K., & McMullen, J. S. (2019). Enhancing quantitative theory-testing entrepreneurship research. *Journal of Business Venturing*, *34*(5), 105928.

Antonakis, J., Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *The Leadership Quarterly*, *21*(6), 1086-1120.

Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: How firm age and size affect the 'capability enhancement–SME performance' relationship. *Small Business Economics*, *42*(1), 33-57.

Arregle, J. L., Hitt, M. A., Sirmon, D. G., & Very, P. (2007). The development of organizational social capital: Attributes of family firms. *Journal of Management Studies*, *44*(1), 73-95.

Atuahene-Gima, K. (2005). Resolving the capability–rigidity paradox in new product innovation. *Journal of Marketing*, *69*(4), 61-83.

Autio, E., Pathak, S., & Wennberg, K. (2013). Consequences of cultural practices for entrepreneurial behaviors. *Journal of International Business Studies*, *44*(4), 334-362.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.

Baron, R. A., & Tang, J. (2011). The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, *26*(1), 49-60.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20-28.

Bonanno, G. A., Brewin, C. R., Kaniasty, K., & Greca, A. M. L. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*, *11*(1), 1-49.

Borusyak, K., & Hull, P. (2020). *Non-random exposure to exogenous shocks: Theory and applications* (No. w27845). Cambridge, MA, USA: National Bureau of Economic Research.

Brandon-Jones, E., Squire, B., Autry, C. W., & Petersen, K. J. (2014). A contingent resource-based perspective of supply chain resilience and robustness. *Journal of Supply Chain Management*, *50*(3), 55-73.

Brinkerink, J., & Rondi, E. (2021). When can families fill voids? Firms' reliance on formal and informal institutions in R&D decisions. *Entrepreneurship Theory and Practice*, *45*(2), 291-318.

Brown, R., & Rocha, A. (2020). Entrepreneurial uncertainty during the COVID-19 crisis: Mapping the temporal dynamics of entrepreneurial finance. *Journal of Business Venturing Insights*, *14*, e00174. https://doi.org/10.1016/j.jbvi.2020.e00174

Bullough, A., & Renko, M. (2013). Entrepreneurial resilience during challenging times. *Business Horizons*, *56*(3), 343-350.

Bullough, A., Renko, M., & Myatt, T. (2014). Danger zone entrepreneurs: The importance of resilience and self–efficacy for entrepreneurial intentions. *Entrepreneurship Theory and Practice*, *38*(3), 473-499.

Chadwick, I. C., & Raver, J. L. (2020). Psychological resilience and its downstream effects for business survival in nascent entrepreneurship. *Entrepreneurship Theory and Practice*, *44*(2), 233-255.

Chandler, G. N., & Hanks, S. H. (1994). Market attractiveness, resource-based capabilities, venture strategies, and venture performance. *Journal of Business Venturing*, *9*(4), 331-349.

Coviello, N., Winklhofer, H., & Hamilton, K. (2006). Marketing practices and performance of small service firms: An examination in the tourism accommodation sector. *Journal of Service Research*, *9*(1), 38-58.

Covin, J. G., Garrett, R. P. Jr, Gupta, J. P., Kuratko, D. F., & Shepherd, D. A. (2018). The interdependence of planning and learning among internal corporate ventures. *Entrepreneurship Theory and Practice*, *42*(4), 537-570.

Covin, J. G., Green, K. M., & Slevin, D. P. (2006). Strategic process effects on the entrepreneurial orientation–sales growth rate relationship. *Entrepreneurship Theory and Practice*, *30*(1), 57-81.

D'Aveni, R. A., & MacMillan, I. C. (1990). Crisis and the content of managerial communications: A study of the focus of attention of top managers in surviving and failing firms. *Administrative Science Quarterly*, *35*(4), 634-657.

Davidsson, P., & Gordon, S. R. (2016). Much ado about nothing? The surprising persistence of nascent entrepreneurs through macroeconomic crisis. *Entrepreneurship Theory and Practice*, *40*(4), 915-941.

De Carolis, D. M., Yang, Y., Deeds, D. L., & Nelling, E. (2009). Weathering the storm: The benefit of resources to high-technology ventures navigating adverse events. *Strategic Entrepreneurship Journal*, *3*(2), 147-160.

De Clercq, D., Dimov, D., & Belausteguigoitia, I. (2016). Perceptions of adverse work conditions and innovative behavior: The buffering roles of relational resources. *Entrepreneurship Theory and Practice*, *40*(3), 515-542.

DesJardine, M., Bansal, P., & Yang, Y. (2019). Bouncing back: Building resilience through social and environmental practices in the context of the 2008 global financial crisis. *Journal of Management*, *45*(4), 1434-1460.

Dienes, Z. (2014). Using Bayes to get the most out of non-significant results. *Frontiers in Psychology*, *5*, 781.

Doern, R. (2021). Knocked down but not out and fighting to go the distance: Small business responses to an unfolding crisis in the initial impact period. *Journal of Business Venturing Insights*, *15*, e00221.

Doern, R., Williams, N., & Vorley, T. (2019). Special issue on entrepreneurship and crises: Business as usual? An introduction and review of the literature. *Entrepreneurship & Regional Development*, *31*(5–6), 400-412.

Domurath, A., Patzelt, H., & Liebl, A. (2020). Does negative feedback impact new ventures' organizational identity? The role of founding teams' human capital and feedback source. *Journal of Business Venturing*, *35*(3), 105987.

Ensley, M. D., Pearce, C. L., & Hmieleski, K. M. (2006). The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *Journal of Business Venturing*, *21*(2), 243-263.

Ensley, M. D., Pearson, A. W., & Amason, A. C. (2002). Understanding the dynamics of new venture top management teams: Cohesion, conflict, and new venture performance. *Journal of Business Venturing*, *17*(4), 365-386.

Flatten, T. C., Engelen, A., Möller, T., & Brettel, M. (2015). How entrepreneurial firms profit from pricing capabilities: An examination of technology–based ventures. *Entrepreneurship Theory and Practice*, *39*(5), 111-1136.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218-226.

Giones, F., Brem, A., Pollack, J. M., Michaelis, T. L., Klyver, K., & Brinckmann, J. (2020). Revising entrepreneurial action in response to exogenous shocks: Considering the COVID-19 pandemic. *Journal of Business Venturing Insights*, *14*, e00186. https://doi.org/10.1016/j.jbvi.2020.e00186

Gittell, J. H. (2008). Relationships and resilience: Care provider responses to pressures from managed care. *The Journal of Applied Behavioral Science*, *44*(1), 25-47.

Gittell, J. H., Cameron, K., Lim, S., & Rivas, V. (2006). Relationships, layoffs, and organizational resilience: Airline industry responses to September 11. *The Journal of Applied Behavioral Science*, *42*(3), 300-329.

Grant, R. M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California management review*, *33*(3), 114-135.

Grube, L. E., & Storr, V. H. (2018). Embedded entrepreneurs and post-disaster community recovery. *Entrepreneurship & Regional Development*, *30*(7-8), 800-821.

Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective* (Vol. 7). Pearson.

Han, J. K., Kim, N., & Srivastava, R. K. (1998). Market orientation and organizational performance: is innovation a missing link? *Journal of Marketing*, *62*(4), 30-45.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, *46*(6), 1251-1271.

Herbane, B. (2019). Rethinking organizational resilience and strategic renewal in SMEs. *Entrepreneurship & Regional Development*, *31*(5-6), 476-495.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55.

Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: Antecedents and consequences. *Journal of Marketing*, *57*(3), 53-70.

Jenkins, A. S., Wiklund, J., & Brundin, E. (2014). Individual responses to firm failure: Appraisals, grief, and the influence of prior failure experience. *Journal of Business Venturing*, *29*(1), 17-33.

Jin, L., Madison, K., Kraiczy, N. D., Kellermanns, F. W., Crook, T. R., & Xi, J. (2017). Entrepreneurial team composition characteristics and new venture performance: A meta–analysis. *Entrepreneurship Theory and Practice*, *41*(5), 743-771.

Kellermanns, F., Walter, J., Crook, T. R., Kemmerer, B., & Narayanan, V. (2016). The resource-based view in entrepreneurship: A content-analytical comparison of researchers' and entrepreneurs' views. *Journal of Small Business Management*, *54*(1), 26-48.

King, D. D., Newman, A., & Luthans, F. (2016). Not if, but when we need resilience in the workplace. *Journal of Organizational Behavior*, *37*(5), 782-786.

Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Morales Reyes, C. A., Prochotta, A., Steinbrink, K. M., & Berger, E. S. C. (2020). Startups in times of crisis–A rapid response to the COVID-19 pandemic. *Journal of Business Venturing Insights*, *13*, e00169. https://doi.org/10.1016/j.jbvi.2020.e00169

Lehmann, D. R., McAlister, L., & Staelin, R. (2011). Sophistication in research in marketing. *Journal of Marketing*, *75*(4), 155-165.

Lengnick-Hall, C. A., & Beck, T. E. (2005). Adaptive fit versus robust transformation: How organizations respond to environmental change. *Journal of Management*, *31*(5), 738-757.

Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, *21*(3), 243-255.

Linnenluecke, M. K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, *19*(1), 4-30.

Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, *16*(5), 429-451.

Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly*, *21*(1), 41-67.

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of Management*, *33*(3), 321-349.

Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). Psychological capital: Investing and developing positive organizational behavior. *Positive Organizational Behavior*, *1*(2), 9-24.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*(3), 227-238.

Maula, M., & Stam, W. (2020). Enhancing rigor in quantitative entrepreneurship research. *Entrepreneurship Theory and Practice*; *44*(6): 1059-1090.

McKelvie, A., Wiklund, J., & Brattström, A. (2018). Externally acquired or internally generated? Knowledge development and perceived environmental dynamism in new venture innovation. *Entrepreneurship Theory and Practice*, *42*(1), 24-46.

McNeish, D. (2017). Multilevel mediation with small samples: A cautionary note on the multilevel structural equation modeling framework. *Structural Equation Modeling: A Multidisciplinary Journal*, *24*(4), 609-625.

McNeish, D. M., & Stapleton, L. M. (2016). The effect of small sample size on two-level model estimates: A review and illustration. *Educational Psychology Review*, *28*(2), 295-314.

Miller, K. D. (2007). Risk and rationality in entrepreneurial processes. *Strategic Entrepreneurship Journal*, *1*(1-2), 57-74.

Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, *3*(1), 1-25.

Morgan, R. M., & Hunt, S. (1999). Relationship-based competitive advantage: The role of relationship marketing in marketing strategy. *Journal of Business Research*, *46*(3), 281-290.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, *54*(4), 20-35.

Niiya, Y., Crocker, J., & Bartmess, E. N. (2004). From vulnerability to resilience: Learning orientations buffer contingent self-esteem from failure. *Psychological Science*, *15*(12), 801-805.

Ortiz-de-Mandojana, N., & Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal*, *37*(8), 1615-1631.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Sage.

Reeves, M., & Whitaker, K. (2020, July 2). A guide to building a more resilient business. *Harvard Business Review*. https://hbr.org/2020/07/a-guide-to-building-a-more-resilient-business

Reivich, K., & Shatté, A. (2002). *The resilience factor: 7 essential skills for overcoming life's inevitable obstacles*. Broadway Books.

Renko, M., Carsrud, A., & Brännback, M. (2009). The effect of a market orientation, entrepreneurial orientation, and technological capability on innovativeness: A study of young biotechnology ventures in the United States and in Scandinavia. *Journal of Small Business Management*, *47*(3), 331-369.

Rodríguez-Sánchez, A., Guinot, J., Chiva, R., & López-Cabrales, Á. (2019). How to emerge stronger: Antecedents and consequences of organizational resilience. *Journal of Management & Organization*, *27*(3), 1-18. https://doi.org/10.1017/jmo.2019.5

Rouziès, D., & Hulland, J. (2014). Does marketing and sales integration always pay off? Evidence from a social capital perspective. *Journal of the Academy of Marketing Science*, *42*(5), 511-527.

Rouziou, M., & Dugan, R. (2020). An introduction to an old acquaintance: Using Bayesian inference in sales research. *Journal of Personal Selling & Sales Management*, *40*(2), 114-131.

Rutherford, M. W., Kuratko, D. F., & Holt, D. T. (2008). Examining the link between "familiness" and performance: Can the F–PEC untangle the family business theory jungle? *Entrepreneurship Theory and Practice*, *32*(6), 1089-1109.

Rutz, O. J., & Watson, G. F. (2019), Endogeneity and marketing strategy research: An overview. *Journal of the Academy of Marketing Science 47*, (3): 479-498.

Saini, A., & Johnson, J. L. (2005). Organizational capabilities in e-commerce: An empirical investigation of e-brokerage service providers. *Journal of the Academy of Marketing Science*, *33*(3), 360-375.

Santoro, G., Bertoldi, B., Giachino, C., & Candelo, E. (2018). Exploring the relationship between entrepreneurial resilience and success: The moderating role of stakeholders' engagement. *Journal of Business Research*, *119*, 142-150.

Shepherd, D. (2020). COVID 19 and entrepreneurship: Time to pivot? *Journal of Management Studies*, *57*(8), 1750-1753.

Shepherd, D. A., & Williams, T. A. (2014). Local venturing as compassion organizing in the aftermath of a natural disaster: The role of localness and community in reducing suffering. *Journal of Management Studies*, *51*(6), 952-994.

Shrader, R., & Siegel, D. S. (2007). Assessing the relationship between human capital and firm performance: Evidence from technology–based new ventures. *Entrepreneurship Theory and Practice*, *31*(6), 893-908.

Sinclair, V. G., & Wallston, K. A. (2004). The development and psychometric evaluation of the brief resilient coping scale. *Assessment*, *11*(1), 94-101.

Smallbone, D., Deakins, D., Battisti, M., & Kitching, J. (2012). Small business responses to a major economic downturn: Empirical perspectives from New Zealand and the United Kingdom. *International Small Business Journal*, *30*(7), 754-777.

Stam, W., Arzlanian, S., & Elfring, T. (2014). Social capital of entrepreneurs and small firm performance: A meta-analysis of contextual and methodological moderators. *Journal of Business Venturing*, *29*(1), 152-173.

Stoverink, A. C., Kirkman, B. L., Mistry, S., & Rosen, B. (2020). Bouncing back together: Toward a theoretical model of work team resilience. *Academy of Management Review*, *45*(2), 395-422.

Sutcliffe, K. M., & Vogus, T. J. (2003). Organizing for resilience. In K. S. Cameron, J. E. Dutton, & R. E. Quinn (Eds.), *Positive organizational scholarship: Foundations of a new discipline*: (pp. 94-110). Berrett-Koehler.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509-533.

Tugade, M. M., Fredrickson, B. L., & Barrett, L. F. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality*, *72*(6), 1161-1190.

Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, *26*(3), 341-358.

VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement*, *57*(6), 995-1015.

Vanhove, A. J., Herian, M. N., Perez, A. L. U., Harms, P. D., & Lester, P. B. (2016). Can resilience be developed at work? A meta-analytic review of resilience-building programme effectiveness. *Journal of Occupational and Organizational Psychology*, *89*(2), 278-307.

Volberda, H. W., Foss, N. J., & Lyles, M. A. (2010). Perspective—Absorbing the concept of absorptive capacity: How to realize its potential in the organization field. *Organization Science*, *21*(4), 931-951.

Walter, A., Auer, M., & Ritter, T. (2006). The impact of network capabilities and entrepreneurial orientation on university spin-off performance. *Journal of Business Venturing*, *21*(4), 541-567.

Weick, K. E. (1995). *Sensemaking in organizations* (Vol. 3). Sage.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, *16*(4), 409-421.

Wiklund, J., & Shepherd, D. (2005). Entrepreneurial orientation and small business performance: A configurational approach. *Journal of Business Venturing*, *20*(1), 71-91.

Williams, T. A., Gruber, D. A., Sutcliffe, K. M., Shepherd, D. A., & Zhao, E. Y. (2017). Organizational response to adversity: Fusing crisis management and resilience research streams. *Academy of Management Annals*, *11*(2), 733-769.

Williams, T. A., & Shepherd, D. A. (2016). Building resilience or providing sustenance: Different paths of emergent ventures in the aftermath of the Haiti earthquake. *Academy of Management Journal*, *59*(6), 2069-2102.

Wooldridge, J. M. (2010), *Econometric analysis of cross section and panel data*. MIT press.

Wooten, L. P., & Crane, P. (2004). Generating dynamic capabilities through a humanistic work ideology: The case of a certified-nurse midwife practice in a professional bureaucracy. *American Behavioral Scientist*, *47*(6), 848-866.

Yli-Renko, H., Autio, E., & Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, *22*(6-7), 587-613.

Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multilevel mediation using hierarchical linear models: Problems and solutions. *Organizational Research Methods*, *12*(4), 695-719.

Zhou, K. Z., & Wu, F. (2010). Technological capability, strategic flexibility, and product innovation. *Strategic Management Journal*, *31*(5), 547-561.

## Author Biographies

**Ali Anwar** is a PhD candidate at the Lazaridis School of Business and Economics in Canada. His research focuses on salesforce management and how sales organizations cope with challenges at multiple levels. Ali has a particular interest in studying these issues in young ventures. His research has appeared in the *Journal of Personal Selling and Sales Management, Journal of Strategic Marketing, and International Journal of Information Management*.

**Nicole Coviello** is the Lazaridis Chair of International Entrepreneurship and Innovation at the Lazaridis School of Business and Economics in Canada. She studies topics at the intersection of marketing strategy, international business, and entrepreneurship. Her research is published in the *Journal of Marketing, Journal of International Business Studies, Journal of World Business, Academy of Management Review, Journal of Business Venturing, and Entrepreneurship Theory and Practice*.

**Maria Rouziou** is an Assistant Professor of Marketing at HEC Montréal, where her research interests focus on sales force intra-relationships, brand ambassadorship, sales force incentive compensation, and sales force management. She received her PhD in Marketing from HEC Paris in 2016. Her work has appeared in the *Journal of Personal Selling and Sales Management, Marketing Letters, Journal of Business Research, amongst others*.