

ORGANIZATIONAL CULTURE AND FIRM PERFORMANCE UNDER ENVIRONMENTAL
VOLATILITY: THE CASE OF THE COVID-19 PANDEMIC

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Conditionally Accepted Research Report, *Academy of Management Discoveries*
Please do not quote or cite without authors' permission
December 2024

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ABSTRACT

We examine how organizational culture influenced firms' financial resilience during the COVID-19 pandemic. To investigate the relationship between culture, culture change, and financial resilience in the context of a widespread exogenous crisis, we will use qualitative data from millions of employee reviews on the Glassdoor platform and employ natural language processing (NLP) techniques to estimate over 1,000 firms' cultural profiles. We seek to provide insights on how six theoretically derived organizational culture dimensions—adaptive, collaborative, detail-oriented, integrity, results-oriented, and cultural tightness—influenced companies' financial resilience during the COVID-19 pandemic. Our findings will advance theory linking culture and culture change to financial resilience as well as explain how culture can buffer firms from the negative effects of exogenous shocks. We also anticipate generating practical insights on how firms can leverage culture to build resilience.

In the wake of the COVID-19 pandemic, companies and industries around the world faced enormous upheaval and vast organizational change (Altig et al., 2020; Baker et al., 2020). As a result of the pandemic, as well as past instances of disruptions emerging in the external environment, companies have faced significant earnings volatility, lower performance, and even extinction (Ding et al., 2021; Gregg et al., 2022). Moreover, employees have left their jobs and shareholders have held back on investing in public companies in response to massive shocks like the COVID-19 pandemic (Huang et al., 2018). Of course, industries are differentially affected by a particular crisis. For example, the COVID-19 pandemic as a public health emergency presented greater challenges for the restaurant and airline industries than for the high technology industry (Chebbi et al., 2021). Even within industries, firm performance significantly varies in response to exogenous shocks (Fu & Shen, 2020), raising questions about the organizational-level factors that enable firms to survive and recover from such shocks.

We examine how one factor, organizational culture, may have influenced firms' resilience when facing the COVID-19 pandemic. Since culture—key norms that influence what members expect and how they behave (Chatman & O'Reilly, 2016)—operates across an entire organization and influences a wide range of behaviors, it is likely integral to an organization's response to a significant shock. We focus on organizational resilience in the context of environmental disruptions and on how some organizations are able to adapt more effectively in response to adverse experiences (Caza et al., 2020; Raetze et al., 2022; Zolli & Healy, 2012). Specifically, we trace how U.S.-based firms grappled with pandemic-related volatility, and their resulting financial resilience. Our operationalization of resilience is outcome-focused (Ilseven & Puranam, 2021), measured using firms' financial performance data to quantify their growth, recovery, or loss—up to three years after the onset of the pandemic, and controlling for their

pre-COVID-19 financial performance. Researchers have used financial data to assess resilience in numerous studies that employ an outcome-oriented lens (Cheema-Fox et al., 2021; Nguyen et al., 2023; Palmi et al., 2018).

Existing theory lacks clear and cohesive insights regarding whether and which cultural dimension(s) support or impede firms when they face adverse and unexpected challenges (Brown et al., 2021). A meta-analysis focused on the link between culture and firm performance revealed that there are substantial inconsistencies across studies (Hartnell et al., 2011), and raised the concern that most studies employed an oversimplified or limited integration of organizational culture dimensions. In contrast, our study includes a comprehensive selection of well-established and validated cultural dimensions: Adaptive, collaborative, detail-oriented, integrity, results-oriented, and cultural tightness (Chatman et al., 2014; Gelfand et al., 2006).

We will not only analyze these culture dimensions individually, but we will also examine their impact when considered together, offering a more realistic representation an organization's cultural profile (e.g., O'Reilly et al., 1991). It is possible, for example, that certain cultural dimensions operate together in enhancing firm performance amidst volatile market conditions. For example, organizations that are simultaneously more adaptive, results-oriented, and detail-oriented may stand the best chance of maintaining financial resilience during an exogeneous crisis like the COVID-19 pandemic, which contributed to a vast array of concerns involving employee and customer health, remote work protocols, new technology adoptions, and so forth.

Moreover, while some theory suggests organizations adapt to address environmental pressures, prior studies have mainly treated organizational culture as static (Meyer, 1982; Schein, 2010). We measure firm culture both before the COVID-19 pandemic (T0) and the period

immediately following its disruptive onset (T1) to investigate how pandemic-driven changes in an organization's culture may have aided firms in maintaining strong financial performance. Thus, we examine three relationships between firm culture and financial resilience during the COVID-19 pandemic: (1) how individual cultural dimensions influenced firm financial resilience; (2) how combinations, or patterns, of cultural dimensions influenced firm financial resilience; and (3) how the environmental shock itself may have caused firm culture to change, and whether that cultural change influenced firms' financial resilience during a massive environmental shock. As discussed below, we also examine which factors may moderate these relationships and we consider data two years beyond T2 to explore the longer-term impact of the crisis.

We develop a novel natural language processing (NLP) approach to assess over 1,000 firms' cultures. We leveraged an online archive of company-level reviews from Glassdoor (www.glassdoor.com), a career intelligence platform that hosts employees' feedback and ratings. To our knowledge, no past study has attempted to test how firm culture—measured as individual cultural dimensions, as combinations of cultural dimensions, and changes in those dimensions during the study time frame—affects firm financial performance following a disruptive external shock, particularly with such a sizable and diverse sample of companies. The COVID-19 pandemic, as a historical event, provides a rare and unique opportunity to study a large sample of firms from every major business sector, all facing the same volatile environmental disruption within a shared window of time.

As companies continue to seek answers to questions about how to best manage a “post-COVID” workplace (Spicer, 2020), this study aims to help develop theory on how company culture serves as a critical strength or potential liability for firms responding to major

external pressures. The impact of specific cultural dimensions—and especially their interactive configurations and reactive changes—in affecting an organization’s financial resilience is not well understood (e.g., Chatman et al., 2014). Developing more insights about how organizations can foster better cultural solutions for combating unanticipated challenges is essential as businesses face additional threats including climate change, growing worldwide health risks, political unrest, and an increasingly competitive global market environment.

In the following sections, we begin by defining organizational culture and by discussing the known links between culture and organizational performance. We also review the potential influence of specific culture dimensions on organizational resilience as firms attempt to respond to major environmental shocks. Prior research has offered multiple competing possibilities, generating uncertainty about the role of these culture dimensions in fostering resilience. We also discuss why a multifaceted exploration of firm culture, which considers how organizational culture dimensions may operate together and change due to the pandemic, can yield novel insights on the culture-performance link. In the next section of this report, we provide a detailed description of our methodology and planned analyses. Finally, we conclude by discussing the potential for theory building about how culture influences the relationship between environmental volatility and firm performance.

Defining Organizational Culture

Organizational culture is “a system of shared values defining what is important, and norms defining appropriate attitudes and behaviors” (O’Reilly & Chatman, 1996, p.166). Although norms and values are closely related, norms specify the expected attitudes and behaviors, whereas values provide the rationale for these expectations (Parks & Guay, 2009). Organizational culture reflects the norms that act as a social control system in organizations

(Chatman & O'Reilly, 2016). Norms translate into observable behaviors and attitudes, which implies that informants can reliably report on and articulate norms (Caldwell et al. 2008). This contrasts with the difficulty of identifying the deeper and more ambiguous elements of culture such as underlying assumptions, beliefs, and cultural artifacts (Schein, 2010).

A primary reason that managers and researchers are interested in organizational culture is because they believe that culture influences organizational performance (Chatman & O'Reilly, 2016; Hartnell et al., 2011). The evidence relevant to this commonly held assumption, however, is surprisingly mixed (Gregory et al., 2009). Researchers have tried to confirm a link between culture and firm performance (Balthazard et al., 2006; Bezrukova et al., 2012; Hartnell et al., 2019). For example, Hartnell and colleagues (2011) conducted a meta-analysis of 84 studies to understand the relationship between culture and firm performance, which they found to be equivocal. Additionally, O'Reilly et al. (2014) identified 31 more studies that explicitly investigated culture and performance. A review of these papers revealed only nine studies that found associations between culture and firm financial performance outcomes. Several of these results were less compelling due to their small sample sizes. Culture was found to be consistently related to employee attitudes and more subjective assessments of firm performance (e.g., Bezrukova et al., 2012; Denison & Mishra, 1995), but the link between organizational culture and financial performance was less consistent.

Establishing a consistent link between culture and objective firm performance measures, specifically financial outcomes, has been difficult due to various conceptual and practical challenges. This includes disagreements about how to define and measure culture (Schneider et al., 2013). For example, several scholars of organizational culture (Chatman and O'Reilly, 2016; Hartnell et al., 2019) have concluded that the failure to reliably link culture to firm performance

is due to the conceptual blurriness of some of the more popular measures of culture such as the Denison Organizational Culture Survey (DOCS; Denison & Mishra, 1995) and the Competing Values Framework (OCAI; Cameron & Quinn, 2011) that also overlap with other constructs such as organizational effectiveness. Other taxonomies and measures of organizational culture have been critiqued for oversimplifying culture (Hartnell et al., 2011). A second problem pertains to methodological challenges, with studies applying small samples, failing to consider industry differences, or relying on measures that have not been validated for assessing firm culture (Chatman & O'Reilly, 2016; Detert et al., 2000). Thus, despite the widespread belief that culture and financial performance are closely related, empirical research has been less compelling.

It is possible that these mixed results could be attributed to narrow or static approaches taken by past researchers studying the impact of organizational culture on firm performance, as well as not accounting for contextual influences. Some researchers, for example, have identified potential contingencies between culture and firm strategy such as environmental turbulence (e.g., Sørensen; 2002). In this study, we assess whether emphasizing certain cultural norms, patterns of cultural dimensions, and changes in these dimensions can help sustain higher levels of firm performance amidst the COVID-19 crisis. We have also included several theoretically motivated moderators, including feasibility of remote work and COVID-19 risk perceptions, that may capture contingency effects between select organizational culture dimensions and firm performance.

Considering the Culture-Performance Link in the Context of an Exogenous Shock

The COVID-19 pandemic and firm resilience. In response to a significant crisis such as the COVID-19 pandemic, organizational and individual resources can be quickly depleted both financially and strategically. This depletion restricts an organization's capabilities and severely

threatens its survival (Duncan et al., 2011; Farjoun & Starbuck, 2007; Williams & Shepherd, 2016). Firms typically experience depletion in strategic resources, which are rare, valuable, and hard to imitate or substitute (Crook et al., 2008; Barney, 1991). These strategic resources could include expert or well-trained employees, customers and market share, reputation, patents, and unique knowledge (Barney & Arikan, 2005).

The loss of strategic resources can reduce corporate growth, production capacity, and firm distinctiveness. Indeed, recent research has shown that the COVID-19 pandemic has had an overall adverse impact on firms' net profit return rates (Shen et al., 2020), as well as their stock performance (Ding et al. 2021). Exogenous disasters can also strain human resources due to turnover and other abrupt changes in the labor market (Gittell et al., 2006; McFarland et al., 2020), and lead to reduced information sharing (Corbacioglu & Kapucu, 2006). At the individual-level, past research has found that such events lead employees to report lower job satisfaction and greater depletion of psychological resources. Vaziri and colleagues (2020), for example, found that employees were less satisfied and more likely to intend to leave their jobs when forced to work from home during the COVID-19 pandemic. Even though external shocks typically have a negative impact on companies and their employees, they can also present opportunities for some organizations, such as increasing their organizational learning capabilities (Maier et al., 2001).

Research has begun to provide some clues about the organizational factors that were characteristic of companies that fared well through the COVID-19 pandemic, in comparison to firms that did not. For example, in a study of over 11,000 Chinese firms, Shen and colleagues (2020) found that companies with lower sales revenue prior to the pandemic experienced greater financial losses. In another study of over 6,700 firms across 61 economies, Ding and colleagues

(2021) examined the connection between multiple corporate characteristics and better stock return outcomes following the pandemic. They found the overall drop in stock returns was lower among firms with stronger pre-pandemic finances (e.g., more cash flow and less debt), less exposure to the virus from being a more localized business; more past corporate social responsibility activities such as supporting social and environmental issues; and less “entrenched” executives, meaning firms with fewer policies protecting executives from being removed (e.g., anti-takeover devices, poison pills, supermajority amendments, or golden parachutes). Furthermore, stock returns among firms in which large stakes were held by families or governments experienced lower stock declines. In contrast, corporations with greater ownership by hedge funds or asset management companies performed worse in terms of their stock prices. No research to-date, however, has empirically examined how multiple well-defined culture dimensions, and the way they change, influence organizational resilience, particularly in the context of the COVID-19 pandemic.

Identifying cultural dimensions relevant to firms’ financial resilience. In reasoning through how culture affects firm performance following exogenous shocks, it is useful to focus on well-established cultural dimensions. The Organizational Culture Profile (OCP) assesses several key cultural dimensions that researchers have validated (e.g., Chatman et al., 2014; O’Reilly et al., 1991). In contrast to previous measures that have been criticized for oversimplifying organizational culture (Hartnell et al., 2019), the OCP presents a more comprehensive framework that encompasses a variety of categories pertaining to organizational culture (Chatman et al., 2014). By assessing a culture’s content and strength, the cultural dimensions defined by the OCP reflect the complexity, uniqueness, variety, and range of an organization’s set of norms (Chatman & O’Reilly, 2016). This framework has been refined and

validated by several researchers and has been shown to be generalizable across industries (e.g., Chatman & Jehn, 1995; Judge & Cable, 1997; Sarros et al., 2005).

We initially incorporated six previously validated OCP cultural dimensions for this study: Adaptive, collaborative, customer-oriented, detail-oriented, integrity, and results-oriented. Organizational cultures high in adaptiveness encourage flexibility, innovation, and experimentation. In collaborative organizational cultures, teamwork is greatly valued over autonomous efforts (e.g., Chatman & Barsade, 1995). Customer-oriented cultures place importance on providing quality customer service. A detail-oriented culture prizes accuracy and precision. Cultures of high integrity emphasize norms promoting honesty and fairness. Results-oriented cultures favor fast-action to achieve concrete short-term performance goals.

Alongside these six dimensions, we explored a seventh dimension, cultural tightness-looseness (TL), which we believe to be highly relevant to how firms respond to crises. Cultural tightness refers to the strength or degree to which norms are strongly held and strictly enforced within an organization (Gelfand et al., 2006). Research has shown, for example, that countries characterized by cultural tightness-looseness can be distinguished based on their response to significant national challenges (e.g., Gelfand et al., 2011).

Prior studies have raised the possibility that several OCP dimensions influence organizational effectiveness including financial performance, yet the results are mixed. For example, several studies have shown how companies with high cultural adaptiveness thrive under unfavorable conditions (Chatman et al., 2014; Williams et al., 2017; Friedman et al., 2016). Adaptation is often highlighted as a crucial indicator of organizational resilience (Välikangas, 2010; Pike et al., 2010; Vakilzadeh & Haase, 2021). Nevertheless, other studies have shown how firms that are extremely adaptable and flexible cultures are less likely to

develop a sustained structure or to reach collective alignment across their organization to address unexpected challenges (Hadida et al., 2015).

Likewise, businesses that are experiencing unexpected turmoil may benefit from having highly collaborative cultures (Power, 2018; Waugh & Streib, 2006). Strong relational ties are often associated with collaborative cultures and can help facilitate positive joint responses to a crisis. Collaborative cultures can support sudden switches in approaches, for example, when in-person teams need to suddenly work using virtual interfaces, as many businesses had to do during the pandemic (Wu et al., 2021). On the other hand, research has shown that among Himalayan expeditions, a context in which the risks are extreme, those that prioritized collaboration without considering the benefits of individualism in surfacing unique climbing expertise failed to accurately assess and rely on expertise, favoring equality regardless of expertise in making real-time decisions to turn back or take one route over another (Chatman et al., 2019). Consequently, expeditions in which climbers had varying levels of expertise and embraced norms for collaboration were more likely to experience climber death. This implies the possibility individual rather than collective judgment could have been more helpful for accommodating the consequences of COVID-19 at work.

Further, organizations high on integrity prior to the pandemic may have been in a better position to mitigate workplace uncertainty due to their histories of support and transparency. Nevertheless, a culture of integrity could be difficult to sustain as it may be harder to build trust among people and customers who are not co-located, especially as workplace trends continue to show more employers continuing to support remote work arrangements (Cascio et al., 2016).

Research has also examined the broader cultural dimension of tightness-looseness that has been studied at the national level and is relevant at the organizational level, especially in the

context of organizational response to crises (Gelfand et al., 2006). Cultural tightness refers to the strength or degree to which norms are strongly held and strictly enforced within an organization (Lee & Kramer, 2016), while cultural looseness is associated with a group that exhibits greater flexibility in behavior and openness to differences. A tighter culture tends to evolve in contexts where there are high levels of threat and there is more need for rules to help coordinate and increase survival. Following major crises, cultures typically increase in tightness by enforcing stricter rule abidance for the purposes of optimally addressing threats as a unified collective (Gelfand et al., 2021). Tighter cultures, therefore, are more likely to establish strong standards and practices when facing an exogenous shock that increases their chances of successfully weathering a threat. Indeed, recent research across 57 societies found that those with higher tightness had far fewer COVID-19 cases and deaths per capita (Gelfand et al., 2021). Relatedly, computational models have shown that cultures high in looseness took much longer to coordinate in the face of threats and had lower survival rates.

The question of whether cultural tightness can help organizations to be more financially resilient during the COVID-19 pandemic, however, remains untested. On the one hand, organizations with greater cultural tightness prior to the pandemic may have greater ability to coordinate faster and avoid financial decline (Gelfand et al., 2021). Culturally tighter organizations, much like tighter societies, may excel in situations that necessitate tight group coordination (Gelfand et al., 2006). Thus, companies already high on the tightness dimension may be better prepared to manage a sudden shock. On the other hand, these stricter standards may come at a cost. If tighter firms give employees insufficient leniency and flexibility to improvise and innovate, they may be unable to navigate such a fast-moving and unprecedented situation. Past research has shown how the tendency of groups to increase in tightness when they

are under duress can backfire when taken too far—perhaps reminiscent of a threat-rigidity response (Staw, Sandelands, & Dutton, 1981)—resulting in a lower capacity for agility and innovation than cultures with higher looseness (Farndale & Sanders, 2017; Harrington et al., 2015; Prokopowicz et al. 2021). Indeed, Gavrillets and colleagues (2024) found that very high levels of cultural tightness were maladaptive for societal groups experiencing environmental shocks. Therefore, the tightness dimension provides another lens in which to examine a firm’s economic resilience following a crisis, especially on the question of whether there are more benefits to providing employees with greater stringency or more license to bend the rules.

Research identifying some of the precursors to financial resilience following the COVID-19 pandemic hint at valuable insights but do not always directly examine possible cultural factors that may explain these relationships. For example, the research conducted by Ding and colleagues (2021) found that firms with high social responsibility activities prior to the pandemic were less negatively impacted in terms of stock returns. We may speculate, for example, that greater levels of social responsibility activities could reflect a firm culture high in integrity. Numerous studies of organizational resilience have more directly examined effective organizational cultures (Barasa et al., 2018; Koronis & Panis, 2018; Vakilzadeh & Haase, 2021). Some of these studies, however, appear to be more conceptually aligned with organizational climate in their specification of firm practices. Paunescu and Argatu (2020), for example, discuss cultivating a “culture” focused on resilience response planning. Labaka and colleagues (2016) also call for a “resilience-focused culture” that involves deploying resources toward employees to teach them adversity readiness and coping mechanisms.

Nevertheless, the organizational resilience literature identifies many useful and informative organizational predictors of resilience such as supporting creativity (Walker et al.,

2014), increasing transparency (Gover & Doxbury, 2018), greater collaboration (Barasa et al., 2018), and leadership that frames adverse events as learning opportunities (Sawalha, 2015). These predictors may not have been directly labeled as facets of culture, but they certainly exhibit conceptual overlap with the present study's select dimensions of organizational culture. For instance, firms that promote creativity and transparency would likely score high on cultural looseness (Prokopowicz et al. 2021). This conceptual overlap offers additional support for including the cultural variables we have selected for this study, and we aim to directly examine these potential cultural drivers using a broader and more diverse sample of organizations.

Cultural patterns and resilience. The present research will also explore the optimal *interplay* between culture dimensions as they facilitate or impede firm performance. Specifically, this study will investigate whether organizations that exhibit an optimal mix of different cultural attributes establish greater financial resilience in navigating the challenges posed by the COVID-19 pandemic. We apply a pattern approach (Bergman, 2000; Magnussion, 1995; Schneider, 2001) to delve deeper into the how the six cultural dimensions may operate together in affecting a firm's financial resilience. Most organizational culture research reports the independent effect of a single cultural dimension such as adaptability on firm performance (e.g., Chatman et al., 2014). Scholars have long theorized, however, that successful firms cultivate diverse capabilities, especially when managing competing interests like promoting both stability and readiness for change (O'Reilly & Tushman, 2008; Smith & Besharov, 2019; Smith & Lewis, 2011). As such, we will utilize cluster analysis to determine multiple sets of culture dimensions together at varying levels. This will allow us to identify, for example, if a culture profile expressed by moderate adaptability, high integrity, and low collaboration has a different impact

on financial resilience compared to a profile high on adaptability but low on integrity and collaboration.

Our objective is to examine the impact of different cultural configurations by initially drawing insights from studies about managing organizational polarity (O'Reilly & Tushman, 2008; Smith & Besharov, 2019). Notably, the organizational ambidexterity framework (March et al., 1991; O'Reilly & Tushman, 2008) focuses on the complexity that firms face in maintaining their competitive edge—by having to balance the competing goals of exploiting existing business practices and exploring future market innovations. Using this same logic, we suggest that organizations with moderately adaptive cultures as well as moderate cultural tightness could be more capable of effectively addressing post-pandemic demands, which pushed firms to offer flexibility to various constituents while imposing new structural demands (Prokopowicz et al., 2021). We will start with these theoretically derived possibilities in testing sets of cultural dimensions. Results from our application of this pattern approach, which entails the designation of multi-dimensional cultural profiles, has the potential to provide new perspectives and surprising insights about the interplay between various cultural dimensions that could, when examined together, account for higher firm resilience.

Cultural change and resilience. Firms experienced extensive changes during the COVID-19 pandemic and so we will also investigate organizational culture as a dynamic phenomenon. The prevailing functionalist view of culture posits that human groups, including organizations, develop cultures in response to shifting environmental demands (Gelfand et al., 2011; Kluckhohn & Strodtbeck, 1961; Schein, 2010). Groups proceed to devise complementary systems in the form of norms and other forms of coordination that serve as the bedrock to their evolving cultures. Most research, however, examines organizational culture as a static

characteristic, and neglects to empirically investigate this functionalist proposition that environmental jolts can prompt cultural readjustment (Meyer, 1982). COVID-19 certainly caused significant disruptions for organizations—displacement, the need for personnel to adapt to new technologies like video conferencing, and large shifts in market demands. The pandemic provides a rare chance to empirically test the underlying assumptions of the functionalist perspective: Does culture change following a seismic external shock, and if it does, what does optimal cultural change look like? Moreover, which changes across cultural dimensions are more likely to help versus harm organizations? One study suggests that the COVID-19 crisis caused firms to, at least temporarily but rather rapidly, reduce their focus on being results-oriented and increase their focus on being supportive to employees (Brown et al., 2021). We seek to systematically explore culture change, potentially coded as “responsiveness” by employees and customers, and its potential influence on firms’ financial resilience.

Moderating factors affecting the relationship between culture and resilience: Feasibility of remote work and risk perceptions. We will also examine two key COVID-19 related moderators that may affect the culture-financial resilience relationship. The first is the feasibility of remote work scores (Dingel & Neiman, 2020) that identifies the share of jobs within each 2-digit industry sector that are capable of being performed at home. This measure classifies occupations based on their ability to be performed entirely at home (Dingel & Neiman, 2020). To measure the feasibility of working at home, we used surveys from the Occupational Information Network (O*NET) to classify occupations based on their ability to be performed entirely at home (Dingel & Neiman, 2020). The reason this moderator is important is that, theoretically, being able to work from home gives organizations more flexibility to deal with the lockdowns that characterized this shock. That is, organizations with a higher proportion of jobs that could be

performed remotely had more flexibility in maintaining operations during lockdowns and social distancing measures. The effectiveness of remote work in preserving financial resilience however, likely depended on how well it aligned with or was supported by the organization's existing cultural dimensions. For example, we may expect that the positive relationship between an adaptive culture and financial resilience will be stronger for organizations with a higher proportion of jobs that can be performed at home. On the other hand, the relationship between a collaborative culture and financial resilience may be negatively impacted in organizations with a higher proportion of jobs that can be performed at home. That is, while collaboration is generally beneficial, extremely high levels of collaboration might be challenging to maintain in a remote setting.

We will also include a moderating variable for COVID-19 risk perceptions (Stephany et al., 2022), which offers a snapshot of how different sectors perceived COVID-19 as a business liability based on a textual analysis of negative sentiment in 10-K reports from firms' SEC filings. Risk perception is important in terms of how it interacts with culture. We assess risk perception through the CoRisk-Index using negative sentiment to measure how seriously companies viewed the risks associated with the COVID-19 pandemic. It is based on analyzing 10-K reports filed by U.S. companies to the Securities and Exchange Commission (SEC) (Stephany et al., 2022). Our view is that more negative language used in relation to COVID-19 indicates higher perceived risk from the pandemic felt by that company or industry. The risk perception index could serve as a proxy for the severity and immediacy of the challenges faced by different industries during the pandemic. Industries with higher risk perception scores likely faced more immediate and severe disruptions, which could amplify the effects of certain cultural dimensions (like adaptiveness, integrity) while potentially diminishing the benefits of others (like

detail-orientation). Likewise, high risk may amplify the benefit of tightness given that extreme threat requires a lot of coordination.

The more negative language used in relation to COVID-19 indicates higher perceived risk from the pandemic felt by that company or industry. Accordingly, the risk perception index could serve as a proxy for the severity and immediacy of the challenges faced by different industries during the pandemic. Industries with higher risk perception scores likely faced more immediate and severe disruptions, which could amplify the effects of certain cultural dimensions (like adaptiveness and integrity) while potentially diminishing the benefits of others (like detail-orientation). Likewise, high risk may boost the benefit of tightness given that extreme threat requires a lot of coordination. Indeed, Gavrillets and colleagues (2024) found that moderate levels of cultural tightness were strategically adaptive for societal groups experiencing fast and severe environmental shocks, but not for those experiencing mild shocks. Considering COVID-19 risk perceptions varied across sectors, this moderation analysis may offer additional nuanced understanding of how different cultural dimensions may benefit firm outcomes, only at specific levels of identified threat to a business.

The present study aims to resolve unknowns and tensions regarding the relationship between culture and firm performance, and specifically, how firm culture influences firms' response to a major exogenous shock. In conducting this study, we hope to develop a theory of how organizational culture dimensions individually, in combination, and dynamically, translate into meaningful performance benefits or losses for firms.

METHOD

Data and Sample

To assess and measure firm culture, we leveraged almost two million employee reviews from Glassdoor's website. In past studies, firm-level assessments provided by employees on Glassdoor have been linked to consequential organizational outcomes, from stock performance (Green et al., 2019), to a company's likelihood of committing financial fraud (Ji, Rozenbaum, & Welch, 2017). Researchers have inferred nuances in the cultural differences that exist across firms by using Glassdoor's open-ended responses from employees on the pros and cons of their workplaces (Corritore et al., 2020; Sull et al., 2019).

We develop a new set of computationally derived linguistic dictionaries to assess firm culture specifically for each of the seven culture dimensions identified above. These indices will enable us to understand both baseline levels and changes in these cultural dimensions derived from employee reviews from the period before the COVID-19 pandemic occurred (January 2019) to when it was a significantly lower threat (June 2021). To test the culture-performance link, we plan to examine how culture relates to a set of standard financial performance indicators including return on investment (ROI), return on assets (ROA), and Tobin's Q. Since there are a variety of factors affecting firm performance, we will isolate the effect of culture on firm performance by controlling for firm size and industry sector.

We restricted our original sample of Glassdoor reviews to those written between January of 2019, before the COVID-19 pandemic occurred, and June of 2021, the time following the start of the pandemic after vaccines became available. We consider the beginning of the pandemic to be the time period when most U.S. states and the federal government announced shelter-in-place and physical distancing orders - around March 2020 - the timeframe in which the pandemic had a

significant impact on companies. We also focused on publicly traded firms headquartered in the U.S. using Compustat to collate our financial outcomes data. We identified and collected reviews from Glassdoor queries that prompted employees to describe the “pros” and “cons” of the company in which they work. Glassdoor defines pros as, “Share some things this company is doing well,” and cons as “Share some things this company could do better.” To increase the reliability of our firm-level cultural assessments, we excluded companies that had fewer than 50 reviews per year—a standard used in past research that also utilized Glassdoor comments for measuring firm culture (Corritore et al., 2020). Our final dataset from Glassdoor approximated 1.8 million employee reviews and a sample of 1,068 publicly listed firms.

Measures

Firm culture dimensions. We quantified firms’ cultural profiles from Glassdoor reviews by developing linguistic dictionaries for our initial set of seven cultural dimensions (adaptive, collaborative, detail-oriented, integrity, results-oriented, customer-oriented, and culturally tight). We first preprocessed Glassdoor reviews by combining the open-ended employee reviews and removing stopwords (e.g., “a” “the” “is”), as well as lemmatizing and lowercasing all words. Next, we applied a word embedding method (WEM), to capture the semantic similarity of words. Specifically, we relied on Global Word Vectors for Word Representation (GloVe) from the “gensim” package in Python (Pennington et al., 2014). GloVe is an unsupervised word embedding algorithm pre-trained on Wikipedia and Gigaword 5 text entries that have vectorized and charted the relationships between billions of words. Therefore, GloVe offers a comprehensive and appropriate mapping of semantic relationships found between most commonly used English words. This WEM configures words as coordinates that are closer together in its mapped multi-dimensional mapping when they share more semantic similarity.

For example, “king” is semantically similar and shares a closer distance to “man” compared to the word, “woman.” This produces a higher cosine similarity score (CSS) between “king” and “man” than between “king” and “woman.” This approach has been used to develop dictionaries that predict societal trends (Choi et al., 2022; Jackson et al., 2019).

To account for our data’s Glassdoor-specific communications context, we took the extra step of fine-tuning GloVe’s pre-trained model with additional data that is more germane to our sample of texts. This involved further training the pre-trained word vectors with texts from a set of randomly selected out-of-sample Glassdoor reviews. This leverages the linguistic knowledge of the WEM, allowing adjustments that are more specialized to Glassdoor’s unique conversational elements. By doing this, we can account for the linguistic nuances that are present in Glassdoor reviews, including novel terminology and common typos employees may use to express themselves on this platform.

Next, we applied the fine-tuned algorithm to build and expand upon our dictionaries for adaptive, collaborative, detail-oriented, integrity, results-oriented, customer-oriented, and cultural tightness. We obtained a list of terms from subject matter experts that closely relate to each dimension, i.e., our “seed words” (see Table 1 for a sample of seed terms per dimension), which became the starting point for identifying additional terms to build out our linguistic indices. Then, we obtained the top 50 words from the fine-tuned algorithm described above with the highest CSS from each seed word for each cultural dimension. Once we generated a comprehensive list of terms for each cultural dimension, the four authors independently labeled terms that were either antonyms or lacked face-valid semantic relevance to each corresponding cultural dimension. The authors came to full agreement on the finalized list of terms that constitute the linguistic indices for all cultural dimensions of interest (see Table 2).

After establishing these dictionaries, we next calculated the percentage of texts among the Glassdoor reviews that contained linguistic signatures of each cultural dimension (Tausczik & Pennebaker, 2010). From the results of this scoring process, the customer-orientation dimension was excluded from our set of cultural predictors due to the limited presence of related keywords that appeared in our sample of Glassdoor reviews.¹ Next, we aggregated the linguistic scores from the individual employee reviews and calculated the average detection of each cultural dimension across employee reviews at the firm-level. We performed this firm-level aggregation at quarterly and annual chunks of time from year 2019 to year 2021. This select temporal period is representative of the periods right before, during, and right after the start of the COVID-19 pandemic and enables us to examine changes in these dimensions over time. Following this step, we merged the firm-level culture data with the corresponding company's financial performance data (see Table 3 for descriptive statistics on the final cultural predictors at the firm-level).

Firm performance. As a widely accepted metric for assessing profitability and firm efficiency, ROA represents a firm's capacity to capitalize on its current assets. By analyzing a firm's net income in proportion to its total assets, ROA provides insights into a company's operational efficiency. ROI assesses the success of an enterprise's investment decisions by evaluating its profit or loss ratio in relation to their incurred expenditures. Tobin's Q has been commonly used as an indicator of a firm's intangible assets and capabilities, revealing valuable insights about a company's future growth prospects (e.g., Bharadwaj, Bharadwaj, and Konsynski, 1999). Tobin's Q measures the market value versus the book value of a firm and is highly correlated with firm creativity and innovation efforts (Kogan et al., 2017). Additionally,

¹Less than half the Glassdoor employee reviews in our sample contained search terms from the customer-oriented dictionary. This suggests that it was not a prevalent theme among our sample of Glassdoor reviews. Therefore, we excluded this cultural dimension to avoid skewed results. Removing this dictionary did not change our sample size.

we will compute a secondary set of these financial outcomes that represents their “relative resilience” (Ilseven & Puranam, 2021), by estimating each firm’s financial outcomes in proportion to their group mean, i.e., their industry average. This enables us to view how a firm may have demonstrated more or less financial resilience, compared to their industry peers, who likely encountered similar pandemic-related difficulties specific to the industry. Table 4 provides descriptive statistics on these select financial outcomes variables.

Control variables. To accurately assess the role of culture on firm performance, we will control for a variety of potentially confounding factors. To control for firm size, we will use the logged value of company sales, as firm size can affect marginal gains in fiscal performance with larger organizations having greater access to more resources and diverse revenue streams. We will incorporate the specific sector of a firm as a fixed effect in our models since patterns of change in company performance over time are subject to unique industry differences and demands. Industry differences are especially important to isolate, considering the pandemic’s widely varying effect on different economies (Ding et al., 2021). For example, some industries saw increased demand (e.g., health care firms), while others saw decreased demand (e.g., airlines) during the pandemic based on their business focus. We will also control for firm’s headquarter state, collected from Compustat, because of the variations in local government regulations and in COVID-19’s varying impact across states. Furthermore, we will add a firm’s pre-pandemic financial performance as a constant to account for between-firm financial differences prior to the pandemic in our OLS models predicting financial performance. Prior firm finances have been found to be linearly related to future financial outcomes (Shen et al., 2020). As such, we will control for each firm’s pre-pandemic financial baseline, enabling us to isolate the effect of the cultural predictors on future firm performance outcomes. Finally, we will control

for characteristics of the sampled reviews per firm, including the number of reviews per firm, the average length of reviews per firm, and the average level of positive and negative sentiment exhibited in each firm's set of reviews. We include this latter control variable to isolate our assessment of firm culture more accurately from the overall affective attitude that may be present within the feedback left by employees.

Moderator variables. Additionally, as noted above, we include two moderating variables in our planned analyses. The first is the feasibility of remote work score (Dingel & Neiman, 2020) that is matched to our data based on each firm's industry categorizations. The measure identifies the share of jobs within each 2-digit industry sector that is capable of being performed at home. The measures are constructed through classifying over 1000 occupations in terms of whether the job can be performed remotely and are aggregated at industry sector (2 digit) level. In addition, we also will include the moderating variable for COVID-19 risk perceptions (Stephany et al., 2022) that is divided into sector-based differences. This measure offers an index score of how different sectors perceived COVID-19 as a business liability based on a textual analysis of 10-K reports from firms' SEC filings in 2020.

ANALYSIS PLAN

We will test the link between company culture and financial resilience following the disruptions caused by the COVID-19 pandemic. Our analyses will focus on: (1) how individual cultural dimensions influenced firm financial resilience; (2) how combinations, or patterns, of cultural dimensions influenced firm financial resilience; and (3) how the environmental shock itself may have caused firm culture to change, and whether that cultural change influenced firms' financial resilience during a massive environmental shock. We will also examine how two moderators (risk perceptions and feasibility of remote work) affect these relationships.

How individual cultural dimensions influenced firm financial resilience. We will first focus on the relationship between the variation in firms' cultural profiles and firm performance both before and after the start of the pandemic. We have timestamped the start of the pandemic in the U.S. as March 2020. Therefore, our firm-level variables representing pre-pandemic baselines will be based on aggregated data from prior to COVID-19, 2019 (T0). Variables that are measured during the pandemic's onset will be from the year 2020 (T1). We will use financial performance data from the year 2021 (T2), which represents the time period immediately following the start of the pandemic in 2020 when vaccines became available, and the crisis began to abate. Lastly, as an additional exploratory analyses, we will measure firms' performance outcomes in 2022 and 2023 (T3) to examine how organizational culture affects firm performance in the longer term as the COVID-19 pandemic further receded. We will use the standard set of financial metrics to operationalize firm performance that we described in the Methods section above.

For our empirical analysis, we will first rely on OLS models with industry fixed effects to investigate how each of the six cultural dimensions at T0 (pre-pandemic) predicts firm performance at T2 (and T3). Next, we will examine the squared coefficient for each of the six cultural dimensions to consider curvilinear effects, specifically, whether extremely high or extremely low levels of each dimension have an additional effect on firm performance at T2.

How combinations, or patterns, of cultural dimensions influenced firm financial resilience. Next, departing from a variable-focused analysis strategy, we will proceed to a pattern approach (Magnusson & Torestad, 1993) that considers the interplay and integration of these cultural dimensions. For these analyses, we aim to discern how configurations of the cultural dimension variables may impact firm performance. Utilizing tertile analysis based on the

standard deviation of each cultural variable of interest, we will categorize firms into distinct categorical levels and mix of cultural profiles. These profiles may include high scores across all variables, or a mixed pattern characterized by variations in individual dimension scores. Subsequently, these pattern assignments will be assessed in a mixed-effects model to predict firms' financial performance. By integrating a pattern-based approach with traditional variable-focused analyses, this study aims to provide a comprehensive understanding of how cultural dimensions in concert with one another influence T2 (and T3) firm performance outcomes.

How the environmental shock itself may have caused firm culture to change, and whether that cultural change influenced firms' financial resilience during a massive environmental shock. Finally, we plan to estimate any changes that may have occurred in company culture from T0 to T1 to address the changing workplace environment as firms adjusted their policies and procedures in response to the pandemic. After calculating this difference in culture between the two time points, we will analyze how these shifts in the six cultural dimensions may predict firm outcomes at T2 (our change-in-culture models). For example, for the cultural tightness-looseness measure, positive values would indicate an increase in cultural tightness post-pandemic, while negative values would suggest that firm cultures are becoming more relaxed and looser. All models will include the control variables we describe above. As part of our analysis of between-firm cultural variance on T2 performance, we will be controlling for firm financial performance at T0 to account for the change that occurred from the pre- to post-pandemic periods.

Additional analyses. For our moderation analysis, we will incorporate the COVID-19 risk perceptions (Stephany et al., 2022) and the feasibility of remote work (Dingel & Neiman, 2020)

measures. The former will be applied toward our change-in-culture models and the latter will be applied toward further assessments of the relationship between organizational culture at T0 and firm performance at T2. These analyses have the potential to offer insightful discoveries such as whether remote work potentially moderates the relationship between certain culture dimensions and firms' financial performance.

We also plan to examine how employees' attitudes about their firm will mediate the connection between firm culture and performance. Employee's attitudes will be measured using their overall ratings of a given firm on Glassdoor. This set of analyses will focus on the changes in workers' firm attitudes (from T0 to T1) as a mediating variable in the relationship between changes in organizational culture (from T0 to T1) and firm performance (T2), controlling for employee attitudes in T0. Here we explore how fluctuations on specific cultural dimensions contribute to either enhanced or diminished workplace satisfaction as reported by employees, as well as its repercussions on firm performance outcomes.

Finally, we will apply Coarsened Exact Matching (CEM) to address endogeneity concerns and move closer to causal identification (Iacus et al., 2012). CEM allows us to match firms that are similar on other dimensions, such as size and industry, but differ on culture to test the relationship between organizational culture and financial performance during the COVID-19 pandemic. Past work on organizational culture has used CEM to get closer to estimating causal interpretations by correcting for possible selection bias (e.g. Corritore et al., 2020). To do this, we will match firms by sector, and coarsely, on firm size and number of reviews. This matching strategy effectively removes statistically significant differences in observed covariates among our available observed data across per outcome variable (firm financial performance). In the absence of being able to make direct cause-and-effect claims, CEM helps us to better understand

how much variance in firm performance can be attributed to differences in the cultural dimensions.

DISCUSSION

The primary objective of this study is to build theory that connects culture to firm financial performance by investigating the specific cultural facets that enabled some companies to effectively navigate the COVID-19 pandemic, an unprecedented global crisis, with less decline, or even increases, in their financial performance. Our study will also contribute to the growing body of research seeking to understand the impact of COVID-19 on the economy and how to build greater capacity for organizational resilience through firm culture. Further, this study will examine how emerging changes in workplace cultures, triggered by the shock from the COVID-19 pandemic, influenced firm performance. The pandemic adversely impacted most companies as well as entire industries worldwide, but the financial impact on firms has been surprisingly varied. As financial markets experienced overall decline, certain firms remained profitable or successfully bounced back within the following year. Even within sectors, there was variance among firms in their capacity to maintain financial resilience (e.g., Ding et al., 2021).

Our proposed research investigates the role of organizational culture as a possible factor affecting a company's financial resilience amidst this crisis, with the goal of theory-building and understanding the culture-performance relationship. By leveraging linguistic data derived from millions of employee reviews and utilizing NLP techniques, we will estimate the organizational cultures of over 1,000 publicly traded firms and examine how they predict financial performance during the pandemic. Thus, from a methodological standpoint, this study may also contribute to a useful set of dictionaries for assessing culture from natural language in a variety of digital data sources beyond Glassdoor (e.g., email, Slack).

This research will identify novel discoveries that will expand organizational culture and resilience theories in several ways. First, by analyzing a large volume of employee reviews, the study offers insights into variation in firm cultural dimensions from a larger sample across major economic sectors. This approach goes beyond previous studies that had limited sample sizes and relied on self-reported measures of culture to predict organizational outcomes. We have also constructed specific cultural dimensions that can explain the distinct variance of multiple individual cultural elements on firm financial outcomes—an objective measure of firm performance. Additionally, by comparing pre-pandemic cultural profiles with post-pandemic profiles, we will discover how cultural change affects financial resilience. This analysis will contribute to our understanding of the dynamic nature of organizational culture and its effects on firm performance during environmental disruptions. We will also employ a pattern approach to our treatment of culture's association with firm performance, which may provide more nuanced and in-depth understanding of the mixed cultural configurations that could also potentially reinforce organizational resilience. Finally, this study captures the effect of organizational culture using multiple cultural dimensions and analytical approaches to capitalize on a unique period of widespread environmental volatility, allowing this study to understand culture's role under extreme conditions of uncertainty, change, and threat.

Study Limitations

Despite these potential contributions, the proposed study has limitations. First, the COVID-19 pandemic has a number of idiosyncrasies that preclude generalization to other exogenous shocks. Our results could be generalized to shocks that are acute, unprecedented in scope, require physical distancing, and are (mostly) resolved after a few years. Other types of exogenous shocks such as climate change, may favor different types of cultures. Climate

change, which like COVID-19 has also reached an acute level and has risks that those affected do not agree about, is still different in that it is prolonged and apparently slower moving. Importantly, climate change, to this point at least, has not disrupted people's ability to work together in an office. In the longer run, however, climate change is likely to vastly change where people are able to live comfortably, altering labor markets. It has already made employees susceptible to disruptions in their work resulting from wildfires in residential areas and heat events and pollution that cause health effects. Organizational cultures that have greater flexibility in work modes could be better positioned to weather (no pun intended) such events.

Another type of limitation stems from our level of analysis. In focusing on the organizational level of analysis, we are not focusing on the individual, industry, or national levels, which may both interact with organizational cultures and also directly influence performance outcomes. Consider the industry level of analysis and the issue of demand vs supply, which might interact with culture to affect performance. On-site dining establishments and outside entertainment (e.g., theaters) suffered demand challenges while the automobile industry and health care were challenged with supply-chain issues that could have affected its financial outcomes. We partially account for these types of alternative explanations by controlling for industry, but researchers might continue to examine how these issues create potential alternative explanations for lower financial performance or profitability.

Some of our measures could usefully be validated with additional measures in future research. For example, the descriptions of COVID-19 risk in the 10-K reports that we used to represent resilience may be more about managing investor perceptions and explaining away poor performance (e.g., Salancik & Meindl, 1984) rather than a resilient response. The measure suggests that industries varied in their reported negative attitude toward COVID-19 over time.

Additionally, using Glassdoor data, while advantageous in terms of collecting large samples from many firms and avoiding demand effects since it is unobtrusive, introduces other challenges. First, Glassdoor responses are not explicitly focused on organizational culture, raising potential construct validity concerns (Chatman & O'Reilly, 2016). Second, there may be significant selection bias in that only those employees who have a strong view of the culture – positive or negative – may take the additional step of voluntarily posting their view of the organization on the platform (e.g., Corritore et al., 2020). We tried to mitigate these issues by using an existing culture content framework. Nonetheless, future research should seek to find other ways to cross validate the culture data we collected.

Contributions

The potential theoretical contributions of this study lie in expanding our knowledge of organizational culture and its significance in the context of adverse events such as the COVID-19 pandemic, as well as resolving the equivocal relationship between organizational culture and firm resilience. By identifying specific cultural dimensions associated with financial resilience, our findings may help to identify the mechanisms through which culture influences organizational outcomes during challenging circumstances. From a practical perspective, our findings can potentially offer valuable guidance for firms and practitioners aiming to enhance their readiness to face crises. Identifying cultural dimensions that promote financial resilience can help organizations to develop and foster the culture needed to navigate through future crises effectively. Understanding the importance and function of various cultural dimensions can inform strategic decision-making and interventions aimed at promoting organizational financial resilience.

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Table 1. Sample Seed Words for the Final Cultural Dimensions

Cultural Dimension			
<i>Adaptive</i>	innovate	experiment	adapt
	risk	fast	move
<i>Collaborative</i>	collaborate	team	supportive
	collaboration	support	cooperative
<i>Detail-Oriented</i>	precision	quality	attentive
	precise	attention	detail
<i>Integrity</i>	integrity	ethical	respectful
	honest	standard	fair
<i>Looseness</i>	allow	openness	personalize
	flexibility	leeway	variability
<i>Results-Oriented</i>	direct	expectation	achievement
	driven	performance	aggressive
<i>Tightness</i>	restrain	enforce	govern
	comply	uniformity	forbid

Table 2. Sample Output for Final Linguistic Indices

Cultural Dimension			
<i>Adaptive</i>	evolve	modernize	revive
	transform	potential	agility
	reinvent	chance	outofbox
<i>Collaborative</i>	connect	welcoming	cooperate
	communicate	closeknit	relatable
	collegial	sociable	teambased
<i>Detail-Oriented</i>	indepth	pinpoint	meticulous
	exhaustive	accurate	checklist
	stepbystep	precision	intricate
<i>Integrity</i>	impartiality	regard	fairness
	principled	dignity	respecting
	honesty	decency	trust
<i>Looseness</i>	able	everchanging	encourage
	autonomy	inclusivity	allowed
	disruptive	embrace	foster
<i>Results-Oriented</i>	motivated	resourceful	goal
	pushy	forceful	demand
	hardworking	aggression	quota
<i>Tightness</i>	upholding	imposing	heed
	follow	adhere	clarity
	insulate	determine	control

Table 3. Descriptive Statistics for Final Firm-Level Culture Measures

Cultural Dimension	N	Mean	SD	Min	Max
<i>Adaptive</i>	1016	6.46	1.11	2.15	11.46
<i>Collaborative</i>	1016	5.1	0.9	1.35	8.7
<i>Detail-Oriented</i>	963	2.95	1.44	0.24	10.27
<i>Integrity</i>	1015	4.09	1.03	1.14	8.7
<i>Results-Oriented</i>	1016	3.99	0.98	0.88	7.73
<i>Tightness</i>	992	2.76	1.29	0.19	8.6

Table 4. Annual Firm-Level Averages for Financial Outcome Variables

<u>Fiscal Year</u>	<u>ROA</u>	<u>ROI</u>	<u>Tobin's Q</u>
<i>2019</i>	0.03	0.2	2.34
<i>2020</i>	0.017	-0.004	2.64
<i>2021</i>	0.051	0.094	2.75
<i>2022</i>	0.035	0.074	2.10
<i>2023</i>	0.024	0.074	2.31
<i>2019-2023</i>	0.031	0.088	2.43